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OHS Literature Summary PROHS.010

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MEAT & LIVESTOCK AUSTRALIA

Contents

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1. Introduction.

In 2000 the Australian Meat Processing Corporation (AMPC) and Meat and Livestock Australia (MLA) commissioned the development of an updated Occupational Health and Safety (OHS) Reference Guide to consolidate all OHS research that had been carried out to date in the Australian Red Meat Industry.

The Reference Guide project involves three main tasks:

- review and update the National Guidelines for Health and Safety in the Meat Industry
- review all relevant OHS research in the meat industry
- consult extensively with the Australian red meat industry.

The Workplace Safety Management Division of WorkCover Corporation SA was contracted by the MLA to implement the project. Janice Quarrie, Senior Industry OHS Consultant, managed the project with technical assistance from Nerina Zakarias, Business Development Consultant.

This collection of literature summaries acts as both a review and summary of past research and as a coherent framework for the new Reference Guide for OHS in the Australian Red Meat Industry. The Reference Guide will include all relevant OHS research that has been carried out in the last five years, as well as some selected pieces of research carried out prior to 1995.

This document also includes information derived from searches of relevant OHS databases and Internet resources.

2 National Guidelines for Health and Safety in the Meat Industry.

The Australasian Meat Industry Employees Union (AMIEU) and the Meat and Allied Trades Federation of Australia [MATFA, now the National Meat Association, (NMA)] developed the National Guidelines for Health and Safety in the Meat Industry in 1995 as the primary OHS resource for the Australian red meat industry.

Part One

The introductory section of the Guidelines covers generic occupational health and safety management systems matters and legislative matters. The Guidelines were developed by agreement between employee and employer representatives, and it is stated that where other standards are silent, may be considered as the industry standard.

The scope is outlined as applying to abattoirs, meatworks and slaughterhouses; smallgoods manufacturers; rendering and tallow manufacturers; freezing and cold storage works; casing manufacturers; retail meat outlets; and knackeries and pet food works.

Duties and responsibilities are briefly discussed and the definitions section explains a number of concepts including the legal meaning of the word “practicable”.

The health and safety systems area is comprehensive, describing among other issues the role of a health and safety committee and outlining a health and safety program.

Part Two - Risk Identification, Assessment and Control Framework.

The section on risk identification and risk assessment outlines the established methods succinctly, with the important note that all too often in the management of hazards, risk assessment is bypassed. Examples that are relevant to the meat industry are given and appendices are included outlining generic manual handling hazard management models.

Risk Control & Training

This section advocates a hazard management model based on manual handling, with examples outlined for the application of the hierarchy of control that are relevant to the meat industry, including the reduction of noise in smallgoods production. General training information is provided in the training section.

Part Three - Common Hazards

Manual Handling and Occupational Overuse

This chapter is based on the *National Standard For Manual Handling* [NOHSC:1001 (1990)] which is still current. This standard is not law until it is adopted as a Regulation in a State or a Territory. In most cases the States and Territories have adopted the National Standard as their Regulations while the *National Code Of Practice For Manual Handling* (1990) and the *National Code Of Practice For The Prevention Of Occupational Overuse Syndrome* (1994) have been adopted as State Codes of Practice.

The practical examples in manual handling in the Guidelines offer a snapshot of universal problems throughout the meat industry and the information supplied is valuable and industry specific. The

graphics are sourced from the West Australian Manual Handling Guide (summarised as 5.2 in this collection of summaries) and include practical risk identification methods and controls for handling the removal of beef heads, beef and mutton legging, mutton changeover, table boning and slicing, packing, handling materials in tubs and barrows, and load out and delivery.

Slips, Trips and Falls

Slips, trips and falls are significant hazards in the meat industry. Design issues are covered, including floor and work platforms, lighting and systems of work. A link between slips, trips and falls and manual handling is established, encouraging the risk identification, assessment and control process in tandem with assessing the same in manual handling tasks. Issues such as floor degradation or slip characteristics are covered and a number of control suggestions that follow the hierarchy of controls are made.

Physical Injuries from Animals

This section includes comment on the transport and receipt of animals, the slaughter process and on escaped animals. It also briefly touches on hazards relating to contact with live animals before the process of slaughter.

Occupational Diseases

Zoonotic diseases are covered in this area (Q Fever, leptospirosis, brucellosis) with risk factors and controls suggested. A section on infectious diseases mentions the minimal risk of HIV and the possibility of Hepatitis B and the risk of dermatitis and inflammatory skin disorders is also covered.

Hazardous Substances

The *National Hazardous Substances Regulatory Package* forms the basis of this section, with the *National Model Regulations and Code of Practice* also referenced. Mention is made in this section that AQIS approval does not imply that the use of these compounds is without risk to health and safety. Risk identification, assessment and control follow the same themes as outlined elsewhere in the Guidelines, and factual and legislative advice is offered. Examples that are specific to the meat industry are cited. The Guidelines state that employers should ensure that all substances, not just hazardous substances, are identified then listed within a central register.

Environmental Hazards

General advice is provided in this section in terms of identifying, assessing and controlling hazards related to cold and hot environments.

Plant, Equipment and Tools

This section is based on the *National Standard for Plant* [NOHSC: 1010 (1994)] and makes the point that the Standard loosely covers all machinery, tools, appliance and equipment in the workplace, including knives, carcass saws, automatic wrapping machines, boilers and forklifts. It is emphasised that one piece of plant may have numerous hazards associated with its operation, i.e. manual handling, respiratory, noise, trip and electrical hazards. A model checklist for plant is provided in appendix 7 of the Guidelines. Also contained within this section are several examples of problems with tools and possible risk factors and control ideas, including knives, augers, bandsaws, forklift trucks, and hot water hoses.

Maintenance

Helpful information is provided in this section on developing a maintenance program with suggestions made on control options for hazards related to maintenance. This area advocates that employers should develop a program specifying a schedule for the maintenance of all equipment and workstations.

Noise

This section opens with a general discussion on the causes of noise induced hearing loss. The *National Standard for Occupational Noise* [NOHSC: 1007 (1993)] is referenced with it's recommended exposure standard of 85 dB(A). Sources of excessive noise are suggested and as in other areas responsibilities are outlined for employers and employees, design options are noted briefly, and risk identification, risk assessment, and risk control options are outlined. A short section on training outlines relevant requirements and audiometric testing is covered briefly.

Confined Spaces

This section provides examples relevant to the meat industry and also outlines confined space safe working practices in the risk identification section. The concepts of confined space entry permits and authorised persons are introduced, as well as the need for a standby person to maintain communication outside the confined space. Communication options such as voice radio, hand signals and rope signals are mentioned. In addition appendix 9 provides a model confined space entry permit.

Part Four - Personal Protective Equipment And Clothing

This section describes personal protective equipment as a control measure that should only be used when all other hazard control options have been exhausted. Where the use of personal protective equipment is required, it is noted that one proprietary item will not necessarily suit all workers with respect to comfort and acceptability. Examples are given in the specific equipment area particularly with regard to abdominal protection, hand protection and head protection.

Part Five - Emergency Programs And First Aid

This section advocates that employers in the meat industry should develop emergency procedures to cover all possible sources of emergency. They include such internal issues as fire, explosion, power failure, equipment failure, gas leakage, and escaping animals. External occurrences that should be covered include storms and floods and sabotage. Evacuation plans and emergency crews are advocated. The issue of training is covered. First-aid is briefly covered, with the general advice that employers should consult their State or Territory regulations which prescribe a minimum standard regarding first-aid.

Appendices

A number of appendices are offered, largely consisting of model checklists.

Copies of the *National Guidelines for Health and Safety in the Meat Industr*y can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

3 Health and Safety Management Systems.

3.1 Towards OHS Best Practice in the Australian Meat Industry.

This package consists of a well-researched introductory report, a set of nine case studies of best practice in the meat industry supported by a video on best practice principles in OHS and an evaluation report. The original project was commissioned in 1993 by the Meat Research Corporation (MRC, the predecessor to MLA), with the evaluation report being completed in November 1996.

Background

The meat industry is Australia's third largest export industry, earning more than $4 billion per annum. Total turnover is over $6 billion when taking into account both the domestic and export segments of the industry. The Industry Commission Inquiry of 1994 noted that labour costs were a major impediment to the competitiveness of the meat industry. Initially the industry turned to technology to reduce labour requirements, then awareness developed that human resources needed attention to improve the industry (the Working Related Issues Key Program of the MRC). The industry's approach to OHS was reactive, and the expectation was that employees would be unable to continue after their mid-40s in the industry. Injured workers were seen as being readily replaceable with other more able-bodied employees. The Meat Research Corporation was charged to provide research to contribute to the sustainability of the industry. The OHS Best Practice Project was supported by not only the MRC, but also the National Meat Association (NMA), and the Australasian Meat Industry Employees Union (AMIEU). This project marked the first time that the union became actively involved in an MRC program.

The OHS Best Practice Project set out to tackle the problem of poor performance in OHS which was perceived to be contributing to both high labour costs and placing major constraints on the meat industry's capacity to innovate. The project had four objectives: to develop models of best practice in OHS at the enterprise level; to reduce the financial and social costs related to injuries and illnesses in the meat industry; to develop key performance indicators in OHS to assist in future benchmarking; and to establish a framework for broad workplace reform in the meat industry. Seven principles of OHS best practice were identified and cross referenced from the National Occupational Health and Safety (NOHSC) Best Practice model: management commitment, employee participation, comprehensive integrated OHS management systems, training, communication, innovative risk management, and the development of process performance indicators.

The report describes Best Practice as a process that focuses on the culture of a workplace i.e. how a workplace undertakes it's activities, rather than what it does.

Forty plants, including small, medium and large plants, both domestic and export, were involved in the project from all over Australia and were supported by funding from the MRC.

Within the four parameters of: systems, people involvement, politics, and stories and beliefs, organisations that participated were assessed on the results before best practice and after best practice. Of note were several positive and encouraging results, including the changing belief from the industry being a burnout industry to a belief that injury and disease can and should be prevented. The principles of best practice were also judged before and after and again positive results were reported, i.e. management commitment improved to OHS being recognised as an important issue and getting time and money spent on it, whereas before it was considered a nuisance that often got

in the way of production; and hazards were controlled at their source rather than personal protective equipment being the first and only way to control them.

There were four objectives of the best practice project, all of which were well on the way towards being achieved at the close of the project. The first objective required that a model of best practice being developed this led to the following model (outlined in full) being proposed:

- The Chief Executive Officer should provide visible statements of commitment in deeds as well as words
- Team based approaches are the most effective method of undertaking project activities
- All involved and affected staff need training
- Look at a broad range of issues, with teams in different areas if necessary, supported and guided by a steering group
- Achieve concrete outcomes as quickly as possible - 'get runs on the board'
- Establish formal risk identification, assessment and control mechanisms as a normal part of day-to-day operations and to get the 'nuisance' and 'grocery list' problems out of the way
- Integrate OHS into other concurrent workplace change activities - this helps avoid over commitment by key players (for example, too many meetings), as well as achieving other organisational change goals
- Foster flow on effects - for example, use problem solving skills to address quality problems
- Use performance measures, but recognise the limitations of accident data (don't despair if claims increase as employees increased their trust in the enterprise)

The second objective to reduce the financial and social costs was met with a number of participants experiencing a substantial reduction in the accident related costs. The third objective of developing key performance indicators was partially met with one organisation developing a sophisticated performance measurement matrix. The last objective to establish a framework for broad workplace reform was judged to have been satisfactorily met, particularly with the good will exhibited by the companies involved in the project to initiate and sustain further workplace change.

Several other important lessons were learned while undertaking the Meat Industry OHS Best Practice Project. The lessons included matters such as reducing the concentration on systems by focusing more on a positive workplace culture, making sure that the Chief Executive Officer was involved and committed to the process, celebrating achievements, opening projects up to broad parameters rather than limiting or isolating their scope, and facilitating communication by face-to-face contact.

Case Studies

Blue Ribbon Meat Products

This company, located in Tasmania, used the MRC Best Practice Project to their advantage to assist in developing a new management system while transferring from a privately owned to a publicly listed company. Prior to the project the company approached OHS in a reactionary manner, employees were specific to one task, were seen as somewhat expendable when injured, and return to work processes were uncoordinated. Three catalysts caused the company to change: the financial cost of their poor practices, the OHS Best Practice Project, and the new management system. Several critical issues were addressed utilising consultants and advice from the MRC. These issues included developing an increasing understanding that bad OHS practices led to increased costs, the need for increased resources to drive OHS, the need to integrate OHS into other management systems and the need for training and broad cultural change. New OHS staff were appointed and,

as the company moved from a reactive to a proactive approach several complimentary changes took place. These included a change in the mindset of managers and employees and changes in the processing operations.

The formation of Process Improvement Teams (PIT) was facilitated by bipartite effective consultation and communication, and was complemented by training for management in the Australian Certificate of Supervision in the Meat Industry, and manual handling, problem solving and ergonomic training for some employees. The process of employee selection and recruitment was overhauled and skills audits were carried out. The changing culture meant that managers became more accountable, and improved their commitment and ownership of OHS. This process was difficult and a number of barriers had to be overcome, such as the devolvement of power to the shop floor and the realisation that employee involvement did not have to be threatening.

The company improved its workers compensation management and reduced costs although whether or not the project directly impacted on this is not clear. There was a growing realisation that the regular 25% turnover of staff was not a good thing for the company. The Process Improvement Teams applied themselves to some practical issues and improvements were made with ergonomic issues in the beef breakdown area and the installation of a bandsaw to engineer out the practice of using a meat cleaver to manually split pig carcasses.

While the company experienced positive outcomes from the project, they also experienced a number of problems including resistance to change, employee scepticism, and the growing realisation of their need to challenge the commonly accepted belief that production came before OHS. The main improvements included changes in attitudes and the installation of an improved OHS culture and awareness.

Fletcher International Exports Pty Ltd

This large company in Dubbo in New South Wales employs 650 staff and exports to 70 countries. The company was concerned about an increase in manual handling injury and the associated cost. Again the need to shift OHS from reactive to a proactive position was realised, as despite the company having new plant and up-to-date technology, injuries were still occurring. Management particularly wanted to address the rising cost of claims, to improve their culture and to be part of the industry wide OHS Best Practice program.

A Best Practice OHS committee was formed, headed up by the Occupational Health Nurse as the Project Coordinator.

The company experienced a somewhat deflating setback when they attempted to survey all employees to source information on occupational overuse injuries. Employees were sceptical and suspicious of the survey and the team had to move into damage control. Once the employees accepted the assurances that the survey was anonymous, the process continued with a response rate of 44%. However the information gleaned was too general and the committee realised they needed to approach the best practice process in a different way. An external consultant was hired to carry out a one-on-one survey of employees. Information gleaned from this survey identified training needs, literacy and numeracy problems, limited knowledge or awareness of OHS issues, and low morale and absenteeism linked to poor work practices.

The supervisors completed a basic supervisory skills certificate, and the best practice team were trained in problem solving skills. This helped the team to gain credibility and to tackle a number of practical issues in the workplace to achieve some highly visible wins. These included installing a cryovac leg packing machine to eliminate rolling legs of meat manually, installing a walkway to

eliminate employees jumping or walking on the inedible fat and bone belt, extending a conveyor to reduce lifting boxes in the offal room, and making improvements on the retain rail.

Two types of teams were developed, process improvement teams in various sections of the plant, and an overall issue based team covering plant wide issues. As the project proceeded the company realised that their injury data didn't necessarily indicate success in this type of project. Indeed, due to the improvement in the workplace culture employees were reporting injuries earlier, and this in fact, while a positive outcome, in some ways created the paradox of more injuries.

The company's future plans included integrating and spreading OHS throughout the workplace, understanding the tally system and its links with production, and achieving further cultural change. The team member training resulted in an increased confidence, relationships improved with the union, some of the scepticism and mistrust was overcome and the use of the external consultant was seen as a positive way to introduce fresh insights on the workplace.

Hardwick's Meatworks Proprietary Ltd

Hardwick's is a small meat plant in Victoria employing 100 people and servicing the domestic market. In the past OHS had been applied reactively and a 'them and us' attitude existed between management and employees. In addition the company realised that not managing OHS effectively was increasing the financial burden placed on the company.

Hardwick's used the MRC best practice project as a catalyst to break with past practices and to provide management and employees with the supportive platform to address issues. The newly formed consultative committee made up of employees, union delegates and managers identified four main issues: costs, communication and trust, employee welfare issues, and upgrades of plant and equipment. The consultative committee formed a task force and an external facilitator advised the company of OHS issues. All staff was offered the chance to do a paid first aid course and vaccinations were provided for QFever. All work processes were videoed and manual handling 'black spots' were identified with the aid of an economist. The external facilitator helped the company break the 'them and us' barriers by being a circuit breaker, and job rotation and multi skilling was introduced. In addition knife sharpening was improved by utilising an experienced slaughterman to train staff.

A number of changes occurred at Hardwick's, with the task force team meeting one full day every month. Practical issues such as manual handling when at the load out dock at the Melbourne market were addressed, a calf hoist was introduced and changes were made to the mutton changeover section of the line.

Hurdles were identified such as production coming first, the need for improvement of communication between employees and maintenance, the need for performance measures for middle managers to be extended to include OHS, and the need for consistency in approach among the task force. Outcomes were positive with the change from reactive to proactive including improved employee involvement, improved return to work, improved shift cooperation and improved networking and learning.

MC Herd Pty Ltd

At the time of this project, this company was recognised as an industry leader. MC Herd Pty Ltd is a family-owned company based in Geelong and is the largest domestic processor in Victoria. The company was the first in Victoria to introduce an inverted dressing system on the lamb slaughter line and employeed approximately 240 people. Turnover and absenteeism was relatively low and

consultation was a feature of workplace relations. When the company obtained ISO 9002 in July 1995 employees were rewarded financially for the successful completion of the quality course.

The company was an already involved in a separate best management project comprising seven companies and called the Geelong best practice network. This network had been established in 1993 under funding supplied by the Australian Best Practice Demonstration Program managed by the Department Of Industrial Relations in association with the Australian Manufacturing Council. The company welcomed the opportunity to consolidate their earlier efforts with the MRC Best Practice Project. They formed a best practice team in March 1994 with the aim of focusing on the big picture problems and conducting serious prevention planning rather than being reactive. They wanted to remove workplace hazards, improve workplace culture, reduce costs and improve productivity by utilising employee participation, integrating health and safety with continuous improvement and developing key performance indicators. An external facilitator funded by the MRC supported the company and they met weekly for the first year. Initially the team found it difficult to identify health and safety problems on site due to inadequate health and safety data. More in-depth analysis was carried out and a first-aid accident report form was developed. They also tried to include health and safety issues in the quality manual, using the Hazard Analysis Critical Control Point (HACCP) model to identify the critical control points where hazards could be eliminated. However this model did not identify issues such as employee boredom and negative attitudes and the team decided to tackle smaller, more achievable projects. Three main activities undertaken included an induction training program, the formation of a rendering section best practice team, and the continuation of the integration of health and safety into the quality manual. Practical changes included the engineering department converting gambrels to make insertion into the carcass easier, however clients did not return the gambrels so this simple solution was not maintained. Other solutions included lowering the mutton restrainer to reduce the risk of injury and redesigning the knocking box to increase operator control over the process.

Communication was improved by holding meetings in work hours with provisions made for communication with night shift and loadout drivers. An innovative approach was taken to allowing employees to see work undertaken by employees in other sections of the plant, with the plant engineer conducting plant tours called “Trevor's Tours”. Several change champions assisted the process: the general manager and the union delegate in particular, as well as the managing director Frank Herd who drove the project by initiating, motivating and supporting involvement of all employees across the plant.

Metro Meat International Ltd

This plant no longer operates but at the time was an export abattoir in South Australia that employed approximately 540 people. Past practices were summed up by one employee who stated that “if the machine broke down everything was done to fix it. If a person broke down they were just replaced”. An OHS best practice team was established in an attempt to reduce the incidence of strains and sprains and reduce the reactive culture. Meetings were held during lunch breaks and team members receive training in group processes and problem solving. The offal room was chosen as a starting point and several significant improvements were made in this area. These included putting paraffin oil in the pet food tubs to make the pet food slide out of the bins without lifting them, remodelling the beef paunch area, and redesigning the mutton paunch loading area so that the lifting tasks associated with the area were abolished.

The offal room was appreciative of these achievements, but other employees were not aware of these positive changes and this led to some frustration. Further practical more company wide improvements included an in-house knife-training course including one-on-one training on preparing and sharpening a knife, knife safety, cleanliness and general knife skills.

The company achieved its goals and made improvements to OHS by moving on from its past reactive approach to a more proactive and innovative approach.

R. S. Morrow & Son Pty Ltd

This company was a domestic plant situated in New South Wales and noted for its progressive approach. In particular the company was noted for its open communication and they decided to use the MRC best practice project to focus on reducing injuries and workers compensation premiums and at the same time improve productivity.

Process improvement teams and empowered workgroups led to extensive employee involvement at all levels. The company managed to integrate quality with OHS through a process of experimentation and willingness to learn from mistakes. The whole plant was organised into four process improvement teams, which then further broadened in scope to become empowered workgroups. Safety is firmly entrenched as part of the culture at this plant. An important part of the process was the willingness of senior management to devolve responsibilities to employees. In addition an innovative social approach meant that the managing director made significant efforts to keep the plant looking attractive and an appealing place to work. Practical changes included the installation of a mechanical lifting arm to empty pet food bins that weighed 65 kg, previously involving the inefficient and unsafe practice of two men lifting them.

Behind all the processes at the company a strong management commitment is evident, along with belief in the potential of employee involvement.

Q. Meat, Brisbane

This company is owned by the state government and had more than 300 employees at the time of the project. Historically, management and union relations at the plant were poor, compounded by uncertainty about the plant's future. The company aimed to use the MRC best practice project to address its employee relations and OHS problems by generating goodwill on a project that was a mutual interest to both management and employees. In addition issues such as job satisfaction, multi skilling and the need to reduce the number of sprain and strain injuries, led to the company involvement in the project.

A new OHS committee was formed in 1993, with its first step identifying how sprains and strains were occurring. Process improvement teams were initially formed in the meat hall, then extended to other parts of the plant. Barriers included an organisational culture that made the project tightly controlled and allowed little scope for other employees to have influence or participate. In addition an ongoing mistrust between management and employees was evident and there was a poor quality of communication between management and employees. To overcome this the Human Resources Manager assumed the role of coordinating the project and new life was injected into the project as it continued to hit the barriers. The change included training core employees in quality and problem solving and an improvement in the focus of the Best Practice Project process improvement teams. One major practical improvement was a complete upgrade of the pig line, with an immediate reduction in the number of injuries and an improved work environment. Training programs included concentration on aspects such as career paths, TQM, job rotation and workplace rehabilitation. Nearly one-third of all employees were trained in problem solving techniques.

A number of significant achievements were experienced including improvements in trust, dispute resolution and management commitment.

Tamworth City Abattoir

The Tamworth City Council owned Tamworth City Abattoir at the time of this project. The abattoir had very rudimentary health and safety systems in place, with a health and safety committee that was required by State legislation, but no general health and safety policy. The company aimed to use the MRC best practice program as a catalyst to improve their safety performance. They had four goals: upgrade rehabilitation and OHS induction, improve communication with employees and improve statistical records.

One major practical implementation was an extension of the boning room and upgrading of machinery, which led to a reduction of manual handling risks in the boning room.

Difficulties for this company included conflicting time pressures as the company grew and expanded. Of the original project goals the induction manual was the only outcome to be completed within the framework of the project.

Copies of the *OHS Best Practice* package can be obtained from Meat & Livestock Australia, ph (02) 9463 9116.

3.2 On Strong Foundations - Meat Industry OHS Best Practice Evaluation Report.

This report is an evaluation of the Meat Research Corporation (MRC) OHS best practice project. The OHS best practice was a sub program of the MRC work-related issues program. There are six sections to the report: background, key features of the project, evaluation methodology, evaluation findings, discussion, conclusion and recommendation. There is one appendix that is a questionnaire used to collect data from participating meatworks.

Section 1 - Background to the Project

The Australian meat industry is an important industry with annual returns greater than $4 billion and is Australia's third largest export earner. The nature of the industry is such that it is highly competitive between plants, particularly in the domestic segment, which has a declining market. However paradoxically there is considerable dependence on each other, particularly in the area of food safety. Low profit margins are a feature of the meat industry throughout the world. While the industry tends to use casual employees to cover seasonal requirements, in the main most enterprises provide permanent jobs throughout the year. Industrial relations have been highly adversarial, and until the OHS best practice project, the union had not been involved in any MRC research or development.

Labour costs were identified as a major impediment to the international competitiveness of the Australian meat processing industry, and the approach to OHS was reactive with risks accepted as an essential feature of the industry. Many companies have minimal systems in place, and even companies involved in the MRC Best Practice Project did not all have structures and systems in place.

Previous strategies by the MRC to address OHS in the meat industry had focused on formal structures and systems, with an industry OHS management plan distributed throughout the industry in the early 1990s. However the uptake of the plan did not appear to be all-inclusive. The situation at the time of the report appeared to essentially involve employees raising problems and “fighting” management to get them fixed. OHS staff was seldom employed, and in general OHS functions were seen as less important than “real” work, namely production. OHS committees tended to focus on maintenance issues rather than identifying and addressing big picture OHS issues. There was a

tendency for management to say one thing but do another. Essentially there was a belief in the industry that prevention was too difficult, and safety was regarded as a trade-off against the speed of the chain.

Section 2 - The Best Practice Project

The best practice project plans and objectives are outlined in the earlier "Towards OHS Best Practice" summary. Seven principles of OHS best practice were used based on the principles of WorkSafe Australia's OHS best practice project. The project was implemented in six stages, starting with a focus group, discussion with industry, expressions of interest from enterprises, successful applications, implementation of projects, and evaluation and dissemination. Nineteen plants, including large and small companies, undertook relatively detailed enterprise specific projects. The project marked a significant change for the MRC, which in the past had carried out primarily technically based projects.

Section 3 - Evaluation Methodology

The evaluation objective was to assist program developers to plan and deliver the best possible interventions, rather than provide proof of the effectiveness of the program. The evaluation examined five issues: the use of OHS as a vehicle for strategic change, the role of the OHS best practice project within the MRC work-related issues program, the role of individuals within the project, use of networking strategies, and the impact of the project on Chief Executive Officers (CEOs).

The evaluation was carried out in four stages. All participating plants, the project coordinator and a number of other stakeholders who had been involved were surveyed via a questionnaire based around the objectives of the project. The second stage involved the collection of information from all participating meatworks, information gathered from a sample of participating meatworks answering more in-depth qualitative information, which was compared to information from a sample of non participating meatworks and key stakeholders in the project.

Section 4 - Evaluation Findings

In summary the following features were found with *enterprise* level projects:

- the most common project themes were strategies to address sprains and strains and problems with boning rooms
- the project coordinator was usually the OHS manager
- CEO involvement varied from complete commitment to no involvement
- participation occurred through a representative project team in every case
- ten participating plants worked to integrate OHS with other areas of management
- performance measurement was an area that did not appear to be well understood.

In addition six *industry* level projects were undertaken: OHS benchmarking (summarised in 3.4) in this collection, a solution handbook for noise hazards, training materials on knife sharpening, an interactive CD training package on problem solving, the formation of a small business network of eight domestic plants in Victoria supported by a consultant, and the development of the National OHS Guidelines. The Guidelines marked a significant achievement with industry parties agreeing for the first time on how to address OHS, which was increasingly being seen as a major impediment to industry performance.

Recommendations from the evaluators to use the above information include a model for OHS best practice project at the industry level. This consisted of identifying, issues, forming a network of plants to address these issues, developing solutions and strategies and implementing them.

CEO Involvement

The critical difference between plants was found to be largely due to the actions taken (or not taken) by CEOs during the course of the project. One of the considerable achievements of the project was that CEOs were exposed to a new paradigm of management, allowing them to move away from the traditional adversarial approach used in the meat industry.

Project Achievements

Many companies cited cultural change as an unexpected and welcome outcome from their involvement in the project. The most common problem faced in undertaking the project was releasing people. Companies that were more successful in overcoming this had greater CEO, senior management and union involvement in their projects. Financially for every one dollar contributed by the MRC the organisation's contributed on average close to five dollars. The nature of their investment was primarily capital expenditure, such as new technology and in human resources (egtraining). Other problems faced in undertaking projects included a lack of management commitment, a diminishing motivation, reduced employee commitment, and delays in achievement of projects.

Training

Training was an integral part of the project with considerable budgets in some cases spent on training. The components of training included, in descending order, problem solving, ergonomics, induction, knife sharpening and manual handling. Feedback from participants in training was very positive, reinforcing the important role of training in increasing participation by the broader workforce.

Communication

Staff reported that face-to-face methods of communication were most effective, followed by team meetings, noticeboards, walks and talks, and informal discussions. Literacy and numeracy issues were a challenge, and the evaluators suggested strategies to improve communication such as harnessing the “grapevine”, and using pre- and post-production time to have quick discussions with small groups. Networking with other plants was seen as very important and regarded as a real strength of the project.

Employees

In companies where real change was effected, employees reported positive job satisfaction. In companies where projects were stalled or had limited outcomes employees' disillusionment increased. Projects that included the union were more likely to have positive outcomes.

Participation, Including Project Coordinators and Team Members

Project coordinators were critical to the success of the project, often acting as an honest broker between the parties and providing a great deal of energy and motivating teams to get involved.

Membership of the team was challenging at times, and in some cases team members were given derogatory labels such as “management suck”, “wimp”, and "dreamer". However where projects achieved positive outcomes, negative attitudes were replaced by respect for the contribution of the team members.

Working Environment

In most cases changes that were effective in the workplace related to manual handling.

Compensation Data and Statistics

The meat industry does not collect statistics in a consistent or comparable manner. While accident data should not be relied on as a sole indication of OHS performance, it is essential to monitor these parameters in order to review the projects effect. Outcomes varied with some plants experiencing significant reductions, and other plants reporting substantial increases in the cost of compensation over the period of the project.

Key Performance Indicators in OHS

Few participants measured their performance in OHS even in traditional indicators. Only 2 participants developed process indicators of OHS performance. These indicators included aspects of hazard identification, employee involvement, training, employee procedures and induction.

Section 5 - Discussion

The evaluators compared three models of change for OHS and workplace reform - the medical technical approach, the top-down approach, and the grassroots bottom-up approach. The medical technical approach has not been successful in improving OHS performance in the meat industry, and the top-down approach is not successful for enterprises with little or no understanding of the need for change. The bottom-up approach was applied in this project within the broad principles provided by the MRC. The strength of this approach is that it allows an enterprise to identify its own problems and strategies and build its own commitment regardless of its starting point.

The evaluators go on to outline process markers of success and four frames of organisational analysis.

Parameters for Success

Six factors were identified that the evaluators found to be linked to positive outcomes. They were:

- addressing all 4 change enablers (structural framework, human resources framework, political framework and symbolic framework)
- CEO commitment and involvement
- demonstrated CEO commitment for devolution of power
- celebrating achievements
- projects that are broad rather than limited or isolated in the scope, and
- communication facilitated by informal face-to-face contact.

Further, the evaluators stressed that the meat industry must learn to change the definition of work and treat work such as participation in the best practice project as “real” work, that is just as important as working on the production line.

Section 6 - Conclusion

The bottom-up model, on which the OHS best practice project is based, has been an effective vehicle for strategic change in the industry. The pace of change in the meat processing industry needs to accelerate if it is to remain internationally competitive.

Copies of the *On Strong Foundations evaluation report* can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

3.3 Benchmarking of Leadership and Management Skills

This comprehensive study of leadership and management competencies in the meat processing industry was commissioned by the MRC in July 1996. It consisted of a review of the existing literature relating to management competencies generally, as well as recent studies conducted within the meat industry. Three principal outcomes and findings were made:

- leadership and management competencies should be treated as indistinguishable
- a suitable model for management competencies is now available, developed within this project
- prior to 1994 considerable management competency gaps were identified in the industry.

Twenty firms selected from Queensland, New South Wales, Victoria and South Australia, including exported, domestic and smallgoods, both large and small, participated in the project.

The methodology involved an interview process based on an agreed competency assessment system. A percentage score was applied to each of 21 competency units, within the five broad competencies of managing operations, managing finance, managing people, managing information and managing the future. Eight managers and two employees were interviewed at each site and in addition each manager was asked to complete a management style analysis questionnaire, as well as each company being asked to complete a human resources benchmark data sheet.

The results were collated and used in the assessment of management competencies within the company, with the findings indicating that as a whole, the meat processing industry was improving in management competencies, but some gaps still needed to be closed. Specific gaps were found in the competency units of: financial knowledge, personal development, computer expertise, human resourcing practices and sharing of information. Competency in the area of managing operations is relatively good but still needed to be improved (all competencies were benchmarked against the standards from the Australian Human Resource Institute/Human Resource Management Consulting Benchmarking survey).

The gap analysis gave rise to the following recommendations:

- assess and establish detailed management competencies for the meat processing sector
- provide strategic management development for senior managers
- institute a comprehensive frontline manager development program
- develop a model for comprehensive human resources function for each company
- develop and implement greater diversity in managers
- promote the marketing of the industry to schools and to the community.

Copies of the Benchmarking of Leadership and Management Skills report can be obtained from, Meat & Livestock Australia, ph (02) 9463 9166.

3.4 Meat Industry OHS Benchmarking Workbook

The Meat Research Corporation as part of the OHS Best Practice Project produced this workbook in December 1996. It was designed to help meat industry companies to benchmark OHS between plants and to help them to develop performance indicators to measure the effectiveness of OHS benchmarking. It was written as a meat industry specific supplement to WorkSafe Australia's OHS benchmarking kit. The book is a working document with each section including questions and activities to be completed as part of the OHS benchmarking exercise. The aim is to establish them by involving a team of people from each plant in the benchmarking activities.

There are 15 sections in the workbook which fall into four phases of benchmarking:

Phase One - Establish the OHS Benchmark Project:

Section 1 - what is benchmarking?
Section 2 - why benchmark OHS?
Section 3 - what is OHS performance measurement?
Section 4 - are we ready to benchmark OHS?
Section 5 - what do we want to achieve from benchmarking OHS?
Section 6 - who will do the work?

Phase Two - Establish Self Knowledge

Section 7 - how is it done now?
Section 8 - how well is it working?

Phase Three - Learn From Other People

Section 9 - Who do we benchmark with?
Section 10 - how do we prepare for a benchmarking visit?
Section 11 - how do we conduct a benchmarking visit?
Section 12 - how do we report back?

Phase Four - Make it Happen

Section 13 - how do we implement changes?
Section 14 - how do we evaluate the effectiveness of the changes?

Benchmarking is described as a commonsense activity to facilitate learning from each other. Within an OHS parameter it is described as examining the OHS management processes in their entirety, searching for the best way to undertake key processes, and adapting and implementing the best processes to within one's own company.

The remainder of the workbook sets out the above phases into a series of explanations of each section, then question and answer formats to facilitate the benchmarking process for the team involved.

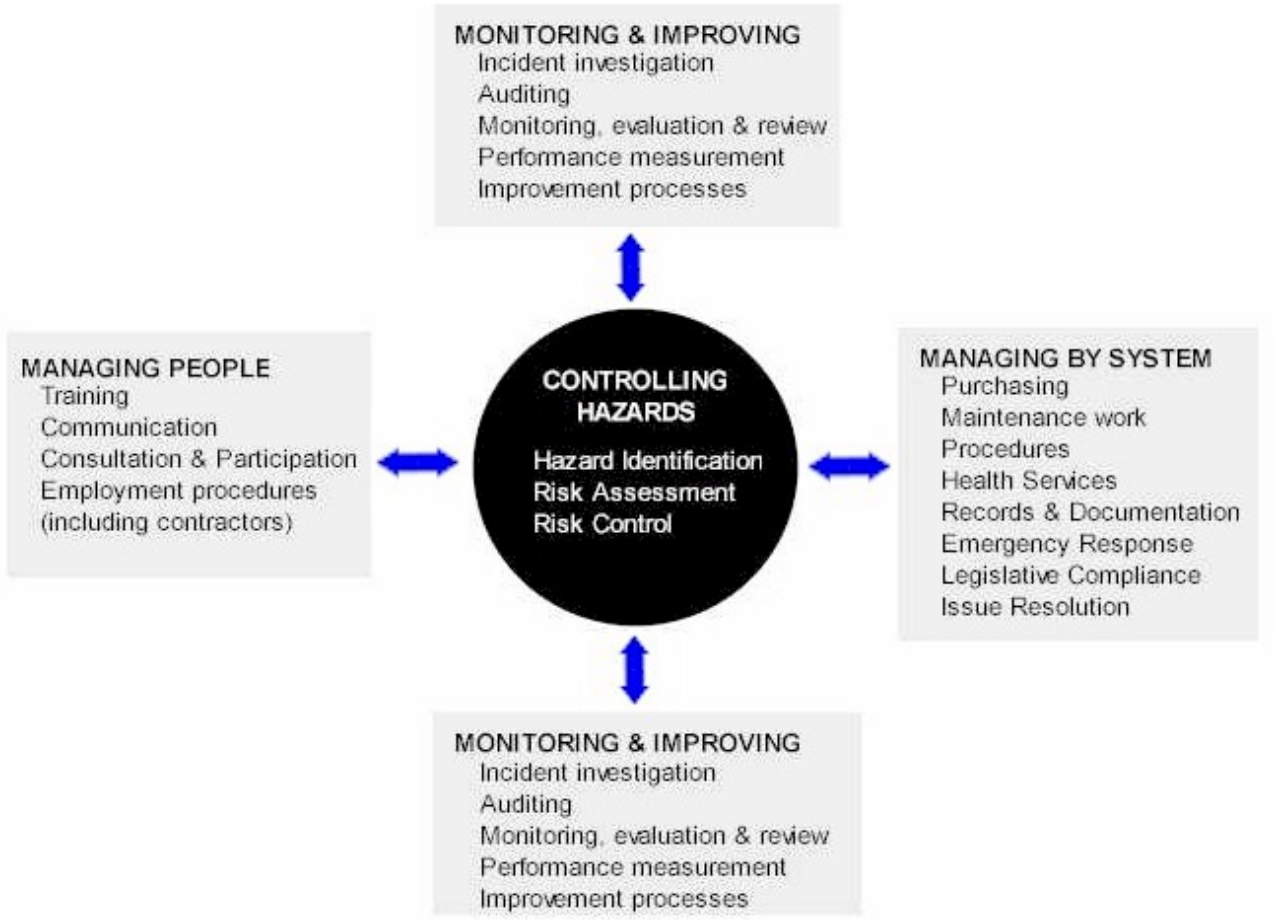
Copies of the *Meat Industry OHS Benchmarking Workbook* can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

3.5 MISHCIF Users Guide

This project was carried out from 1998-99 and was developed as a follow-up to the successful OHS Best Practice project for the meat industry. The title in full is *MISHCIF User's Guide - Applying the Meat Industry Safety and Health Continuous Improvement Framework – 1998*. The user's guide is directed towards the processor and encourages them to use the guide in one of three different ways to apply MISCHIF to their OHS management system. The three ways include a:

- simple review and planning exercise
- detailed strategic planning exercise, or
- detailed (possibly external) review or audit.

The model has a central component of controlling hazards, with the four main principles to achieve this outlined in a circular fashion around the central theme. The surrounding components include monitoring and improving, managing by system, leadership, and managing people, and are further broken down into a number of other elements. The model is presented in the user guide as follows:



Next the IADRI improvement loop is presented with a continuous improvement circle of elements for companies to check their progress against, including: intent, approach, deployment, results and improvement.

The guide presumes that the process is guided by an internal or external facilitator who uses the concepts outlined in the user's guide to apply MISCHIF to the needs of the enterprise. The reader is coached towards assisting an organisation to choose which approach to apply by considering the following questions:

- Is the OHS committee familiar with the principles of continuous improvement in OHS?
  If not, use the straightforward review and planning exercise to introduce the continuous improvement approach. Detailed and sophisticated applications can be considered once the committee is familiar with the framework. The straightforward review and planning exercise is outlined in section one of the User's Guide.

- Does the enterprise need to develop a detailed strategic plan for OHS?
  If the enterprise has to refocus its approach on OHS the User Guide outlines this process in section Two of the guide.

- Does the enterprise want to have a detailed review and evaluation of the OHS management system?
  Section Three of the User Guide outlines a method to conduct a detailed, possibly external, audit of OHS management, ensuring that a continuous improvement focus is taken.

Section 1 - Using MISHCIF in a simple review

Initially broad objectives for the review need to be clarified, eg identifying where OHS efforts should be concentrated, working out where the major OHS gaps are, conducting further investigations to improve OHS management.

Once this is clarified the company is encouraged to go through the five elements of MISCHIF and their components using a visual aid of the MISCHIF model as a guide and scoring each component against the IADRI continuous improvement lead. The depth of examination depends on the time available and the interest and expertise of the group. Each component is reviewed in the simple manner of asking several questions, i.e. what happens? How well does it work? What have been the problems? Do we do these things? Do they work? The scores should then be averaged out to give an overall score for the element, the team is then asked to make realistic goals for where they want to go in OHS management over the next 12 months, and to outline what would have to be done to get to that goal. An action plan is developed to address what has been identified and the process is complete.

Section 2 - Using MISHCIF to develop an OHS strategic plan

Again the facilitator is guided through the process with some clear and useful instructions. A representative group from the enterprise is guided to focus on the gaps identified in section One and then to develop and agree on the steps that will be taken to reach the goal. A pictorial model of "where we are now" using "helps" prompts assists the group to picture and overcome several barriers to reach the goal. The "helps" are things that exist both within and external to the organisation, eg commitment from the owners, willingness to provide opportunities to get together to work on actions and/or a good relationship with the local WorkCover office. Barriers also exist within and external to the company, eg lack of finance, resistance from some employees, external uncertain markets for company products. Next the group needs to identify the most useful "helps" and the hardest barriers, and identify those that the committee can influence. Once these are identified the team needs to work out how they will make this happen, possibly developing a separate action plan for each agreed action (a suggested format is provided for an action plan).

Section 3 - Using MISHCIF in a detailed review or audit

This section outlines a much more detailed approach than that used in section one or two. Initially an audit team is convened, with the goal of assessing an accurate and objective measurement of the progress of the enterprise towards achieving its goals in OHS. Each statement on the MISHCIF model is scored in an IADRI scoring booklet within the range of "negative, non-existent" (1) to "fantastic, leads the industry, best practice" (5). The process is outlined in its entirety in the User's Guide, but a brief explanation of each component is as follows: intent - what is the aim? Approach - how was developed, what level of consultation and participation was there are? Deployment - what happens in practice? Results - how effective was the component? Improvements - what improvements are identified and how they put into practice? Guidance is given on scoring, with 3 judged as an acceptable score, and higher scores only to be assigned if an enterprise can clearly demonstrate achievements greater than legal compliance, and lower scores only to be assigned when the enterprise is not able to demonstrate that they meet minimum standards. Individual team members' scores are aggregated to determine a final score. The score is then transferred to the IADRI scoring summary sheet, and added up to give a quantifiable assessment of the organisation's current occupational health and safety management system status.

Copies of the *MISHCIF Users Guide* can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

3.6 Implementing an Integrated Management System

The full title of the project is Designing and Testing a Participative Methodology for Implementing an Integrated Management System. The project set out to develop, with the active involvement of the workforce, a comprehensive integrated management system that covered health and hygiene, OHS, quality and the environment. It was undertaken at a small meat processing plant located on the outskirts of Lismore.

The project was based on the best practice principles of participation, management commitment and leadership. It also included concepts such as flat organisational structures including the devolution of decision-making, continuous improvement and learning, focus on customers and performance measurements. However the project found that integration was not well understood or accepted by Regulators and the project had to include activities to address their discomfort. Another setback involved the assumption of another plant's willingness to invest the time and resources required to network, so this aspect of the project was unable to be fully developed. In addition, a change of ownership of the primary project site, that occurred well into the project implementation phase required changes to the project, but the essential activities continued.

The project addressed six main areas: health and hygiene (incorporating HACCP), occupational health and safety, AUSMEAT standards, preventative maintenance, elements of ISO and environmental management. The project was undertaken in five stages over two years; stage one involving the identification and establishment of a project team, stage two the initial planning and training, stage three implementation of an action plan, stage four monitoring and evaluation and stage five, the project conclusion.

The findings and observations concluded that a participative methodology for developing an integrated management system can be used in small domestic and export meat processing plants. Two examples of achievements made against the five objectives included the findings that a comprehensive integrated management system was successfully achieved with the plant maintaining exemplary QA performance, and a fully trained workforce committed to common goals was partly achieved with the training plan continuing to be implemented at the time of report writing.

The unforeseen changes in management resulted in some unexpected barriers, however the benefits of the project were clear to the new owners and they agreed to continue the project. Accordingly. all aspects of the project were continued - QA, OHS, training, environmental management and maintenance, and the author was able to make a number of recommendations including the following two to the meat industry:

- Workforce participation and involvement is a critical support to achieving the potential benefits of improved management systems.

- When using the HACCP approach to controlling risks, make some modifications to analysis to ensure that the analysis does not merely develop controls through work method modifications. The best controls manage risks at the source, particularly important for OHS and environmental management.

The remainder of the report outlines a number of attachments, including competencies for internal facilitators, timetables for workshops, an example of a hazard analysis and monitoring table, an example of work instructions and training materials.

Copies of the *Implementing an Integrated Management System* report can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

4 Safety Culture in the Meat Industry.

4.1 Positive Safety Culture - the Key to a Safer Meat Industry

The SA Meat Industry OHS Committee as a direct result of their strategic planning exercise has commissioned this literature review and safety culture survey project, where the tripartite committee found that a “them and us” attitude existed within the South Australian Meat Industry. The literature review report is a tightly constructed and erudite summary of the current national and international safety culture literature. It opens with a quote from Professor James Reason, a British safety culture expert “... a poor safety culture will encourage an atmosphere of non-compliance to safe operating practices. Violations are likely to be most common in organisations where the unspoken attitudes and beliefs mean that production and commercial goals are seen to outweigh those related to safety.” (Reason 1998, p. 297)

The literature review goes on to outline a general perspective on safety in the meat industry, describing the insured and uninsured costs of health and safety problems nationwide and noting that the most common injuries are sprains and strains and open wounds. The author stresses that while many research projects and interventions have been commissioned to address the engineering and ergonomic aspects of safety in the meat industry, in the last decade it has increasingly being recognised that behaviour, attitudes and beliefs - in short, culture - is the most important element of safety performance.

The context of this review is to examine the work and thought that has been invested in the investigation of safety culture as the key to improve safety performance, and to apply this insight to an examination of safety culture within the Australian meat processing industry.

To this end a number of different projects and research are explored; the reader is referred to the document for a full outline of these.

The only other safety culture survey conducted within the meat industry in Australia has been a survey of the Queensland meat industry by the University of Queensland School of Psychology earlier in 2000 (4.1 in this collection of summaries). A number of recommendations were made at the closure of this research, examples of which include that safety objectives be included in managerial performance appraisals, that employees should be given higher levels of control and responsibility and that jobs should be redesigned so that people have the opportunity to work in teams and provide support for each other. However a somewhat similar body of work was conducted by the MRC when there was an analysis of management competencies and organisational culture in the Australian meat industry in 1996 (No 3.3 in this collection of summaries). Among other findings from this study, the point was highlighted that the Managing Director or the Chief Executive Officer shapes the company culture, and that most red meat processing firms tended to have an organisational culture that strongly valued compliance with rules and managerial directives.

The literature review goes on to outline some safety frameworks, again referring to a number of different authors, but finding Reason's (1997) error based/defence model and his approach to engineering a safety culture a compelling framework for reducing the vulnerability to workplace accidents within the meat industry. Westrum's work (1993) on the three ways (pathological, bureaucratic or generative) that organisations treat information is also noted as being exceedingly helpful. Other aspects of safety culture such as safety management systems, safety audits, and the risk management process are explored, in relation to national and international findings, as well as engineering (Hazop - hazard and operability study) and behaviour modification.

The author of the literature review goes on to outline more fully the Reason Model of Safety Culture and includes characteristics of low accident plants. A process for measuring a safety culture is put forward with a sample interview survey and pointers on modelling a safety climate. Employee attitudes to safety are explored and a number of different safety culture surveys within other industries such as the New South Wales mining safety awareness survey and its findings are cited.

Hints on changing safety cultures, including creating a safety culture and engendering employee involvement, accountabilities (dealing with mistakes), senior management and organisational level interventions are provided. A set of safety values that need to be assessed, encouraged and reinforced are provided, as well as hints on prevention of injuries, which is central to safety culture.

In closing the author returns again to Reason who asserts that while legislation and regulation are essential foundations to counterbalance the commercial drivers of profitability and cost minimisation, they are not sufficient and other approaches are also required. It is clear from the research that the successful promotion of a positive safety culture is the key to a safer meat processing industry.

Copies of the *Positive Safety Culture Report* can be obtained from Mr Barry Shaw, Meat Industry OHS Consultant, WorkCover Corporation SA, ph (08) 8233 2571.

4.2 Report on Safety in the Queensland Meat Industry

This project was conducted in 1999 by researchers from the University of Queensland in collaboration with the Division of Workplace Health and Safety, the Queensland MIAG and the Queensland AMIEU.

Twenty-one companies participated in the project, from these 296 workers and 13 managers participated. On average workers had been doing their job for seven years and a range of tasks were represented, including boning, packing and trimming.

Factors that were found to influence individual safety included:

- Safety Culture - an organisation with a positive safety culture supports workplace health and safety officers and committees. In addition, with a positive safety culture, workers are more likely to comply with safety procedures, compared to companies with a less positive safety culture.

- Organisational Culture - the extent to which an organisation values its people and their well-being. A positive organisational or positive people culture is one is that in which there is good training, and good communication between employees in management. With a positive people culture, workers are more likely to participate in safety activities, including helping to prevent co-workers from getting injured.

- Work Control - the amount of control employees have over how and when they perform their work affects the degree to which workers can plan their own work. The more control workers have the more likely they are to participate in safety activities such as volunteering to do things to improve work safety.

- Work Relations - the relationship that exists among co-workers and managers at work characterised by workers and co-workers who help when things get tough and who give good advice when someone is experiencing problems. Where there is more support from co-workers and managers, employees are more likely to comply with safety procedures and to participate in safety activities.

- Morale - workers are more likely to participate in safety activities or comply with safety procedures where there is a high level of morale. The way to improve morale is to generate a positive culture in the workplace, and to give employees high levels of control over their own activities.

Recommendations based on the findings.

Recommendations were made as a result of the findings for management, for employees, for companies and for job design. Examples of recommendations for management include safety objectives being included as important goals on the performance appraisals for supervisors and managers, and conducting regular safety surveys accompanied by the union.

Examples for employees include them being given higher levels of control and responsibility by multi-skilling, giving them the authority to make decisions about the way in which they do their work, and giving them a say in decisions that affect them and their work.

The need for companies to provide good safety training is seen as a priority, and finally jobs need to be redesigned so that people have the opportunity to work in teams and provide support for each other.

Copies of the *Report on Safety in the Queensland Meat Industry* can be obtained from the Queensland Division of Workplace Health and Safety, ph (07) 3225 2000.

5. Manual Handling, Occupational Overuse and Ergonomics.

5.1 Ergonomic Best Practice Case Studies

This report on *Ergonomic Best Practice Case Studies from Meat Processing Plants in the Australian Meat Industry* presents a compilation of the risk controls strategies developed through the OHS best practice project as well as other initiatives derived outside of that process. It is a compilation of practical solutions that can be easily implemented to improve the day-to-day safety of work operations in the meat industry.

Initially a survey was sent to 253 organisations in Australia to advertise the author's intention to visit participating sites to examine occupational health and safety initiatives in the meat industry in Australia. Once participation was established and screening of solutions was completed, 29 ergonomic best practice case studies from meat processing plants in Australia were identified and are included in this publication.

Case studies

1 Inserting a scissor base to the bin at a cost of approximately $1,000 can reduce the hazard of bending into and out of laundry bins.

2 Introducing a gravity chute between the processing line and washing area can eliminate the hazards involved while washing product, including filling a 35 kg tub and then carrying it to the washing area.

3 Installing an electronically operated block and tackle at an approximate cost of $2,000 can eliminate the hazards of walking up steps to a level 3 m high with a 20 kg container to pour the contents into the tripe washing machine 8 to 10 times per shift.

4 The hazards involved while trimming hides, consisting of lifting heavy hides which are hard to grip, hard to manoeuvre and were lifted 500 times per day, can be minimised when the hides are delivered in a water chute, then trimmed and simply pushed off the end of the bath tray to fall through a hole in the floor into a storage container below.

5 When turning carcasses on the line for washing the operator manually works above shoulder height with limited variety and muscle/joint movements, increasing the risk of occupational overuse injury. This can be reduced by installing protruding bars to turn the carcass so the spine is facing towards the back, at an approximate cost of $1,500.

6 When cutting the fat from the carcass with a non-powered knife, the repetition of movements combined with the increased grip strength required can increase the risk of occupational overuse injury. A whizzard knife can reduce the frequency of cuts to complete the task, cost of knife approximately $3,000 to $5,000.

7 Using a trolley can eliminate the hazards associated of repetitive lifting of 10 to 15 kg tubs. The trolley height needs to be lower than the conveyor that the tub is taken from and higher than the conveyor it is going to, have a larger centre wheel for reduced effort when pushing, and small end wheels for higher manoeuvrability and ease of turning in limited spaces. Approximate cost of trolley (made in-house) $220 each.

8 The hazards of carrying loaded tubs from one conveyor to another, up and down stairs 2,500 times per day can be reduced by a tub lifting device at a cost of approximately $500 (made in-house).

9 While stunning different size pigs the operator can overreach and twist, with the procedure made worse by the additional load of holding a stunning device. A “v” shape delivery conveyor and counterbalancing the stunner overhead reduces the manual handling. Anti-fatigue matting for the operator also reduces fatigue. Costs for counterbalance unit $200, the mat $150.

10 The hazard of sticking the pig when the animal hangs vertically can be reduced by a rollerbed system where the animal is presented flat on the surface.

11 Introducing an elevated horizontal surface can reduce much of the bending and over-reaching required in shackling a pig presented vertically can also be reduced by having an elevated horizontal surface to eliminate much of the bending over and reaching required.

12 A circular race for herding animals reduces the risk of falling or an operator being knocked by an animal.

13 The significant hazard of lifting heavy beef heads off the carcass and onto a rail can be reduced by installing an air cylinder to lower a hook to the height of the animal's head. The hook is secured to the detached head and then lifts the head up to a height where it can be hooked onto an adjacent rail. Approximate cost $500 (fitted in-house).

14 The jaw-breaking task presents a significant manual handling risk as well as the risk of cuts. An air cylinder attached to a hook secured over the jaw can reduce this. Tension is applied through the hook being mechanically lowered, which then breaks the jaw. Approximate cost of machine $3,000.

15 The hazards of using a manual hook to expose cutting areas during boning tasks can be reduced by the installation of a mechanical hook to pull the attached part of the carcass down. This eliminates much of the jarring action and leaves the operator more balanced and in control of the cutting task. Approximate cost $2,000.

16 Inserting gambrels into the hind hocks of lambs involves considerable pushing effort. The risk of injury in this frequent task (carried out up to 4,000 times per day) can be reduced by putting a 45-degree angle on the end of the gambrels, requiring less effort for the operator to push through the leg of the lamb.

17 When stunning cattle without a cradle the animal sometimes falls out of the knocking box requiring significant manual handling to get it into position for sticking. The installation of a cradle supports the animal in a position to stick, with less movement of the animal reducing the risk of injury for the operator.

18 The hazards involved when stunning beef in the knocking box with no shoulder or head restraint means the operator often bends over to reach the animal, as well risks hitting their arm against the animal or the knocking box. Vertical bars to restrain the head and a front angled ledge to elevate the head and neck ensures the animal's head is in a good position for stunning. In addition a rear ram operates a lever to push the animal forward. These modifications improve the operators' working posture and restrain all sizes of animals in the box.

19 A foot operated air ram to secure a sheep leg by the hook and mechanically lift the sheep up to rail height eliminates lifting in the hook transfer on rear leg task. Approximate cost $1,600.

20 When a change of direction of movement of a carton on a roller conveyor is required it can involve additional pushing and pulling effort from the operator. A marbled surface can be used to move the carton through a change in direction of 90 degrees. Approximate cost of the marbled conveyor $1,500 per metre. Alternatively a flexible roller system can be used at a cost of approximately $2,000 per 3 metre conveyors.

21 A chair with a galvanised frame, and a polyurethane seat can be used at a cost of approximately $500 to reduce fatigue at the weigh station.

22 Installing a rotating cleaning machine at the point where the tongues are removed from the animal can eliminate the double handling of putting beef tongues in a dump bin on the kill floor. They can then be transported to a second area for cleaning. (Manufactured on-site).

23 Doing general meat processing at above shoulder height on the kill floor can increase the risk of fatigue and injury. Often a platform is provided, but this should be accompanied by a step if the platform is more than 300 millimetres high, a highlighted colour and a grip surface on the floor to reduce risk of trips and falls. In addition a kick board around the edge of the platform provides more control against slips and falls and anti fatigue matting reduces the fatigue for the operator.

24 Using nylon rollers on a rail reduces noise, ensures there are no metal filings in the meat product and reduces the risk of manual handling related fatigue and injury.

25 The task of transporting meat product within the processing plant can be facilitated by the use of dump bins with large nylon wheels. Approximate cost $600.

26 Using a trolley that holds one cylinder in front of another reduces the hazard of rolling or lifting gas cylinders around the plant for maintenance work. This also allows ease of manoeuvring, and large air filled wheels also help, while the length of the trolley gives leverage and significantly reduces the manual handling.

27 When using handheld air knives to trim carcasses during downward hide pulling the electric power lead should be directed from the front of the cubicle where there is less chance of getting the lead caught and jerked out of the operator's hands. This has been shown to reduce the risk of cuts during the task.

28 Adjustable heights of boning tables and equipment can reduce poor operating postures and allow for different heights within operators. In addition an adjustable height table allows for the height to be adjusted between light boning or trimming tasks and more physically demanding boning tasks.

29 A ram on a forklift can eliminate manual handling when loading a pallet into a container.

Three appendices make up the remainder of this document: a generic manual handling hazard process, a musculoskeletal chart and a glossary of medical terms.

Copies of the *Ergonomic Best Practice Studies* can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

5.2 Manual Handling in the Meat Industry

This package, called *Reducing the Risk*, was developed in Western Australia in approximately 1996/1997 and is available online at www.safetyline.wa.gov.au

The package is a resource for managers, supervisors and elected health and safety representatives and is specifically designed to help minimise manual handling injuries in the meat industry.

In this instance "meat industry" includes slaughtering, boning, slicing and packing of meat products, but excludes poultry and smallgoods. The package was developed after a comprehensive 12-month assessment of the WA meat industry jointly carried out by the Regulator, WorkSafe Western Australia and the Workers Compensation Body, WorkCover Western Australia.

The reasons for targeting the meat industry are outlined with the customary statistical review highlighting the high number of lost time injuries in the meat industry and the annual incidence rate which is five times the West Australian average. Mechanisms of injury are outlined with a similar scenario to elsewhere in Australia where the most frequent type of injury in the meat industry is being struck by an object, such as a knife or carcass, resulting in cuts and bruises. However, again as elsewhere, the most costly injuries are caused by overexertion or physical strain while handling loads, referred to as manual handling injuries.

The employer and employee responsibilities for safety health and rehabilitation are outlined within the parameters of the general duty of care and consultation.

Section 5 outlines what manual handling injuries are and include some helpful graphics to clarify that manual handling is not only lifting, but also relates to jobs that involve repetitive movements or working in awkward positions for extended periods, and that these tasks can lead to cumulative strain. The range of conditions characterised by discomfort or persistent pain in muscles, tendons and other soft tissues, classified under the occupational overuse syndrome umbrella term, is outlined and specific examples of these are given from actual meatworks.

The financial and business case for reducing the risk of manual handling injuries is outlined in section 6 and the causes of manual handling injuries, including the known risk factors for causing injuries in the back, neck, arms, shoulders, hands and wrists are outlined.

Section 8 provides pointers on how manual handling injuries can be prevented, quoting the WorkSafe Western Australia Commission Code of Practice for Manual Handling (i.e. job redesign the preferred option for employers to control the risk of manual handling injury) and what an employer should ensure, so far as is practicable. The point is made clear that teaching workers to lift correctly is not effective on its own in reducing manual handling injuries, and that most manual handling injuries are not caused by bad lifting technique but rather by bad design of the workplace.

The recommended approach for safe manual handling, following the steps of risk identification, assessment, control and evaluation, is clearly and simply outlined. For risk assessment the reader is guided to find out where the manual handling injuries are happening by looking at injury records, talking to employees and their safety and health representatives about their jobs and watching the work in progress.

The next step is to find out what is causing the manual handling injuries (risk assessment) by looking at the number of injuries related to each job and how serious the injuries have been, the number of risk factors found in the job and how often the task is done. Risk control, the third step, is to decide what changes can be made to prevent manual handling injuries, i.e. redesigning the job,

providing mechanical handling equipment and/or providing training in manual handling skills. Finally, evaluation involves checking that the changes made our working successfully.

Several examples of risk control in meatworks are given in section 9. Under job redesign it is recommended that the hazard of continuous standing be alleviated by providing a foot rest and anti fatigue matting to reduce discomfort from standing, and that a sit-stand stool be introduced to allow workers to take the weight of their feet occasionally. Also a foldaway butt-rest may be appropriate where space is limited and the worker must be able to move around freely. Simple graphics are provided to clarify the usefulness of the suggested controls and the legislative obligations to provide seating where it is practicable are outlined. Aspects relating to work height are covered with the point made that on the slaughter floor the aim is to keep the section of carcass to be worked on between the mid thigh and chest height of the worker. Table heights should be designed so workers can keep their arms at about normal elbow position, with the shoulders relaxed and elbows close to the body. The employer is required to take account of the safety of each employee, and not simply design a workplace, which might be safe for an average sized worker. The positioning of equipment and tool design is covered, again with simple and practical solutions offered, and supplemented by helpful graphics. For example a diagram of a hock cutter with a pistol grip ensuring a good wrist and forearm position is demonstrated.

The hazards inherent in the meat processing industry work environment are touched on, including slips and falls, and the recommended minimum light levels (as outlined in *AS 1680.2 Interior Lighting*) for work surfaces within meatworks are given. Systems for work organisation are offered, with the comment noted that it was beyond the scope of the document to outline alternatives to the tally system of work, but a number of ways that the work can be organised within the tally system to reduce the risk of injury are offered.

Mechanical handling equipment options are outlined, examples of which are: roller conveyors to move cartons in boning rooms, freezers and loading areas, and mechanical hoists to empty tubs into machines.

The legal requirement for employers to provide employees with the necessary information, instruction and training is outlined, in particular new or inexperienced workers being at greater risk of injury, therefore requiring closer supervision, instruction and training.

Section 10 provides ideas for the control of hazards in some specific jobs on the slaughter floor:

- removing heads, trimming and washing (beef)
- legging and leg removal (beef and mutton)
- changeover (mutton) also applies to attaching A-frame and lifting the forelegs onto rail
- flanking and pelt removal (mutton)
- evisceration (mutton)
- separating offal at viscera table (beef)
- cradle method of slaughtering (beef)
- shaving table (pork)
- empty and cleaning paunches in the tripe room (beef)

Further control ideas are provided for the boning room (beef, mutton and pork):

- boning on the chain or rail
- boning and slicing on the table (also applies to trimming and sorting offal)
- packing

- stacking cartons on pallets, stillages and freezer racks

Controls for labouring (beef, mutton and pork) include:

- transport of slides, gambrels and rollers
- handling trimmings and inedible material in tubs and barrows
- handling 50 kilo sacks of bone meal
- loadout and delivery of beef quarters and other products
- loading carcasses and cartons out of chillers and freezers and into shipping containers

A section on rehabilitation outlines what rehabilitation is, why to rehabilitate and how to implement rehabilitation in the workplace. The point is clearly made that rehabilitation programs can reduce workers compensation costs and specific, practical and helpful advice is included on selected, modified or alternative duties. Barriers to rehabilitation are outlined and case study examples of successful rehabilitation are given. The rehabilitation section closes with a number of recommendations: nominate a rehabilitation coordinator in the workplace, establish a rehabilitation policy, have regular contact with injured workers and their treating doctors, use consulting doctors and/or rehabilitation providers if necessary, identify selected, modified and alternative duties for injured workers and be flexible.

In closing the project briefly summarises its objectives and provides four appendices: lost time injuries in the WA meat industry (1994-95), the meaning of "practicable", an example of a rehabilitation policy and guidelines, and a section on further information.

Reducing the Risk is available online at http://www.safetyline.wa.gov.au

5.3 Ergonomic Hazard Management Kit For the Meat Industry

This product is the outcome of an ergonomic project carried out by the Meat Industry OHS Committee in South Australia in 2000. The kit comprises an ergonomic hazard management tool specifically adapted for meat processing tasks, a user guide on how to use the tool, a series of 20 case studies of ergonomic interventions, and a bibliography of relevant readings for ergonomics in the meat industry.

The audit tool consists of four steps: step 1 a risk identification checklist, step 2 risk assessment, and steps 3 and 4 a risk control checklist and action plan.

The user guide consists of a brief introduction and outline of what manual handling is, and a description of the interaction between manual handling hazards and occupational overuse hazards in meat processing operations. The process for conducting an ergonomic audit is outlined consisting of the four steps covered in the tool, then examples are given that are specific to the meat industry, e.g. repetitive throwing of product and multiple staff performing hazardous tasks raising the risk in the risk assessment process. Risk control options are outlined using the hierarchy of control and applying the hierarchy to specific common problems in the red beef industry, eg the head lifting task in the beef industry.

A second example is given for reducing fatigue through work reorganisation, with task rotation between boning and slicing tasks. In all cases industry specific photographs outline the task. A third example is given in the manual handling training section of handling cartons in the packing area of a turkey processing plant.

The guide finishes with a section on tips for good ergonomic audits; including advice that audits should be conducted by a team, not an individual, that they should be measured against standards, that the team should consult knowledgeable persons, that customs and practices should be challenged, and that the risk assessment should take into account not only exposure but the number of people exposed.

The 20 case studies cover the range of tasks that are encountered in the meat industry. Seven case studies are given for the pork industry, five for the poultry industry and the remaining eight are for the beef and sheep industry. Each case study is preceded by a table summarising the results of the audit including the identified factor, examples of assessed factors, and an assessment as to whether or not the factor is within safe limits.

Pork Case Studies (all of relevance to the beef industry)

The first case study involves sorting in a boning room in a pork abattoir. The old sorting method of numerous employees spaced along the sorting belt is identified as a hazard with one operator sitting on a crate instead of a chair, operators not able to keep up with the product due to the speed of the conveyor, space constraints with many combinations of product being sorted into many different bins, overreaching, high-speed repetitive work, and no adjustment to the workstations to accommodate different sized operators. The new sorting method advocates a rotating table that is adjustable in height to accommodate the different heights of the operators, allows the task to be self-paced and improving reorganisation of the sorting process resulting in fewer bins and less congestion in the room.

The second case study identifies hazards related to a de-rinder machine, consisting of a machine at 90 degrees to the belt so product has to be lifted on and off the belt involving unnecessary manual handling, and fast repetitive lifting. The de-rinder machine was placed parallel to the belt to correct the hazards, reducing the lifting and allowing easy transferability of the product back to the belt.

The third case study looks at the boning room layouts and boning and slicing tasks. In this instance the site being assessed had redesigned the boning room. The previous workplace layout involved employees throwing the product between the cutout table and belt, throwing products over the belt to slicers, and bending and twisting when throwing off cuts into dump bins. The dump bins also created congestion in an already congested environment. The new layout consisted of a return belt above the main belt eliminating the bending and twisting to throw product into dump bins behind the boner. The sorting process is also centralised and the reduction in dump bins improves general access and egress around the room. The need to throw product has been eliminated and hazards are further reduced by rotation of staff through boning and slicing tasks.

The fourth case study outlines the task of removing the rib set. The old method involved using a piece of string attached to a handle to pull the meat away from the rib. There was significant jarring and strain placed on muscle and tendon structures and there were significant injuries associated with task. The organisation purchased a hand-held tool accessed from overseas, with significant improvements in reducing the risk associated with the task. The improved wrist position led to a reduced risk of injury, double handling was reduced, effort was reduced, and the end product quality and yield were improved due to the closer cutting edge of the tool.

The fifth case study briefly discussed machine guarding, including legislative requirements from *AS 4024.1:1996 Safeguarding of Machinery - General Principles*, and the sixth case study discussed job rotation principles. The more varied the tasks are, the more variety the muscles have and the risk of injury therefore decreases.

The seventh case study won the SA Meat Industry OHS Committee annual employee award for the employee who developed the concept. Cleaners were suffering injuries from using hot water hoses, needed for washing down work areas. The old method involved cutting off a section of the end of the hose, with a piece of metal wrapped around the end of the hose that heated up as the hot water passed through it. Through a process of trial and error the company developed their own attachment for the end of the hose, made on their own lathe in their own workshop. The shape and bulk of the plastic attachment improved the ergonomic grip required by the employee, but more importantly the risk of getting burned for the operator was reduced.

Poultry Case Studies (again of relevance in the red meat industry)

Case studies 8 to 12 focus in the main on the boning and packing room design, and ladder design for working at heights. Case study eight outlines the virtues of a portable ladder used by the company being reviewed. The ladder had a stable base, hand railings, the correct ratio of height and angle of step design, good step grip, and easy portability. The ladder meets the requirements of *AS 1657:1992 Fixed Platforms, Walkways and Landings*.

Case study 9 involves boning turkeys that are placed on top of pole, requiring a significant amount of force to bone, as well as working at shoulder or above shoulder height from time to time. Recommendations for the management of the risk associated with this task include task rotation, manual handling training and mounting the carton at the height of the conveyor so that the carton can be pushed directly onto the conveyor. Further recommendations, the first of which is high priority and applies to all area in the meat industry, is for training in knife sharpening, with the known effect of the reduction in the sharpness of the knife increasing the muscular effort required by the employee. The final recommendation for the tasks in this workstation is to ensure that good quality anti-fatigue matting is provided for employees to stand on.

Case study 10 outlines tasks carried out at a slicing workstation in the boning room. Recommendations include outlining the fact that the greater the precision of the task the higher the bench height needs to be. In this case the bench height was adequate. Further recommendations include placing the carton on the bench rather than on the floor, improving the workflow of the cartons, knife sharpening, task rotation and manual handling training.

Case study 11 discusses tasks involved in working at the mincing workstation in a boning room. A recommendation is made for the scale used to weigh the cartons of meat to be repositioned to reduce the double handling. Further recommendations include machine guarding, manual handling training and task rotation.

Case study 12 involves the packing area. Tasks include wrapping and packing product and lifting cartons and recommendations remain similar as in other areas, i.e. job rotation and manual handling training.

Red Meat Case Studies

Case studies 13 to 20 are specific to the red meat industry. Hazards such as working with a band saw, punching out sheep, working on platforms at height, and the head-lifting task are described.

Case study 13 relates to working with a band saw. Again *AS 4024.1:1996 Safeguarding of Machinery - General Principles* is cited, with the requirement to fit adjustable guarding on the band saw. The guarding should be placed to allow enough clearance for the product to pass through, at approximately 7.5 cm above the top of the carcasses. It is noted that gloves should not be worn when working with a band saw, that the rate of the task needs to be monitored closely to ensure that

the operator is not under undue pressure to keep up, and that the surrounding floor stability and lighting needs to be at optimal levels.

Case study 14 again covers the issues of machine guarding, pointing out that well guarded machinery reduces the risk of overreaching by employees, thereby reducing the risk of manual handling related injuries.

Case study 15 assesses the task of throwing the product in the boning room and recommends that workstation layouts be reviewed, task rotation occurs, and manual handling training is carried out as a high priority.

Case study 16 looks at the task of punching out the sheep on the slaughter floor. The bending and twisting involved in this task can lead to a significant risk of manual handling related injury including injury to the spine and general occupational overuse injury. Recommendations include task rotation, manual handling training, and an exploration of the possibility of automating or semi automating the task.

Case study 17 remains on the slaughter floor and discusses job rotation, including rotating between punching out and operating air tools to effectively vary the tasks required to be carried out by the employee.

Case study 18 looks at the task of legging in a small domestic meat plant. The wrist movements are comprehensively described, including the wrist deviation and the calculation of spinal flexion. In addition the resistance force is mentioned, with the point made that if the resistance force is high (with a dry sheep or with a knife blade that is blunt) the risk of injury to the muscles and tendons increase. The operators being observed were rotating through a variety of tasks, and in addition were wearing a legging support chain, which hung under the buttocks. This legging support chain helped to reduce the sustained fixed working posture. Recommendations included the ubiquitous task rotation, knife sharpening, manual handling training, and continual monitoring of the work platform layout.

Case study 19 addresses the commonly encountered hazard of employees working at height on a slaughter floor platform. The platform under review was compared to *AS 1657:1992 Fixed Platforms, Walkways Stairways and Ladders - Design, Construction and Installation* and was found wanting. Problems included no kick board at the front edge of the platform and no handrail between the split-level platform. A photographic example is given of as a good slaughter floor platform. This includes a kickboard, side access with a ladder and handrail, enough depth on the platform to allow people to walk past each other and knee height guards placed in between each operator in to provide some protection from falls.

Case study 20 addresses another commonly occurring hazard, that of head removal and head lifting. The tasks involved are described comprehensively and recommendations include an engineering device to completely eliminate the lifting, task rotation and manual handling training.

The final section of this kit is the Bibliography. This is set out in a user-friendly fashion with information and advice given on engineering risk controls strategies on such issues as tool orientation, tool dimensions, and tool materials. General ergonomic advice is given on workstation modifications and responsibilities for design in terms of legislative requirements in South Australia. The principle of counterbalancing to support tool weights, particularly with carcass splitting, is also covered. The third section looks at job rotation issues in terms of broader principles and in relation to the literature reviewed for the project. A final set of tables at the rear of the document classify

the literature in terms of its relevance to the meat industry, the problem and risk factor under assessment, the control measure and the effect or outcome that can be expected.

Copies of the *SA Meat Industry Ergonomic Kit* can be obtained from Mr Barry Shaw, Meat Industry OHS Consultant, WorkCover Corporation SA, ph (08) 8233 2571.

5.4 Assessment of Muscular Strain During the Performance of Tasks

This study was undertaken in 1999 to quantify the muscular strain placed on operators during the performance of meat processing tasks. This study was instigated by the MLA because of the high incidence of occupational overuse syndrome (OOS) and manual handling related incidents in the meat industry. The growing use of high-speed processing techniques and intensive hand activities has contributed to the increased incidence rate. The author quotes that it is not unusual for an employee in a boning room to perform 12,000 or more cutting motions in an eight-hour shift. Injuries such as tendonitis, tenosynovitis and carpal tunnel syndrome are increasing and it is important to identify and assess postures and movements that cause these problems, not only for designers and engineers to engineer hazardous postures out of the industry, but also for trainers and operators to identify and try to control hazardous work tasks.

This study involved site visits to three red meat plants, following two stages, the first stage observing 164 tasks and identifying the more hazardous ones, and the second stage applying electromyography (EMG) to assess the muscle load expended during the selected tasks.

The common tasks that were selected for EMG assessment included boning on the rail, boning and slicing on a bench, throwing product, packing and rodding.

EMG assessment of boning on the rail included assessing vertical cuts, horizontal cuts and the reach required. Recommendations arising from the analysis including reducing the frequency of vertical cuts below chest height by the use a variable height hook, a graduated rail or split or adjustable height platforms, task rotation, reducing muscular exertions during cutting by, for example, maximising blade sharpness and knife handle fit, and ensuring adequate working space.

Boning and slicing on a bench assessed EMG results compared with working heights and poor posture and high muscle effort combined. Recommendations arising from analysis were for a safe bench height, one that is slightly higher for slicing (900 to 920 mm) than the lower height (852 to 900 mm) that allows an operator to apply downward force while boning.

Throwing product between boning and slicing workstations indicated high levels of EMG in the shoulder, upper arms and elbow regions and it was recommended that a conveyor belt or modification to the workstation layout ensure the throwing is eliminated or at least reduced.

Packing, i.e. grasping the product from a belt, packing a carton and pushing the carton onto a roller, was assessed and recommendations included the correct conveyor belt height, carton storage parallel to the belt, good packing techniques, and task rotation.

A common slaughter task, rodding was also assessed and shown to exhibit significantly higher levels of EMG for the right side of the body than the left (obviously when operator was right-hand dominant) plus the potential for lower spinal strain. Recommendations included presenting the carcass on a flat surface, trialling a new rod design i.e. a telescopic rod like a car aerial, training and task rotation.

Copies of this report can be obtained from Meat and Livestock Australia on ph (02) 9463 9166.

5.5 Workplace Health and the Safety in the Meat Industry

This report outlines the overall strategy devised by the Queensland Meat Industry Advisory Group (MIAG) to address issues related to ergonomics in the Queensland meat industry. The Queensland meat processing industry is recognised as one of the State's vital industries. However although the prevalence of lacerations and abrasions has declined over recent years, injuries from ergonomic hazards (such as occupational overuse and back injuries) appear to be increasing, particularly in the boning and slicing areas. Therefore, in an attempt to engender a safety culture in the meat processing industry, the MIAG commissioned the development of the Meat Industry Ergonomics Risk Management Strategy. Four commitments were made that:

- MIAG work with the Division of Workplace Health and Safety to produce the Meat Industry Ergonomics Risk Management Workbook

- MIAG devise an implementation strategy for the Meat Industry Ergonomics Risk Management Workbook

- MIAG investigate the possibility of producing an industry specific training video on ergonomic hazards in the meat industry, and

- The Division of Workplace Health and Safety investigate conducting a target audit program for the Queensland meat industry.

The report commences with a brief Queensland statistical review then outlines the rationale and aims of the project. Ergonomics is defined as the field of health and safety concerned with the adaptation of systems, objects and environments to accommodate human capacities and needs. Further the author states it is a multidisciplinary science drawing on the fields of physiology, anatomy and engineering, which seek to integrate the worker and his/her environment to maximise human capabilities without exceeding human limitations.

The plethora of conditions that present under the umbrella term of occupational overuse injuries are described and a comprehensive statistical review is presented.

It is noted that while there is a legislative obligation placed on every employer to conduct risk identification and assessment strategies, not all employers have the expertise to carry out successful risk assessment, the social or technical expertise to make informed decisions, or the necessary resources to implement control measures.

The methodology for the target meatworks selection strategy is outlined with a statistically robust selection criteria outlined to ensure accountability throughout the process. Eight plants were inspected over a three-week period in May 1998, and once management commitment and the involvement of workers was assured, a number of tasks were carefully scrutinised for the following: movements, postures, layout, task and object, posture and stability, workplace, environmental factors and individual factors. In addition brief interviews were conducted with workers, and video and photographic information was also taken.

The *Meat Industry Ergonomics Risk Management Workbook* is summarised next in this collection of summaries.

Copies of *Workplace Health and Safety in the Meat Industry* can be obtained from the Queensland Division of Workplace Health and Safety (07) 3225 2000

5.6 Workplace Health and Safety in the Sheep, Beef and Pork Industry.

This comprehensive package provides extremely detailed checklists related to risk management for overuse injuries inherent within specific tasks in the sheep, beef and pork operations.

The workbook is designed to be relevant to managers, supervisors, workplace health and safety officers and workplace health and safety representatives in the Queensland meat industry. Eight workplaces were visited in southeast Queensland, including both small and large meatworks. The publication commences with some brief background statistics, and a brief discussion on the incidence of occupational overuse injuries in the meat industry. The publication states that occupational overuse injuries are commonly called work related musculoskeletal disorders (WMSD) and are mostly associated with physical stress when lifting, carrying, moving or holding loads or objects. Task in the meat industry that present potential problems include lifting heavy tubs, transferring meat into cartons, pushing or lifting heavy cuts of meat, handling heavy guts, and load out activities.

Somewhat surprisingly, the publication initially refers to repetitive strain injuries, rather than the more accepted term of occupational overuse injuries. The publication points out that those injuries are more common in boning rooms, but that other areas also cause problems due to repetitive motion, fixed working postures, the exertion of forces, and low-frequency vibration, particularly in cold environments.

A section on what this means in the workplace encourages the reader to minimise or eliminate repeatedly performed tasks where the body is placed in awkward postures, through job redesign or the provision of manual handling devices. The improvements that may be considered are hydraulic rise and fall platforms, trimming bins on wheels, pneumatic and electric tools, and job rotation.

The workbooks are divided into three sections, the first section covering legal obligations and guidelines for risk management in the meat industry. The second section provides checklists for each of the five primary ergonomic risk factors: working postures, repetition and frequency, forceful exertions, vibration, and duration. Within those checklists, the categories are further broken down into the body parts where appropriate, e.g. back, neck, arms and shoulders, forearm and hands, legs and feet, static posture, and work area and tools within the major heading of working postures. The third section looks at a range of tasks associated with beef sheep and pig slaughter, boning and slicing, and packaging. The reader is referred from each specific task to a number of checklists to allow risk identification, assessment and control for that specific task.

Part 1

Background information is provided on the general duty of care associated with the Queensland *Workplace Health and Safety Act 1995*. The risk assessment process is outlined, consultation is endorsed and the legal requirement for training is stated. The point is made that the primary responsibility for achieving health and safety in the workplace rests with employers. It is also stated that most overuse injuries are not caused so much by working mismanagement but rather by bad design of the workplace, e.g. prolonged bending of the back during legging sheep.

Generic information is provided on identifying hazards, and some examples are given such as hand tool use, vibration, and related issues such as slippery floors, fixed working platforms and moderately cold working environments. Problem tasks can be identified by inspection, consultation

and specialist intervention, however statistical review is not mentioned. A simple risk assessment matrix with three categories is provided: minor and unlikely, possible injury, and major risk. The risk control options are also simplified to two main types: design controls and administrative controls. The simplicity of this approach demystifies the risk control process, and the publication is at pains to assure the reader that design controls don't have to be elaborate or expensive. Specific meat industry examples are given, such as workers standing on a platform to keep their work below shoulder height and interim task rotation before mechanisation is fully implemented in a task process. The order of control strategies is suggested, with best possible solutions including redesign or modification of the task, e.g. introducing rise and fall platforms on the slaughter floor. Less desirable solutions, if the aforementioned are not achievable, include work based solutions and administrative controls. The point is made that the practitioner may need to use a combination of control measures.

A comprehensive section is then provided on guidelines to help the practitioner complete the checklists. If read in isolation, the pattern of information is hard to follow and appears somewhat complex. However, many excellent examples that are relevant to the meat industry are given and a summary of the specific advice is as follows:

Working Postures

A good working posture is endorsed, one that can be held with the minimum of muscular effort. It is advised that a varied working posture is better than a fixed posture and that the primary risk factor with working postures is awkwardness. These awkward postures include bending and twisting of the back and neck, stretching or reaching, twisting and deviating the wrist, kneeling or squatting. The awkward working posture is compounded when secondary risk factors such as repetition, duration, sustained or prolonged effort and high force is added. Examples of awkward postures are given: e.g. workers at the viscera table required to reach over a table to grasp offal for inspection involves reaching beyond forearm length. Prolonged standing, as in the boning room where workers sometimes stand for long periods of time on hard concrete floors is another example, as is squatting down to remove heads from pigs on a rail and tall workers stooping over a boning table. Other examples include repeated twisting of the hand and wrist as is common in boning, and leg removal with knives often resulting in high force and awkward and extreme wrist positions.

General hints for risk control related to working postures are provided, including ensuring that workstations are close to a suspended carcass, removing anything that makes workers stretch to reach a carcass, providing a shepherd’s crook or other device to pull awkward material closer. Anti-fatigue matting, footrests and task variations are recommended to make prolonged standing or squatting more acceptable, and the principle of “bend the handle, not the wrist” is stated to advise the use of tools which allow the wrist to remain straight or a neutral position.

Still related to working postures, work area issues such as a cluttered environment with narrow doorways, a build up of material, and gangways that are too small are identified. Lighting and glare is covered, with a note that if there is a big difference between bright and dim areas the risk of trips and slips is increased. Tools and equipment that are difficult to use are identified, such as triggers and faulty mechanisms causing over exertion, heavy hand tools causing strain, and uncomfortable tool grips. Specific hints for risk control are given, including valuable advice on suggested heights for standing tasks: i.e. 100 cm for precision work, 90 cm for light to moderate work and 80 cm for heavy work. In addition pointers are given for tools and equipment, including that they should be maintained in good working order, that tools should be chosen that enable neutral wrist positions and that trolley/bin wheel maintenance programs should be carried out regularly.

Repetition, Frequency and Duration

Repetitive work is stated as the performance of the same work cycle over and over again. If this same work cycle is performed many times during the day this frequency impacts on the risk of the injury, while the duration relates to how long the worker is exposed to a particular posture or action. Three types of fatigue are outlined; local muscular fatigue related to continuous static work, general fatigue related to over exertion of muscles with heavy tasks, and mental fatigue. Examples are given for each of the fatigue types: 1/2 carcass trimming with arms above head for local muscular fatigue, long hours gutting on the slaughter floor for general fatigue and screen based work for mental fatigue. The fact that boring work dictated by a conveyor can also lead to mental fatigue is not mentioned. The issue of control and pace of work is briefly outlined when unreasonable deadlines, periods of peak demand and sudden changes or delay to the flow of materials can cause difficulties. The meat industry tally system is not mentioned, nor is any bonus type system related to production. The issue of extended hours or overtime increasing exposure to risk is noted with the advice that it should be avoided.

General hints for risk control related to repetition, frequency and duration include job mechanisation and redesign of the work cycle. The concept of recovery time is noted; as is the advice that overtime should not be scheduled without redesigning the task. When task rotation occurs it is advised that the operator moves through a number of different tasks, mixing heavy tasks with light tasks, fast and slow tasks, and to be effective, rotation should occur every 2 to 4 hours. Excellent advice is given on rest breaks including micro pauses (between 2 to 60 seconds) which occur naturally in most tasks but can be overlooked in machine paced jobs or when working to deadlines. Further advice includes active rest breaks, noting that when workers take a break they should be encouraged to engage in light physical work or simple mental tasks. This section states that active breaks have been shown in the meat industry to improve recovery from the fatigue, but the research is not cited and it is not clear from where this statement has arisen. Fixed breaks are also advocated, e.g. a regular five minutes away from the work task every hour, or linking in with regular smoko breaks. A final point is made that early reporting of discomfort or pain should be encouraged.

Vibration

Tools used in the meat industry such as whizzard trimmers, air knives and splitting saws can transmit low-frequency vibration to the worker. This vibration can cause a restriction of blood flow and nerve and muscle damage. It can also cause the syndrome known as vibration white finger or Raynaud's syndrome. The worker, reporting tingling or numbness of fingers, whitening on the fingertips, and reduced sensitivity to touch can facilitate early detection. Risk factors that compound the hazard include awkward arm postures while operating tool, the length of exposure to the vibration and a cold environment.

Hints for vibration control include the selection of tools that produce minimal vibration, vibration isolated handles, internal damping such as installation of gearing mechanisms, and handles made from or lined with cork, rubber or plastic. Organisational factors can include providing protective equipment and clothing, task rotation and providing adequate breaks away from the task. Training can be helpful to teach the worker how to grip the tool properly for safe operation.

Forceful Exertions

Muscular activities, i.e. dynamic or static are described with examples given of dynamic activities such as in jerking actions during splitting, and pushing trolleys over uneven floor surfaces. Static activity is particularly troublesome as it restricts the blood flow and can lead to limiting the supply

of oxygen to the muscle. Examples of static activity include holding the carcass steady with one hand while cutting, and working at a distance away from the body.

Load characteristics are then outlined (it is not clear if the author relates this to forceful exertions). It is noted that an uneven load that is poorly designed increases the risk and the hazard is compounded when the object is hot or cold. While the hints for risk control of load characteristics includes efforts to either reduce the size of the load so that is manageable, or to bulk package so that can be handled mechanically, it doesn't mention the problem of market demands. Slings, rollers and hooks are advised to maintain control while handling awkward loads, among other advice. It is stated that the heaviest side of an uneven load should be made obvious, e.g. indicated with an arrow, however it is not clear how this would be carried out in the meat industry.

Handling Loads

As in other areas, risk factors are given for load handling. This includes pushing and pulling, lifting and lowering, and holding, carrying and restraining activities. The hints for load handling risk control are useful particularly as they are specific to the meat industry. Options are given such as floor level chutes, gravity fed disposal chutes, screw conveyors to transfer materials, shifting the headrail closer to the head removal area and locating waste containers close to the workstation. Workers who are sitting should avoid lifting loads from the floor while seated, and the point is made that swivel action seats help workers face the load without having to twist the spine.

Grip and Grasping

The concept of a power grip is introduced, where the fingers flex around an object and clamp it against the palm. It is noted that most work carried out in the meat industry uses a power grip. Prolonged power gripping can cause injury to the hands and wrists, particularly with knife handles that are too small and poorly designed. The risk increases further in cold environments, or in a high humidity environment. The risk control options include following the Australian standards for knife design and selection (AS 2336 - 1992) providing gloves that fit correctly and providing training to workers.

Individual Capability

Issues related to physical and functional capacity of the worker are provided on a separate checklist, and cover issues such as previous knowledge and experience, training and adjustment of work rates. The point is made that control options for individual capabilities should be considered administrative and the last control that is investigated. Rather education and training and a safe place of work is paramount, and special needs such as youth, pregnancy, injuries etc should be taken into consideration. Programs for return to work and for transition periods when workers have been absent or move to a new position are advised.

Checklists

Several generic checklists are provided in part three - risk profiles. The checklists are designed to be photocopied and several checklists are needed for each task that is being assessed. Each of the five main ergonomic indicators are covered, i.e. working postures, repetition, frequency and duration, vibration, forceful exertions, and individual capability. The checklists for worker postures and for forceful exertions are further broken down into the categories outlined above.

Sheep Slaughter

The sheep slaughter section provides numerous tasks broken down into task description, major risks, associated factors and risks, the checklist to use to assess the risk for that task and the page number to turn to. Tasks include: sticking, first leg, trimming around the pelt, horn cutting, hock cutting and leg removal, leg changeover, hide punching, pelt removal, head trimming and removal, trimming, gutting, brisket sawing, working on the offal table, half carcass trimming and handling trimmings and materials in tubs and barrows. Occasionally the tasks are further broken down into options where the carcass is presented on the chain or in a cradle.

Beef Slaughter

As with the sheep slaughter section, numerous tasks are broken down into the task description, major risks, associated factors and risks, the appropriate checklist, and the page number to turn to. Tasks include: sticking, rodding, first and second leg, changeover, working on cradle, rumper, trimming hide around the neck, head removal, hide removal, head trimming, leg removal, brisket saw, gutting out, splitting and half carcass trimming. Again some of the tasks are further broken down into working at chest level, working with the carcass on the chain, or working from an elevated platform.

Pork Slaughter

As with beef and sheep and, the layout remains the same. Tasks covered include: sticking, washing, singeing and shaving, feet and head removal, bunging, gutting out, viscera barrows and table, flair removal, neck trimming, splitting and handling trimmings and material in tubs and barrows.

Packing

The section on packing includes the same layout of task, task description, major risks, associated factors and risks, the checklists to use and the page to find them on. Tasks include bagging and packing into cartons.

Boning and Slicing

The layout remains the same, with the tasks of boning, sticking and slicers covered.

Copies of these documents can be obtained from the Queensland Division of Workplace Health and Safety (07) 3225 2000.

5.7 Reductions in Sprain/Strain Injuries

This project was funded by the MRC to provide training and facilitation services for the OHS Best Practice Project at Q Meat in Toowoomba. It is written as a Case Study of the achievements at the site.

The report starts by outlining the statistics found in the National Occupational Health and Safety Commission statistical review and highlights the 25% of strain injuries that are caused by lifting, carrying, putting down or handling offal and waste products.

This resource is aimed at allowing enterprises to independently identify ergonomic issues and work towards their resolution, with practical solutions that fit within the working and economic environment of the enterprise, and that seek to reduce risk where total elimination of risk is not immediately possible.

The earlier MRC OHS Best Practice project introduced the concept of the Process Improvement Teams to Q Meat, and the positive results meant that the employees on the team were prepared to be actively involved in problem sharing, willing to share information, offer solutions and willing to take ownership of the proposed solutions.

The methodology for this project involved convening a project team, conducting structured workshops outlining the principles of problem solving and ergonomic assessment, identifying a sample of ergonomic problems, using examples to demonstrate the steps in the problem solving model, then developing solutions and writing a final report, including recommendations.

Due to a managerial restructure the project was put “on hold” for about three months, however, despite the delay the workshops were deemed to be a worthwhile exercise as they increased knowledge levels and awareness. The problem identification phase led to the creation of several project task lists, developed after checking with employees on a one-to-one basis. The lists served to categorise the problems identified into safety, maintenance and project issues, then they served as a rough measure of success and finally they were posted to the notice board as a way of keeping all employees informed of the team's progress. Ergonomic assessment workshops supplemented by photos of various jobs on the slaughter floor assisted the team in identifying whether or not a job was acceptable using a 20-degree rule (i.e. if the person doing the job had to move their wrist, elbow, shoulder or bend or twist more than 20-degrees the job was automatically suspect). The team discovered very early on that a lot of the risks could be reduced by job rotation. The author states that the 20-degree rule is a valid means of assessment that requires no specialist knowledge and is easily learned, and that possibly 90 to 95% of problems on a slaughter floor can be successfully identified using this method

Ergonomic solutions were found for a number of the problems identified, however not all the solutions were implemented due to either cost, competing priorities or uncertainty over the species to be processed in the future. The ergonomic problems fell into roughly three categories of simple issues, unthinking acceptance of poor situations, or complex issues. Examples are given of each in the report, including photos outlining various aspects of the tasks.

The recommendations arising from the project were that a case study outlining the ease of ergonomic assessment using a 20-degree rule be written to share the experiences of this group with the industry, and that an ergonomic assessment/problem solving guide be written to accompany the case study to facilitate other enterprises to review ergonomic issues.

Appendices to the report include the detailed project plan, samples of the problem identification lists, and notes from initial meetings.

Copies of *Reductions in Sprain/Strain Injuries* can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

5.8 Guide for the Prevention of Occupational Overuse Syndrome

This package, called *Muscle Minding - A Guide for the Prevention of Occupational Overuse Syndrome in the Meat, Poultry and Fish Processing Industries* was produced in New Zealand as a resource kit for employers and employees and consists of written guidelines, a video and a poster.

The package recognises that occupational overuse syndrome is not a diagnosis, but a complex syndrome with multifactorial causes. The guidelines state that to manage occupational overuse syndrome the employer needs the following: management commitment, controls that address poor workplace design and skilful rehabilitation after early reporting. The package also touches on issues of illness beliefs and the muscle tension theory.

The product commences with the legislative overview of the Health, Safety in Employment (HSE) Act in New Zealand, which covers the responsibilities to identify, assess and control hazards, and design for work safety. The guidelines include the assessment of workloads and recognises the degradation of performance once an employee has reached their physical limit.

The guidelines include a method of specific task analyses called Rapid Upper Limb Assessment (RULA), which measures muscle force, force applied to, and posture, and applies a score in order to prioritise tasks for action. In effect this is a type of risk assessment. The guidelines include recommending electromyography to monitor muscle tension and to facilitate early reporting, plus the usual identification methods of hazard inspections, accident investigations etc.

The guidelines explore issues of adjustable workstations and contain a good section on hazard identification and control options. The product tackles the difficult issues of work organisation and task scheduling, power and authority, time for breaks, micro pauses, and breaks to sharpen knives etc. Further the guidelines talks about sustainable schedules, and recommends that remuneration should not relate to bonus systems or piece rates.

The guidelines touches on other issues such as posture, static muscle loading, the need to vary tasks, issues of a cold environment and vibration, psychosocial and psychological characteristics, behavioural characteristics and others. In each case the guidelines provide potential control options.

The document looks at information and training to recognise the fact that the tasks require a great deal of skill, and the key to avoiding injury is to train the worker as an athlete, to develop a fit relaxed work technique. The video is specific to the meat and fish industry, and in a humorous style, with a very strong New Zealand accent, the worker is endorsed to “stay loose to avoid OOS”. Groups of workers are shown, albeit looking somewhat embarrassed, carrying out exercises to keep their hands, arms, wrists and shoulders loose and flexible.

The appendices consist of some useful checklists and are as follows:

- Cost factors - direct and indirect
- The need for an OHS/OOS policy and what it should cover
- Workstation design checklists
- Anthropometric estimates including explanation and table
- Sample self - report questionnaire
- Video and warm-up exercises
- Posture checklist
- Knife handling including policy
- Working technique checklist

- Example of a rehabilitation program including a flowchart and procedure for return to work following extended absence.

Copies of the *Guide for the Prevention of Occupational Overuse Syndrome* can be obtained from the Occupational Safety & Health Service, Department of Labour, PO Box 3705, Wellington, New Zealand.

5.9 Participatory Ergonomic Interventions in Meatpacking Plants

The National Institute for Occupational Safety and Health (NIOSH) and Centre for Disease Control & Prevention, USA (CDC) produced this publication. In-depth reports of intervention projects to reduce ergonomic hazards at 3 meat packing plants are described. The projects used a participatory approach involving front-line workers, supervisory personnel and others organised into teams for such problem solving purposes. University investigators directed work at each site with expertise in ergonomics, and in one case, organisational behaviour. They facilitated efforts in team building and team function, and furnished observations of the process involved, and provided assessment of results. Reports of the three site studies depict a variety of contexts and opportunities for observing the merits of a participatory team approach in dealing with ergonomic problems in the meat packing industry.

In one case, the intervention advanced the company's initial efforts to develop an ergonomics program, providing training of workers and supervisors selected for teams to direct these efforts. In a second case, the corporate program already included use of ergonomics teams and the report described the team's progress in addressing selected problem operations at one plant site. In the third case the plant had no prior experience in using a team approach in solving worksite problems, so the text describes selecting and training the team members to analyse ergonomic problems in the operations and proposes remedies for implementation.

Findings from these various experiences include the following:

- Successful participatory ergonomics programs require strong in-house direction, support, and ergonomics expertise
- Training programs must develop both teamwork and ergonomics skills among participants
- Teams should include supervisors, maintenance and/or engineering staff (who will actually implement recommended changes), as well as production workers engaged in the jobs being studied
- Access to information, such as illness and injury data, is vital to proper team functioning
- Realistic measurable goals need to be communicated
- Evaluation criteria must be planned.

In providing general information for the individual case reports, the document also includes historical material referencing ergonomic problems in the red meat packing industry and related risk of musculoskeletal injuries, as well a review of the literature offering a rationale for worker involvement in participatory approaches to problem solving in workplace settings.

N.B. Two case study examples can be found in appendix 3 - cross-referenced to and sourced from the OSHROM database.

Copies *of Participatory Ergonomic Interventions in Meatpacking Plants* can be obtained from NIOSH (CDC) at 200 Independence Ave., SW, Room 715H, Washington, DC 20201.

5.10 Health Hazard Evaluation Report

This report outlines a National Institute for Occupational Safety and Health (NIOSH) investigation into a meat plant in South Dakota, USA in 1988. The findings are well outside the research window of this collection of project summaries (research conducted after 1995), however they are useful, so a very brief summary is included in this document.

NIOSH was asked to provide technical assistance to OSHA (the Occupational Safety and Health Administration in USA) to evaluate a plant in South Dakota. The investigation evaluated cumulative trauma disorders (CTDs) within the employees at the plant and the investigation brief involved the following parameters:

- Calculate the plant's incidence rate of upper extremity CTDs
- Administer a questionnaire and perform a physical examination designed to elicit upper extremity CTD symptoms and signs in 200 selected plant employee's
- Gather ergonomic exposure information on 185 jobs at the plant
- Perform multiple logistic regression on the data to estimate association between hand/wrist CTDs and exposure to vibrating tools, forceful jobs, and repetitive jobs
- Calculate the number of missed and restricted workdays for workers suffering from upper extremity CTDs
- Calculate a number of missed and restricted workdays for workers having surgery.

Findings In Brief

- The plant's upper extremity CTD incidence rate was 41.7 per 100 full-time workers per year, compared to 6.7 reported for the US meat packing industry.

- 70% of the 200 selected workers had suffered upper extremity CTDs during the past year determined by questionnaire and 50% of the 200 selected workers had current upper extremity CTDs by questionnaire and physical examination.

- Of the 185 jobs videotaped for ergonomic analysis, 8% were determined to be low risk , 62% intermediate risk, and 31% high risk for developing upper extremity CTDs.

- Vibration (i.e. use of saw or Whizzard knives) was the strongest predictor of hand-wrist CTDs.

- Over a one-year period 85 surgical procedures were performed on 61 employee.

- The investigation found a high incidence rate of upper extremity CTDs and carpal tunnel syndrome among workers at the plant.

On the basis of the investigation, NIOSH investigators concluded that an upper extremity CTD hazard existed at this plant. Recommendations for engineering controls, administrative controls, medical management, and implementing an ergonomics program are contained in the report.

Contact NIOSH, USA, http://www.cdc.gov/niosh or write to 200 Independence Ave., SW Room 715H Washington, DC 20201 for further information on this product.

5.11 Alternatives to current packing station layouts

This project, titled *Alternatives to current packing station layout to develop productivity improvement models* was completed in 1994 and was published in 1999.

The objective of this project was to identify a range of work-related inefficiencies and risks to operators associated with the current packing methods of meat in the Australian meat processing industry. The results clearly showed that many inefficiencies and limitations to improving the cost of packaging are inherent in the design an operation of meat packing rooms in the meat industry.

The project concentrated on the packaging of beef, but many of the recommendations are appropriate for other species.

The history of packing beef has evolved from the shipping of sides or quarters of beef to the exporting of 27.2 kg (60 pounds) cartons of beef. Since the 1980's, a gradual growth in producing vacuum packed product has occurred and today many of the larger abattoirs are processing approximately 40% of beef in a vacuum style, suitable for chill, with the remaining 50% produced in the manufactured trim variety.

The integral skills and competencies exhibited by the team of staff processing meat has at times been somewhat dismissed as “unskilled labour” however good processing skills have a significant impact on the quality of the exported product.

Congestion in the packing room was observed in every abattoir visited as part of this project. This was noted as being due to a number of inadequacies: poor allocation of space, poor layout, poor work practices, inadequate selection of technology and low lead-time when one piece of technology malfunctioned.

A mathematical model was developed to assist in the assessment of the critical issues determined and this was extended to be used as a predictive tool to assess proposed changes in packaging systems. The author recommends that there be a separation of manufactured meat from the vacuum meat, from the slicing table section on through the remaining processes. In addition the planned introduction of a centralised packing system integrating the conveyor systems and packing technologies currently available could achieve a 30% reduction in sprain is and strain injuries, labour savings, reduced downtime for boning and slicing due to greater reliability of technology and greater quality control.

The methodology included the use of a pilot site in Victoria, along with consultation with the Australasian Meat Industry Employees Union. A systems analysis was conducted at the pilot site together with a video taken of the various stages of the packing, boning and slicing operations. Statistics of the boning system were determined and then used to develop a model for the packing room environment. The model was then refined as a series of visits were made to abattoirs in Western Australia, South Australia, Victoria, New South Wales and Queensland. The pilot site then introduced a number of changes which were monitored using the statistical model, together with further video analysis. Injury data was analysed and a series of studies were conducted in association with the manufacturers and suppliers of technology and materials for a packing room environment. A range of suggestions was made for improving efficiency in the packing room operation, details of which are provided in the report. In addition the report outlines

recommendations related to the profile of labour, room layout and product flow, packaging materials and technology and equipment.

6. Environmental Hazards

6.1 Noise Control for Abattoirs.

This document was produced in 1995 prompted by and following the OHS Best Practice Project. It is aimed at abattoir owners, engineers, OHS committees and OHS representatives as a practical guide to provide basic noise solutions through the use of engineering controls. It opens with the comment that traditional efforts within the meat industry to control noise have largely used administrative controls, i.e. rotation of workers and the use of personal protective equipment.

Acceptable noise levels are stated as those lower than 85 dB (A) (*National Standard for Occupational Noise 1993*). (*The National Code of Practice for Noise Management and Protection Act Work*), (NOHSC: 2009 (1993)) provides practical guidance on how the *National Standard for Occupational Noise* can be achieved. In general a high proportion of abattoirs have noise levels in excessive of 85 dB (A). Peak levels are largely due to metal contact, i.e. 111 dB (A), from dropping metal hooks and rollers into metal bins, in knocking area with 96 dB (A) and animal noise from pigs prior to slaughter as high as 104 dB (A).

Nineteen noise problems were assessed and a total of 73 solutions options provided. A synopsis of these include:

- Noise from the pre-breaking and breaking machines in boning rooms and offal rooms can be reduced by dampening of chutes and metal casings with acoustic attenuating materials, isolating breakers from general work areas and by installing lids and flaps.

- Impact noise of bones and meat against metal surfaces in boning rooms can be reduced by reducing the distance between chutes and work areas, dampening chutes and applying noise dampening materials to the underside of the surfaces.

- Noise from overhead fans in chillers and freezers can be reduced by doors being interlocked with variable speed control units, reducing the fan tip speed, using multi-blade low noise fans, running fans at lower speed during loading and fitting sound attenuators to fans.

- Noise on the kill floor can be reduced by nylon coating on metal rails or by redesigning the chain to minimise metal-to-metal contact.

- Low noise nozzles, relocating cleaners to low employee exposure areas and by installing alternative chain cleaners that are not pneumatic, can reduce air noise from chain cleaners on the kill floor.

- The noise of air knives on the kill floor and in the boning rooms can be reduced by air mufflers being fitted to exhausts to decrease the noise, regular maintenance, lower speed of knives where possible and testing and purchasing alternative designs.

- The impact noise of bones and offal against metal trap doors on the kill floor and in paunch processing can be reduced by removal of the metal trap doors and / or replacing them with rubber or similar material, providing cushioning between metal trap door and chute, dampening the chutes or using rubber conveyors instead of metal.

- The noise of hide pullers on the kill floor can be reduced by applying dampening materials to the rear of chutes, installing alternative materials on chutes, reducing the height and speed of

fall of chains and hide, redirecting exhaust air away from the work area, applying dampening material to inside of the drum or by purchasing low noise equipment.

- The noise of using an explosive knocking system while knocking can be reduced by using alternatives to traditional explosive knocking such as electric stun guns for mutton, carbon dioxide for pigs, pneumatic knocking gun for beef, and by isolating the knocking area from the rest of the plant.

- The impact noise while knocking can be reduced by a more rigid knocking box with solid panels to minimise vibration, securing the animal to prevent thrashing about, rotating the knocking box to reduce impact noise when the animal falls, nylon guides in the door mechanism to dampen the impact of the door against the frame and by modifying the gate closure.

- Noise from guards on processing equipment that cover motors, belts and chains etc that vibrate can be reduced by securing guards to machine, isolating guards from transmission sources or by replacing thin sheet steel guards with heavier materials and providing dampening materials on the guard.

- The noise from vacuum packing machines in the packing and boning rooms can be reduced by additional air filtering, dampening the panelling of the machine, removing the vacuum machine away from the packing area, or by fitting low noise fittings to exhausts on the offcut blower for the rotary type of vacuum machine.

- Noise from water pumps, air compressors and chillers, or boilers in plant rooms can be reduced by separation from the main employee area, enclosing in acoustic enclosures, or using screw compressors instead of reciprocating compressors.

- Impact noise from hooks hitting each other and from metal on metal contact with metal rails can be reduced by modification of roller controls, slowing down the movement of rollers, providing cushioning mechanisms or enclosing hook return conveyors.

- Hook impact noise from hooks hitting each other and from dropping into bins or crates can be reduced by reducing the height of the drop, modifying the design of the bin to reduce impact and dampen noise of hooks, relocating away from the main work area, using a non metallic chute or conveyor to transport hooks and slowing down the speed of the hook return by reducing the gradient.

- The noise from air conditioning outlets in boning areas can be reduced by using larger outlets, using alternative dispersion devices, for example air-conditioning socks, lower speed fans or fitting sound attenuators to duct work.

- The transmission of engine noise through flooring and connected equipment in production areas can be reduced by using buffers, eg polyurethane, or ensuring conveyors are not connected directly to hoppers of machines.

- The noise from workers tapping on handrails with the backs of knives on the kill floor and in production areas can be reduced by filling hollow sections of handrails with sand or cement.

- Equipment noise in all areas can be reduced by ensuring all future equipment purchases have noise specification ratings below the recommended levels and by ensuring equipment is installed such that noise and vibration is isolated from work areas.

The document goes on to outline the principles of noise control including modifying the noise source to reduce the noise output, removing or limiting the receiver from the area or preventing the exposure of the receiver. Noise control planning should be carried out in consultation with employees and should involve the development of a written noise control policy and program of action. The principles of engineering controls are outlined both at the source and within the noise transmission path. Advice on the prioritisation of engineering based noise controls includes assessing the magnitude of the noise, assessing the number of exposed employees, and assessing the practicability of the solutions within the workplace.

Appendices to the document includes information on: measuring noise in abattoirs, administrative controls, personal protective equipment, an information sheet on "how we hear", definitions, useful contacts and useful references.

To obtain copies of *Noise Control for Abattoirs*, contact Meat & Livestock Australia, ph (02) 9463 9331.

6.2 Noise Reduction Project - Final Report

The Meat Research Corporation OHS best practice project identified the occupational noise was a priority area for research. While hearing protection as a means of protecting employees from noise is used predominantly throughout the meat industry, this is seen by the legislative bodies as only an interim measure.

This project outlines detailed and specific engineering advice for three noise sources identified as needing extra attention by the previous project (MRC: Noise Control for Abattoirs (1995) Summary 6.1):

- Air powered knives;
- Impact onto stainless steel benches
- Impact of hooks and rails

The project was carried out in consultation with suppliers of noise reducing initiatives and with six abattoirs across Australia. Solutions were subjected to laboratory evaluation and to limited field evaluation. Further evaluation within abattoirs is required to ensure that the initiatives are acceptable from other perspectives such as durability, cleaning properties, impact on productivity and maintenance requirements.

Air Knives

A number of commonly used air knives were tested both before and after modification with findings of significant reduction in both LAeq (continuous steady noise over a period of 8 hours) and peak measurements. The first was the Jarvis Dehider and the second was the Bettcher Whizard Model 1300 UZ. Photographs of both tools and also the laboratory environment used for testing are provided in the document and act as useful visual prompts for the reader. In addition photos of mufflers and other noise reducing components are also provided.

Stainless Steel Benches

The results of dropping bones onto stainless steel benches both when benches are treated and untreated are outlined and it was evident from these trials that the noise dampening properties of the

treated stainless steel reduced the noise levels significantly. Again photos of an untreated stainless steel benches and a treated stainless steel tabletop are provided.

Hook and Rail Noise

Hook and rail noise was assessed using, among other control options, plastic surface of rails, polypropylene facing of shackle return rail, plastic hooks, polypropylene and rubber at end of hook rail, aluminium hooks and screw feed rails. A range of hook and rail configurations are measured when the beef rail descends between floors, has a curved corner rail system, has bare metal rails in the chiller and then, in the same chiller, tested with plastic surface rails. In each case noise modification methods led to significant noise reduction.

Other sources of noise were touched on briefly, i.e. vacuum sealing machines, chute noise, boning room chute entry conveyers and a stainless exit chute from a boning room into a bone processing area below the boning floor. High levels of impact noise were found within some of these operations. Rib saws also known as scribe saws were also found to provide excessive noise. The authors advise that these other issues warrant further investigation.

The project proved that engineering modifications can effectively reduce noise levels in abattoirs through a range of simple innovations.

The appendix provided gives technical detail on air knives, exhaust filters, air hose connectors and acoustic dampening material.

Contact, Meat and Livestock Australia on ph (02) 9463 9166 for further information about this Report.

6.3 FM Radio-Equipped Hearing Protection Devices

This project involving the assessment of the use of FM Radio-Equipped Hearing Protection Devices in the Australian Meat Industry was conducted from 1996 to 1997 in a Queensland meat facility, funded by the MRC. The report opens by recognising that Noise Induced Hearing Loss (NIHL) is a work-related permanent injury and that while engineering the noise out is commonly offered as a solution for noise problems, engineering does not cure the social problems related to monotony and boredom. As a cure for the monotony and boredom many workplaces either install radios or allow their workers to listen to Walkman style personal portable radios and cassette players at work. However these systems can increase an already high ambient noise level to one that is above the legally accepted daily dose of noise.

To counter this problem some manufacturers have begun manufacturing earmuffs fitted with gain limited FM radio circuits, allowing their wearers to listen to music as they work while still ostensibly providing reliable hearing protection. A number of these earmuffs are currently available on the Australian market, but this study was confined to the Bilsom 797 radio. The company was known to be the first Australian meat industry employer to trial this type of hearing protection, so the company was approached for permission to study the earmuffs in order to establish whether radio equipped earmuffs could be used in other meat industry companies for hearing conservation programs.

This report outlines the six-month trial, including workplace sound level surveys, screening hearing tests of 40 survey participants, a literature survey and a general examination of the use of these earmuffs in boning rooms and abattoirs.

The methodology followed a two stage survey, with stage one involving audiometric screening of 50 participants using Bilsom 797 radio hearing protectors, and also ascertaining the noise levels that participants were exposed to at their workstations. Further a literature search established that no research had been undertaken in this area, so the use of music in the workplace and Walkman style radios was examined instead. Stage two involved further pure tone audiometric testing of the original participants to establish if any hearing loss had occurred during the intervening six months, with further noise exposure measurements also carried out. In addition stage two involved a benefit and attitude survey in order to ascertain the participants' attitudes to the hearing protectors and to their freedom of choice of music. Of the project's 50 original participants 10 dropped out, with the remaining 40 participants proceeding through and providing enough adequate research data to give a clear finding.

The literature review found that in circumstances where a Walkman style radio is listened to in noisy conditions, all noise sources combined together to give a cumulative effect that can significantly increase the wearer’s noise exposure.

The questionnaire results identified that 90% of the sample reported that they strongly liked the Bilsom 797 radio earmuffs while virtually all found the earmuffs comfortable to use. Most participants wore the muffs for a full shift, those that didn't stating they became too tired or too hot and sweaty. Other questions related to the wearer’s opinion of the quality of the radio sound, preference for type of music, and preference for radio station. 100% of the participants fully supported the proposition that the earmuffs provided them with hearing protection and relieved the monotony of work. 95% agreed that the muffs made their work easier. 82% stated that they could communicate with their co-workers while wearing the muffs and 95% reported that they turned the radio down if they want to hear what other people are saying to them. When queried on the volume settings the results appear surprisingly high with 53% using from a three-quarter to full volume setting, 41% using a half to three-quarter volume setting and only 6% using a below half volume setting.

Two sound level surveys were carried out in accordance with the recommendations of Section 2, *AS 1269:1989 Acoustics - Hearing Conservation*. A summary of the noise levels found is contained in one of the report appendices.

A number of interesting findings transpired over the life of this project:

- The audiometry survey, which although inconclusive, showed that some participants may have experienced lower-level noise induced hearing threshold shifts as a result of the middle to high-volume levels they usually set their ear muff radio to.

- The harsh environmental conditions (humidity, temperature) that exist in the abattoir and boning room where the project participants worked had in some cases caused circuit board corrosion problems, and circuit and earphone failures.
- No increase in the abattoir and boning room knife cut injury levels in the six months after the earmuffs introduction appeared to point to the conclusion that users do not lose concentration when listening to the radio, and therefore do not suffer more knife cut injuries.

Recommendations have been made for users as well as for manufacturers. Recommendations for users include that users do not use the earmuffs radios at full volume setting, and also, because the muffs do not provide adequate hearing protection from impact style high noise levels, the radio earmuffs are not suitable for working in areas such as larriages, stickholes or knocking boxes.

Recommendations for manufacturers include the need for investigation into the use of component encapsulation methods to protect the earmuffs electronic circuitry and also to limit the maximum output of the FM radio to 80 dB (A) in order to reduce any risk of noise induced hearing loss from the use of the earmuffs.

Four appendices are included in the report: Bilsom's 797 radio brochure, a copy of the questionnaire administered during stage two, a summary of the noise level measurement results and an unedited collection of documents from the company showing the historical background to the radio earmuffs introduction into the organisation.

Copies of *FM Radio-Equipped Hearing Protection Devices* can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

7. Occupational Diseases

7.1 Q Fever Information Kit for the Australian Meat Industry

This comprehensive information kit was revised in December 1997 and was produced by the Meat Research Corporation in association with expert advice from leading researchers such as Professor B.P. Marmion from the Institute of Medical and Veterinary Science, Adelaide, South Australia. In addition a national survey on Q Fever vaccination programs in the Australian meat industry was conducted.

Introduction

Zoonotic diseases are prevalent in meat processing and allied industries, the most notable of which, in the Australian meat industry, is Q Fever, a recognised occupational hazard for those working with live and slaughtered cattle, sheep, goats and kangaroos. People most at risk are the meat processor, including contractors and plant visitors, farmers and stock workers, stock transporters, feedlot workers, livestock traders, shearers and associated professionals and veterinary personnel.

Incidence

Q Fever is a notifiable disease in all States and Territories and in the decade between January 1986 and January 1996 there were 5,600 cases of Q Fever reported nationally. However these statistics do not reflect the true incidence rate and a more accurate figure is estimated to be 4 times the 5600, i.e. approximating 22,500 Q Fever cases over 10 years. The under reporting is contributed to by the disease occasionally being subclinical (very mild) and not requiring medical intervention by a GP who misses a diagnosis, or by limited pathology testing. The meat industry accounted for an approximately 50% of all reported cases of Q Fever, suggesting that there have been approximately 11,000 cases of Q Fever in the meat industry nationally over the past 10 years.

Cost

Data analysed by Professor Marmion between 1984 in 1994 indicates a mean average of $3,987 per acute case, and $37,201 for chronic Q Fever. Litigation can take the cost to as high as $100,000 in a chronic case, leading to an estimate of $300,000 when the period of disability covers three years. In 1997 an AQIS meat inspector was awarded a $1.2 million payout by New South Wales Court for failure of the employer (the Commonwealth) to provide a safe working environment.

Prevention

The most effective way to protect at risk individuals is to conduct a pre-screening and vaccination programme. Despite an effective vaccine being available since 1989 many employees in the meat industry remain unvaccinated.

The purpose of the handbook is to assist plants who have not addressed the Q Fever problem, with guidelines that require adaptation to State or Territory legal requirements.

What is Q Fever?

Q Fever first surfaced in the 1930s when workers at a Brisbane meat plant became unwell with an unknown fever. The diagnosis was written as “query” fever, later abbreviated to Q Fever.

The c*oxiella burnetii* organism that causes Q Fever in humans can be carried by a variety of domestic and wild animals, without the animal displaying signs of infection. An infected animal excretes large amounts of the organism in its urine, faeces, and milk and particularly in the placenta or birth products. The organism is extremely resilient and can withstand both hot and cold harsh environmental conditions, as well as being highly contagious within domestic herds where infection is mostly spread through inhalation of infected dusts and contaminated droplets.

Transmission to humans can occur via direct or indirect means. With direct exposure fine mists or very small droplets can be released into the air during the slaughter and processing of infected animals, or when handling infected offal and products of conception. Indirect exposure can occur in windy conditions as organisms can be blown for a kilometre or more in dry windy weather and humans then inhale infected dust. In addition moving animals in pens or holding yards and animals being transported on trucks can also raise infected dusts. As the organism can survive in harsh conditions for many months in a dry state it is a constant, often hidden source of infection.

The incubation period is usually between 19 to 21 days, but it may range between as much as 14 to 60 days depending on the intensity of exposure.

Signs and symptoms include sudden onset of acute fever, chills, profuse sweating, cough, severe headache, muscle pain and weakness. Often the diagnosis of influenza is made and laboratory tests are required to confirm the diagnosis of Q Fever. Individual responses will vary, with some experiencing no illness and it only becoming apparent that the person has come into contact with Q Fever when antibodies are detected in a blood sample or with a positive skin test reaction. Others may just feel 'off-colour' and may not seek medical attention. Typically however, the fever lasts seven to 10 days, is accompanied by excessive sweating (needing many changes of clothes and bed linen), nausea, vomiting, diarrhoea and anorexia. Often the person loses between 6 to 12 kg if the acute episode is prolonged. Occasionally hospitalisation is required, as persons with pre-existing heart valve damage could be at risk of developing endocarditis, or the central nervous system, lungs, liver, kidney, testes, heart muscle or tissue could be affected. Death is very rare. Generally the illness lasts between one to six weeks and most sufferers gain life long immunity to further infection. Treatment is by appropriate antibiotics.

Complications can include prolonged debility and fatigue, now known as post Q Fever Fatigue Syndrome, which exhibits features similar to chronic fatigue syndrome, and follows about 20% of acute Q Fever cases. As this condition that can last for five to ten years or longer the cost to the industry is considerable, and patients suffer from an incapacitating fatigue on minor exertion, muscle and joint pains, depression and other unpleasant symptoms.

Risk Management

The section on risk management for Q Fever follows the same philosophy as outlined in the core of all occupational health and safety legislation in Australia, i.e. the duty of care for the employer to provide a safe work environment and safe place of work.

Risk identification

It is not possible to identify an animal with Q Fever, as they do not display any outward signs of infection, therefore all stock should be considered as potentially infectious. Within each organisation, analysis of workers compensation claims data for Q Fever will need to be interrogated to identify the areas where the greatest number of Q Fever cases has occurred. These areas could include yards, slaughter floors, the tripe room, load out or even the office. As the infected dusts can

be ducted from the high-risk area by air-conditioning or via the ventilation system, not only workers in outlying areas can be affected, but also surrounding residential areas.

Risk Assessment

Most tasks in meat processing plants must be assessed as potential risks, due to the extreme hardiness of the organism and the fact that the air-conditioning can recirculate aerosols and dust in ventilation systems. Any individual is at risk of becoming infected, but those most at risk are new workers who haven't developed immunity. In addition non-immune visitors, especially those making random visits to the workplace, are at risk of developing Q Fever.

Risk Control

The publication cites the National Guidelines for Health and Safety in the Meat Industry, 1995 as the only source of advice specific to the meat processing industry on control measures and work practices. A summary of the National Guidelines is provided as 2.1 in this set of summaries, but for specifics the reader is urged to consult the Guidelines. The hygiene measures that are outlined in the Guidelines are clearly desirable, however any airborne infections such as Q Fever are only effectively tackled by vaccination. A Q Fever vaccination programme should be made available to all employees who work in a meat processing plant. Unless non-immune visitors wear appropriate respiratory protection they should be discouraged from entry to the plant (i.e. a class P2 particulate respirator).

Legal Responsibilities

The document notes that the employer has a legal obligation to ensure employees, visitors and contractors are kept safe from injury while at work, including consultation, information and training.

Pre-screening and Vaccination Programme

Currently in Australia the only vaccine available for protection against Q Fever is Q-Vax from CSL (Combined Serum Laboratories) Ltd. Prior to vaccination, pre-screening must be carried out via blood test and a skin test to investigate past exposure to Q Fever. In addition it is advisable to take a history of past work practices, lifestyle and any illness that might have been Q Fever. Seven days after pre-screening the skin test is examined and the results from the blood test are interpreted. If there is no evidence of past exposure to Q Fever vaccination can proceed.

Vaccination

It takes approximately 15 days for immunity to develop to Q Fever following vaccination. Occasional side effects may be experienced including tenderness at the site, or more rarely fever and sweating. However vaccinating an immune individual may result in a severe local or general reaction. Occasionally 'vaccine failures' have occurred after correctly performed vaccination, presumably due to individual biological variations, however the vaccine appears to be over 95% effective.

Planning a Q Fever Vaccination Programme

Comprehensive practical advice is given on the practicalities of planning a programme, including staggering the release of workers to avoid long queues for screening and assigning a coordinator. An information sheet useful for employee education is provided at appendix 1 and while the pre-

screening programme will identify eligibility, a sample employee questionnaire is provided at appendix 2 to assist the coordinator.

Further sample documents are provided at appendix 3 (explanatory covering letter), and appendix 4 (Q Fever release of information authority form).

Employee refusal should be discussed in the presence of a union delegate and all should be informed of the employer and employee's legal obligations. Workers who continue to refuse vaccination should be placed in a position where they are at lower risk of exposure to Q Fever. An employee non-consent form is provided at appendix 5 which can record the incident, but does not indemnify an employer from a workers compensation claim for Q Fever for that particular individual. Visitors to the plant, including contractors and labour hire employees should be required to show proof of immunity to Q Fever before gaining entry to the plant. The provider of the vaccination must be either a Registered Medical Practitioner or an accredited Registered Nurse trained and skilled in performing the procedures. Pathology services may be useful for assistance in States and Territories who do not utilise specialist pathology laboratories for Q Fever pre-screening (as do South Australia and Victoria) .

Facility Requirements

The document offers specific information on a hygienic and private area for screening and pre-screening, and for the practicalities of conducting vaccination. Administrative requirements including a zoonoses card (appendix 7), consent form (appendix 8), pre-screening protocol (appendix 8a) and an overall daily register (appendix 9) recording all activities within the programme are discussed. Maintaining records is critical and a complete record of the vaccination and pre-vaccination screening should be maintained and filed in the employee’s medical file. It is also recommended that an alphabetical register is kept.

Coordinator responsibilities are outlined and the reader is given an estimate of the time parameters needed to conduct a programme. Helpful information on staffing requirements and release of workers is all useful to assist the processor to conduct an effective programme. Finally the importance is stressed of accurate records of employees on leave for them to be followed up to ensure they do not miss being screened on their return and subsequently contract Q Fever.

A useful checklist is provided for implementing a programme, and advice is given on maintaining the programme. The final appendix (10) gives important information on storage and transport of vaccines.

Storage and Transport of Vaccines

This appendix is adapted from the Australian Immunisation Handbook, 6th Edition, National Health and Medical Research Council, 1997. It outlines the procedures required to maintain the 'cold chain' upon delivery of the vaccine to the plant. Either the CSL Ltd Time - Temperature Indicator (T-TI) must show that the vaccine and/or the skin test is still within the safe temperature range, or the cold pack or ice brick accompanying the delivery must be still partially frozen. A dedicated vaccine refrigerator should be used whenever possible or vaccines should only be stored on the middle and upper shelves of domestic refrigerators to maintain the recommended range of 2 - 8°C. Vaccines should only be transported in a small polystyrene container surrounded with fresh freezer blocks.

Copies of *Q Fever Information Kit for the Australian Meat Industry* can be obtained from Meat & Livestock Australia, ph (02) 9463 9166.

7.2 Q Fever - Your Questions Answered

This booklet was sponsored as a service to the medical profession by the Commonwealth Serum Laboratories (CSL) Limited, with the support of Professor Barrie P. Marmion, in 1999.

It opens with a general outline of what Q Fever is, how many people are affected, and what the cost of the disease is. The disease aetiology and transmission is described with the causes outlined, the transmission to humans both direct and indirect, with the note that while human to human transmission of Q Fever can occur, it is extremely rare.

The population at risk is stated as primarily workers within the livestock and meat industries, with the risk of contracting Q Fever amongst Australian meat workers being estimated as high as one in 300 unvaccinated workers per year.

Due to the occupational nature of Q Fever, men are more likely to develop it than women, with the main symptoms outlined in the booklet, including the fact that Q Fever is often misdiagnosed as influenza.

Other signs or symptoms that may be present include severe headaches and possible encephalitis (in 0.2 to 1.3 % of cases).

The length of the acute infection is noted as being from between two to six weeks, with some experiencing symptoms of post Q Fever fatigue syndrome for two to six months before regaining their pre-Q Fever state of health.

The manifestations of chronic Q Fever are outlined and include endocarditis and post Q Fever Fatigue Syndrome (QFS), both of which are discussed in the booklet.

The document goes on to give the medical profession valuable advice on diagnosis and treatment including what the medical examination will reveal, how Q Fever is diagnosed serologically, which serological tests are used and the importance of phase variation in serodiagnosis. Several important features that relate to antibody response are outlined, including the fact that a negative serological result in the first 10 days after onset does not exclude Q Fever.

Antibody patterns in chronic Q Fever show clear differences, and advice is given on how chronic infection with Q Fever is diagnosed as well as how Q Fever Fatigue Syndrome is diagnosed. The serological response to the vaccination is outline and the treatment of Q Fever endocarditis is described.

A section on prevention and pre-vaccination screening outlines those who should be vaccinated, and how to perform the skin test, whether or not it is accurate, and other issues specific to the pre-vaccine treatment. The point is clearly made that only those subjects with negative skin test results should be vaccinated. How to perform vaccination and the safety profile of Q-Vax is covered, and the role of the medical practitioner or nurse in pre-vaccination screening and vaccination is summarised.

Public health perspectives are discussed, such as the fact that Q Fever has been a notifiable disease in all Australian States and Territories since 1977, and the reason that there has been no reduction in the incidence in Q Fever is due to the slow uptake of Q Fever vaccination programs within the industries associated with a high risk of the disease.

The document points out that the incidence of Q Fever can only be reduced only by increasing vaccination coverage, and barriers to implementing vaccination programs such as lack of knowledge and motivation, cost, the itinerant nature of a large proportion of the workforce, and the lack of local resources are outlined as some other reasons that may affect a company's decision to implement a vaccination programme.

Two appendices are found at the rear of the document: an information sheet developed by Professor Marmion in South Australia and a sample consent form for subjects undergoing pre-vaccination screening and vaccination as part of a worksite programme.

Copies of *Q Fever - Your Questions Answered* can be obtained from Commonwealth Serum Laboratories (CSL) Limited, 45 Poplar Road, Parkville, Victoria, 3052.

7.3 Zoonosis - More Than a Dose of the 'Flu

A summary of this video has been included in this collection of summaries as, despite the fact that it was developed in 1991, the video contains not only some excellent information, but currently there is a dearth of audiovisual zoonotic disease awareness products in the Australian meat industry.

The video was produced in South Australia in coordination with AQIS, the AMIEU, the Public Sector Union, the South Australian Department of Health, Housing and Community Services and the Meat Research Corporation.

The video contains valuable industry specific footage, and starts by displaying the slaughter floor and states that the killing floor is a dangerous place, not just for the animals. The low-key approach and somewhat chatty prose makes the video easy to listen to. It is pointed out that physical skills can protect a meat worker to a certain extent, but this video is about the risk that cannot be seen, and is present in some (you don't know which) of the animals all around you.

The listener is told that open wounds, eyes, the mouth, the air we breathe and unwashed hands combined with a cigarette to the mouth during a smoko break are all possible conduits for transmission of zoonotic diseases (diseases that can cross from animals to humans). In addition, when conducting a cleanup, the cleanup water can spray around the finest of droplets containing the seeds of the disease.

Costs are quoted from the Meat Research Corporation that at least one-third of all costs paid in the meat industry are not because of injury but because of illness. It is not clarified if these illnesses are all zoonotic illness or other work-related illness, so this statement is not particularly useful.

The three main zoonotic diseases in the meat industry are discussed and explained comprehensively: leptospirosis, brucellosis and Q Fever. Leptospirosis can be contracted from pigs and dairy cattle, Q Fever from cattle, sheep and goats, and brucellosis from cattle and feral pigs.

Brucellosis is called undulating fever overseas, due to the fact that the classic fever endured by the sufferer undulates up and down. Some sufferers are sick for weeks or months, sometimes they never fully recover. One sufferer interviewed requires regular hospital attention for chronic chest infections, another has polyarthritis in all joints with a 20 to 30% loss of mobility, and another has 30% damage to kidney function. The gutting point of the slaughter chain is most risky with feral goats and feral pigs that are pregnant commented on as ' living' (sic) bombs. Unborn calves (slinks) are also significantly of risk. When the video was made, overseas public health demands had forced a national eradication of brucellosis, which was largely successful at the time.

Leptospirosis is found in domestic pigs, however once the kidney is removed from the pig there is no further risk unless it is pierced in the removal process and urine is spilled onto the carcass, raising the risk significantly for workers further down the line. The need for personal protective equipment (gloves, aprons, masks, goggles) at this point is vital, and the video states that while space suits are impossible for complete protection they are what is needed for complete protection. In addition ventilation and cooling is an ongoing issue that frequently needs improving. At the time of reporting, Monash University was trialling a leptospirosis vaccine, but did not have the funding to proceed further.

Leptospirosis is also found in dairy cows (pasteurisation kills it in the milk), and the video moves to the primary producer, giving the example of dairy cattle in the Murray River region, where it is estimated than half of the dairy cows are infected with leptospirosis, thus placing farmers at significant risk. A herringbone milking shed is shown, where the design allows farmers to milk 200 cows in less than 2 hours. However, while the design is good for milking, it increases the risk to the farmer as the access pit puts the farmer in direct line when a cow urinates.

The video points out that zoonotic organisms are great survivors due to their hardy nature, and that there is significant risk in stockyards, sale yards and while transporting animals.

Professor Marmion from the IMVS in Adelaide is interviewed about his work with Q Fever, when his work produced the vaccine as recently as 1986. The Professor talks about processors often developing immunity due to exposure to the disease, but casual visitors such as maintenance personnel are at high risk particularly on the slaughter floor and in the by-products area. He later talks about the post Q Fever debility syndrome where the sufferer experiences fatigue, sweating at night, loss of mental alertness and occasional personality changes. The zoonotic diseases are described as cruel diseases with wives interviewed explaining how their partner has changed; their partner blaming them, and even becoming aggressive. In rare cases there can even be major heart complications. While it is often the men that become unwell, wives obviously share the problem, and in Adelaide an action group called ZAAG - Zoonotic Awareness and the Action Group was formed as both a support group and to compile a list of doctors in South Australia who were fully familiar with zoonotic diseases. An AQIS meat inspector, a member of the group, was interviewed for the video and told of his experience with leptospirosis, when he had great difficulty in convincing his doctor that what he was suffering wasn't “just the flu”, and that his loss of vision and mobility was due to an occupational disease.

The video closes with the somewhat hopeful statement that while in the past zoonotic diseases were perceived as the bludgers excuse, they would now be recognised as true occupational diseases.

7.4 Feasibility Study: Establishing a Q Fever Register

This feasibility study, funded by the MLA, AMPC and the New South Wales WorkCover and had been identified as a priority of the New South Wales Meat Industry Sub Group as a priority for the Australian meat processing sector.

The primary aim of the study was to determine the feasibility and the approaches to be used in establishing a Q fever register for meat workers in New South Wales. If the register proved to be effective in New South Wales it is anticipated that it will be extended to a national level.

The feasibility study sought to determine the acceptability of establishing a centrally held Q Fever immunity register that was easily accessible to the meat processing industry. It also sought to

identify the methods of registration and storage of, and access to, data that is likely to be the most effective at maintaining high levels of immunisation.

The feasibility study included, among other things, an assessment of:

- industry expectations of a register
- ethics and privacy issues
- costs
- software options
- industry requirements for development and operation of the register
- evaluation
- cost-effective analysis of the register

The methodology involved seven research strategies:

- two discussion groups were conducted, to network with people within the meat industry who are interested in OHS issues
- a sample of employees were surveyed
- a sample of employers and managers were surveyed
- site visits were made to four abattoirs
- interviews with managers of other registers were conducted
- a cost benefit analysis was conducted
- consultation with software development experts was carried out.

All aspects of data collection during the feasibility study consistently pointed to the conclusion that workers, managers and health professionals saw a Q fever register as highly desirable. 90% of managers believe that a Q fever register would be “very useful” or “extremely useful”, 85% of workers supported the idea of register with a further 13% indicating that they didn't know enough about it to comment.

The paper stated that although there is a growing commitment by employers and the meat processing industry to ensure workers are immune to Q Fever before they commence work, this is still far from universal practice.

Advice from workers and health professionals was to keep the data on the register to a minimum.

The cost of establishing a register was estimated for the first year to be $107,600 (being $82,600 for set-up costs excluding software, and $25,000 software development), with second and subsequent years costing around $23,000.

Recommendations for progressing a Q Fever register include:

1 The register be a “live” register, accessible through the Internet
2 A central data manager manages data quality through programming.
3 Access to the register is provided through standard Internet connections limited to one or two authorised persons at each workplace, as well as persons authorised by the employers such as health professionals trained in Q Fever testing (note: authorisation should be through a renewable encryption key).
4 Access to the database should be free

5 A reference group comprising representatives from major stakeholders in the register be formed to manage the quality of the process and the tender process, as well as oversee the register and its evaluation, and manage the collection of retrospective data.
6 Tender specifications to be developed through close consideration of the detailed recommendations contained in this report.
7 Tender briefs to be sent to a range of creditable organisations with a strong track record in ethical research and database management.
8 Organisations that tender for the project nominate the software most appropriate for the register
9 Funds are made available for the establishment, maintenance and evaluation of the register to the levels recommended within the report.
10 Work to establish a register commence as soon as possible with a view to involving Queensland and New South Wales, then the remaining States and Territories.

Final note from the consultants - “There is widespread support, a clear need, and justification for development of a Q Fever register”.

To obtain copies of *Feasibility Study: Establishing a Q Fever Register*, contact, Meat & Livestock Australia, ph (02) 9463 9166.

8. Personal Protective Equipment (PPE) and Clothing.

8.1 Cut Resistant Gloves

Three documents make up this project: Guidelines, a brochure, and the consultants report.

Brochure

This brief flyer outlines several main points related to cut resistant gloves. It covers issues such as what cut resistant gloves are, health concerns, benefits and disadvantages and how effective cut resistant gloves are. Cut resistant gloves are described as fibre gloves woven with a cut resistant fibre available in various thicknesses and hand sizes. Their use on the knife hand and non-knife hand is described. Statistics are noted for lacerations to hand and arms in South Australia over the past four years including the cost to the meat industry. AQIS requirements are noted and *AS 4461:1997 Australian Standard for Hygienic Production of Meat for Human Consumption (2nd Ed)* is cited.

Benefits and disadvantages are noted including the assertion that wearing cut resistant gloves can eliminate up to 80% of knife cut injuries, provide greater dexterity than steel mesh gloves, keep hands warm in temperature controlled areas, are more comfortable than steel mesh gloves, and are lighter weight than steel mesh gloves. Concerns are noted such as the potential for occupational overuse injuries in the knife hand when wearing cut resistant gloves, difficulties in getting waterproof gloves over cut resistant gloves as required in controlled areas, and the fact that a cut resistant glove is not stab proof.

The final point is made that lacerations can be avoided by wearing a thin cut resistant glove on the knife hand and a thicker cut resistant glove or a steel mesh glove on the non knife hand.

Guidelines

The Guidelines were developed by the South Australian Meat Industry OHS Committee to provide practical guidance on the use of cut resistant gloves. They were intended to be a source of information and advice, and a useful starting point for consultation between employers and employees and gloves suppliers. They were also intended to be useful as part of the risk assessment process.

The project was instigated as a result of statistical review revealing that in the South Australian WorkCover Corporation database nearly 30% of claims in the meat industry were hand and wrist lacerations. In terms of agency of accident knives and power saws accounted for nearly 30% of all claims in the meat industry. These knife lacerations accounted for around 25% of all workers compensation costs to the industry.

The project consisted of a literature review, a survey of all meat plants in South Australia, discussions with AQIS and meat hygiene technical experts, a six-month field trial of three brands of cut resistant gloves, and surveys and workplace diaries within participating meat workers detailing performance issues, wear and tear etc.

The document discusses the fact that research conducted by the CSIRO and the Australian Meat Technology Pty Ltd has enabled AQIS to approve two fibres as acceptable for use in temperature-controlled areas of meatworks. These fibres are Kevlar and Spectra. However disposable water

resistant gloves are still required to be worn over cut resistant fibre gloves in slaughtering and dressing areas where cross contamination between carcasses is still possible.

Task requirements with the knife hand and the non-knife hand are described and ergonomic issues are briefly touched upon. More research is required to identify those ergonomic issues further. The document points out that the chain mesh glove is traditionally worn to protect the non-knife hand and forearm and that very few workers in South Australia wear any other form of protection. In particular the knife hand, which runs the risk of a run through injury, is unprotected in 95% of cases. The benefits of cut resistant gloves are summarised on the brochure mentioned previously, as are problems with current designs, however one important problem is that the range of sizes available in cut resistant gloves do not match the anthropometric measurements of hand sizes of the general meat employee.

One important point to note on page 3, the Guidelines inadvertently appear to endorse the unsafe practice of plunging the hand into 82°C water at the same time as washing the knife in the hot water. This was an unintended consequence and an addendum has been added to the remaining copies of the Guidelines.

Among other issues, further research is required to evaluate knives with guards designed to reduce run through injuries.

Report

The report outlines in full the methodology used by the consultants when carrying out this project on behalf of the South Australian Meat Industry OHS Committee. The executive summary points out that while these cut resistant gloves have been on the market for many years this project indicated that they are rarely used by South Australian meat workers. The project focused on, to a large extent, a comparison between the chain mesh glove and the cut resistant glove. This is because the chain mesh glove is largely used within the meat industry, but the glove was found to be uncomfortable and restricted movement of workers hands. It was also found it was difficult to clean and that the hand became cold in contact with the cold conductive mesh in temperature controlled areas.

The executive summary continued on to outline the involvement of the five abattoirs in South Australia who participated in the trial. A total of 150 meat workers were involved, although only 50 wore gloves over the entire trial period. This highlighted the resistance to the wearing of gloves by experienced meat workers, and also followed incidents when a hand was scalded from contact with 82°C water, and another when a worker stabbed his hand through the glove.

The executive summary closed with the feedback that, despite initial resistance, operators were generally positive towards wearing the gloves on the knife hand. The cut resistant gloves were found to offer cut protection for the hands and were warmer and more comfortable than the chain mesh gloves. Due to the brevity of the trial, it was hard to draw conclusions that the cut resistant gloves were dramatically successful in reducing lacerations, despite the fact that there were minimal lacerations during the trial. It was pointed out that in the two interstate plants where glove wearing is mandatory on both knife hand and the non-knife hand, an 80% reduction in lacerations has been achieved over a two-year period.

Report Methodology

The literature review section of the report outlines several examples of international and national statistics on the incidence of serious lacerations injuries to the hand and arm. It pointed out that during 1996 to 1999, in South Australia, 29% of hand injuries in the meat industry resulted from knife cuts. The report further outlines the industry survey; which was structured into two parts. The first part was for completion by the employer, and the second part was for completion by the employee. The Research and Analysis Unit of the SA WorkCover Corporation provided statistical review for the project. Host sites were chosen after extensive consultation with the steering committee and after negotiation with several companies, some of who were not able to be involved due to company opening or closing over this particularly volatile time. Cut resistant gloves and rubber gloves were purchased and, after visiting each host employer, employees were provided with thick and thin gloves, depending on the knife hand or non-knife hand use. Evaluations where undertaken by a three-month and six-month survey, and by workplace diaries kept by employees wearing the gloves.

The report goes on to outline the findings of the industry surveys and to discuss task analysis issues. As in the Guidelines, the benefits and challenges of using cut resistant gloves are explained, and future challenges are outlined. The report then outlines an implementation strategy, including conducting seminars during the SA Workplace Health and Safety week, when the Guidelines and the flyer were launched, hosting a workshop during the joint union/management conference in South Australia and inclusion in newsletters, among other strategies. Data summary is presented in the remainder of the report consisting of appendices including: the survey, the PowerPoint presentation used in the workshops, and the draft Guidelines as they were prior to going to print. The last appendix summarises knife laceration injury data in the South Australian study; findings which endorse the major findings found interstate where if cut resistant gloves are worn universally and their use is made mandatory lacerations can be reduced by up to 80%.

Copies of the cut resistant gloves products can be obtained from Mr Barry Shaw, Meat Industry OHS Consultant, WorkCover Corporation SA, ph (08) 8233 2571.

9. Training

9.1 Health and Safety Competencies

This document titled *National Guidelines for Integrating Health and Safety Competencies into National Industry Competency Standards* is of relevance to the meat industry as it assists industry to integrate OHS competencies into industry competency standards. The Guidelines are not Regulations or prescriptive, rather they provide a basis for the inclusion of OHS into industry standards. They aim to assist Competency Standards Bodies to deal effectively with OHS and were prepared on the basis of the National Training Boards *National Competency Standards - Policy and Guidelines (second edition).*

The generic OHS competencies described are the minimum necessary for effective health and safety management and workplaces. The three different units of competence apply to employees, supervisors and managers. The generic competencies do not address specific hazards, nor do they restate legal responsibilities, rather they embody the competencies necessary to fulfil legal requirements. They do not restate tasks or work processes but encompass four types of competency: tasks skills, task management skills, contingency management skills and job/role environments skills.

Generic Competency A for employees:

> *"Follow defined occupational health and safety policies and procedures related to the work being undertaken in order to ensure own safety and that of others and a workplace."*

Generic Competency B for supervisors:

> *"Implement and monitor the organisation's occupational health and safety policies, procedures and programs in the relevant work area to achieve and maintained occupational health and safety standards".*

Generic Competency C for managers:

> *"Establish, maintain and evaluate the organisation's occupational health and safety system in order to ensure that the workplace is, so far as is practicable, say that without risks to the health of employees."*

There are four steps involved in incorporating OHS into industry competency standards: identifying industry specific OHS issues, deciding whether to integrate OHS into the industry standards or keep it separate, determining progression as employees gain greater competence and field testing OHS competencies.

Industry specific OHS issues, which need to be considered in this document's application to the meat industry, include hazards such as a machine operation, manual handling and hazardous substances.

In addition, industry characteristics such as access and equity need to be included.

For copies of *National Guidelines for Integrating Health and Safety Competencies into National Industry Competency Standards,* contact the National OHS Commission, GPO Box 58 Sydney NSW 2001, phone (02) 9577 9555.

9.2 National Training Information Service

These training package details are from the National ITAB - National Meat Industry Training Advisory Council Limited – (MINTRAC), copyrighted by the Australian National Training Authority (ANTA). These details are outlined on their web site: www.atpl.net.au.

Qualifications and the units of competency are outlined for the certificates of meat processing in abattoirs, boning and laboratory areas. Also in leadership, meat safety, quality assurance, rendering, slaughtering and smallgoods. In addition qualifications are outlined for the certificate in meat processing in smallgoods laboratory, smallgoods leadership, smallgoods manufacturing and smallgoods quality assurance.

Unit MTMMP4A outlines the requirement to follow safe work policies and procedures. Elements of competency and performance criteria include the requirement to fulfil OHS responsibilities and recognise the OHS responsibilities of key personnel, follow workplace OHS policies and procedures, provide information to the workgroup about OHS, contribute to the participative arrangements in OHS, follow workplace procedures for hazard identification and risk control, follow emergency procedures and operate machinery safely.

Unit MTMMP54A outlines the requirement to apply OHS and other Regulations. Elements of competency and performance criteria include keeping the immediate work environment safe, employing safe working practices, safely storing, collecting and disposing of hazardous materials, responding effectively to accidents and emergencies, and maintaining personal health in the workplace.

Further details can be sourced from the National Meat Industry Training Advisory Council Limited - MINTRAC. The contact person is Ms Margaret Tayar, the Executive Officer, postal address 451 Lyons Road, Five Dock NSW 2046. Tel (02) 97137639, facsimile (02) 97137614. Email:mintrac@zeta.org.au

9.3 Training Resources Overview of the Meat Industry

This brief document is published by MINTRAC and is included as an example of documentation designed for use for Certificate 2 in Meat Processing Abattoirs. While the focus is on a general overview of the meat industry, a small section outlines the legal requirements for workplace policies on OHS. The document points out that Government OHS legislation states that it is the responsibility of both the employer and the employee to maintain a safe and healthy work environment. The publication does not clarify that this responsibility is principally charged to the employer who has the overall control of the workplace.

It is noted that in order to adhere to the legislation, cooperation is needed between management and employee. The OHS legislation aims to provide a safe place of work, safe systems of work, safe ways of working and to maintain set safety standards.

In closing the publication points out that the employee, under the legislation, is required to take reasonable care for their own health and safety and health and safety of others, to use the safety equipment supplied and to follow safe working procedures.

Further details can be sourced from Ms Margaret Tayar, National Meat Industry Training Advisory Council Limited - MINTRAC, 451 Lyons Road, Five Dock NSW 2046, phone (02) 9713 7639.

9.4 Creating a Safe Learning Environment at Hardwick's Meatworks

This project was carried out at Hardwick's meatworks in rural Victoria, with the aim of building on the structured training introduced within the industry through the work of MINTRAC and the Leadership Development Group. The company set out to create a work environment which valued and supported ongoing learning by employees, using OHS as both the focus of activities and the test of outcomes. The project aimed to integrate learning as a key aspect of work at Hardwick's. The three components of a learning organisation are noted by the author as a well-developed capacity for double loop learning (when learners are able to question and revise the goals for learning), an ongoing attention to learning to learn and where key aspects of organisational function support the learning. A unique feature of the project at Hardwick's was the use of OHS as both the catalyst for the project and a key focus of project activities.

Project context

Through the development of national competency standards and accompanying training programs, the profile of training within the meat industry has been lifted and its value has been highlighted. At the same time, considerable change to the legal and administrative arrangements for food safety in domestic plants in Victoria had taken place. Instead of externally employed meat inspectors, Victorian plants have been required to establish HACCP-based quality assurance systems. These were internally managed and externally audited. The MRC's OHS best practice project provided an opportunity to address OHS within the training framework.

Project methodology

The approach taken to the project was based on action learning principles (i.e. that adults learn best when the issues involved are meaningful and relevant to their day-to-day life). A seven stage methodology was used: establish action learning projects with the OHS best practice team, identify what people need to be able to do now and what they want to learn, identify what people can and what they cannot do, identify the causes of not being able to meet required standards, plan a program to meet the identified training needs, implement the training plan, and evaluate the project and develop a strategic plan.

Evaluation of project outcomes

The following project achievements were identified: a cleaner safer workplace, maintenance people keeping up with maintenance, workforce more competent, work-related injuries reduced due to the enterprise controlling risks better, emphasis on multi-skilling increased, an improvement in communications and an increase in the awareness of OHS.

Conclusion

Hardwick's successfully achieved its project objectives of integrating OHS and quality assurance, and extending organisational change through the development and implementation of their training plan. Valuable lessons for the rest of the meat industry had been provided by this organisation, examples of such being that projects of this nature require substantial management and workforce commitment, that the seven stage process used at Hardwick's encourages participation, that the discipline of participative strategic planning is highly effective, and that a shift is required from a teacher centred model of learning to one centred on learning as an individual.

Further details can be sourced from Ms Margaret Tayar, National Meat Industry Training Advisory Council Limited - MINTRAC, 451Lyons Road, Five Dock NSW 2046, phone (02) 9713 7639.

9.5 MeatSafe: OHS Project in the Meat Industry

This final report and its accompanying products have been reviewed as, while they are outside the window of recency required for this project, it gives us an important example of an OHS project specific to the meat industry that appeared to be extremely successful at the time but has since disappeared without trace within South Australia. The two-year project was carried out over the period from April 1992 to May 1994 and was the result of funding from the SA WorkCover Corporation Research and Education Grants to the South Australian Food and Beverage Industry Training Council Inc.

The solid outcomes produced by this project included the establishment of consultative mechanisms in participating work sites, a comprehensive industry wide Training Needs Analysis, training resource material and marketing material developed, and training implemented in the majority of meat processing organisations in South Australia. The project was carried out in the days when the Training Guarantee Act still applied, thereby providing organisations with extra funding for on-site training that was only paid to the organisation if the training was carried out.

The project, jointly run by the Australasian Meat Industry Employees Union (SA Branch) (AMIEU), the Meat and Allied Trades Federation of Australia (now National Meat Association) (SA Branch) and the South Australian Food and Beverage Industry Training Council Inc, included retail and wholesale as well as processing and the aims were to improve the management of OHS in the industry, reduce the injury rate, and reduce the cost of injuries in the industry.

The materials were aimed at managers and supervisors, but all efforts were made for all the material to be applicable for employees as well and particularly for supervisors with low literacy levels. A steering committee was formed made up of the principal organisations, along with a meat lecturer from TAFE, two meat processors and one retail organisation. The project commenced with the literature search and the consultant states that at that stage OHS was very new in the meat industry. The project comments on the Meat Research Corporation study and the development of an OHS plan for the meat industry and that while the three volume resource folder was a very important initiative for the industry the consultant felt it had some major drawbacks: - the issues were too broad, a full-time person with OHS training was needed to implement the plan, it needed training to use the resource, and the information was too much to absorb. Smaller organisations found the plan almost impossible to use because of the time and knowledge required to comprehend it.

Training Needs Analysis

The Training Needs Analysis utilised four methods: statistics, checklist, interview and forum/discussion. The statistics are almost a decade old, but it is still interesting to note that the percentage of costs for open wounds remain much the same today at around 25%, while strains and sprains and musculoskeletal injuries accounted for 40% of costs then and now accounts for 50%. The checklist used was a simple systems audit checklist sourced from the WorkCover Corporation based on the five key elements for a good OHS management system. The interviews were conducted with the assistance of students from the University of South Australia and three industrial forums were held with good representation from the industry.

A training program consisting of 18 modules was developed and broken down into three steps. The training course was for managers, supervisors and employees in the industry and an outline of it is provided in the appendix of the report. Slides were taken from participating work sites and were later transferred to video, the subsequent manual handling and induction video package is available

from the SA WorkCover Corporation library. While the products were developed with close consultation with the industry, on review they are somewhat generic in their appearance.

The 18-module training package was delivered in-house to 15 organisations and also delivered via training courses at the Regency College Institute of TAFE. The evaluations taken at the time of training delivery appear very positive in their feedback.

Discussion

Many issues remain the same today as they were nearly 10 years ago. Issues of the day were stated as:

- The tally and seniority system within the industry
- The restrictions on export requirements that govern the practices in the industry impacting on OHS
- The increased demand for grain fed cattle in the export market making the cattle more difficult to bone due to the high-fat content in the meat
- A lack of responsibility and training in OHS at all levels of the industry
- The economy putting pressure on all companies
- No Code of Practice in the meat industry (the document stated that there was a code of practice being drafted in Victoria, this may refer to the National Guidelines)
- Little planning for OHS in the industry

Other items in the discussion that are of note was the involvement of students from the Centre for Human Resource Studies at the University of South Australia which provided sound scientific validation for the Training Needs Analysis and the development of the training materials, and assisted with the literary and numeracy challenges associated with the materials.

Another innovative method used to involve industry members was a poster competition held among union members, which was enthusiastically supported with innovative and high standard entries. The eventual winning character (the 'MeatSafe' logo) was used for safety messages, posters and booklets.

Case studies used in the training material based on real incidents arising from the meat industry increased the credibility of the materials.

Recommendations

The report strongly stated that many of the benefits that were realised as the result of the project would be lost without ongoing additional support for the management of OHS within the industry. One recommendation was for a full-time position to be funded by WorkCover for an OHS officer/training to work specifically with the meat industry. The suggestion was for this position to operate out of the ITAB. Another suggestion was for WorkCover to formally approach TAFE to review the OHS component of courses for the meat industry for new entrants; this was seen as being an appropriate way of preparing the next generation of managers for the industry. Interestingly both of these have occurred, but not until 1998 and not operating out of the ITAB.

Further recommendations to the industry included the development of an OHS Code of Practice that would be enforceable. This is not expected to occur. Other recommendations included that regular forums jointly funded by the employer and employee association in the industry continue and that the ITAB, MATFA and the AMIEU regularly promote the training packages that were developed and hold library copies of the packages making them available to industry on cost recovery basis.

While the former has been revisited via the WorkCover Corporation SAfer industry's approach, the latter appears to have completely disappeared with all efforts made to purchase or source the documents frustrated.

Issues identified for the industry to address in the future continue to be of importance: induction training, job rotation, the need for legal responsibilities to be constantly emphasised and the poor management of rehabilitation in the industry creating much financial loss and human suffering and requiring further education.

In closing the consultant who carried out the project comments that “the meat industry should no longer accept high injury rates as a compromise for production. Only by a proactive approach, determination and constant improvement on existing OHS systems can the previous poor OHS record be rewritten.”

For further information about this project contact Mr Barry Shaw, Meat Industry OHS Consultant, WorkCover Corporation SA, ph (08) 8233 2571.

10 General Meat Industry OHS Guides and Audits.

10.1 Health and Safety Guide for the Beef and Small Stock Processing Industry

This guide has been developed for employers, employees, contractors, suppliers and manufacturers in the beef and small stock industry. In this case the Beef and Small stock industry includes processing live cattle, sheet, pigs and goats but excludes poultry, emus and kangaroo. The guide aims to help employers and employees take a fresh look at their workplace.

The first section covers generic OHS requirements under the Queensland legislation. The importance of effective health and safety management is stressed and general information is provided on consultative mechanisms. Queensland legislation requires employers and principal contractors with workplaces of more than 30 employees to nominate a suitably qualified Workplace Health and Safety Officer. The duties of the Workplace Health and Safety Officer are described and the need for a workplace specific health and safety policy statement is outlined. Training requirements are noted with the postscript of the importance of the role of the supervisor to maintain healthy safe work practices. The need for preventative maintenance of plant and equipment is explained, as is the need for adequate reporting and investigation including, in the latter, legislative reasons and statistical reasons. The emergency planning and first-aid responsibilities are outlined and the need for an effective rehabilitation program is briefly covered

Risk Management

The general hazard management principles of hazard identification, risk assessment and risk control measures are outlined, along with some specific examples for the meat industry. In particular the guide outlines the hazard of noise and its management in a meat plant and describes the need for a heavily integrated approach, due to the fact that hazards in the beef and small stock processing industry cannot be managed in isolation. A background is given of the aetiology of noise induced hearing loss and definitions of acceptable noise are defined, i.e., 85dB(A) exposure over an eight-hour period, with the peak value of 140dB(A) as the absolute limit to which a person may be exposed. The standard non-technical measure of persons having to raise their voices to be heard by another person 1 m away is given to outline the fact that hearing is at risk if this occurs. Multiple causes of noise exist in the meat industry, including live animals, movement of metal hooks etc, often compounded by walls, floor and ceiling surfaces constructed of hard materials. Guidance is given on conducting a noise assessment, then appropriate control measures are suggested including design, substitution, redesign, separation, administration, and finally personal protective equipment. The *Code of Practice for Noise Management at Work* is referred to for further information.

Other common hazards are then addressed including: knives, saws and cutters, manual handling, physical injuries from animals, extremes of temperature, occupational diseases, slips, trips and falls, mechanical hazards, hazardous substances and confined spaces. Each are briefly described in terms of their injury risks, and possible control measures are provided. The area on manual handling cites the *Queensland Code of Practice for Manual Handling*. The section on physical injuries from animals is broken down into livestock handling and slaughtering. Both sections on extremes of temperature (cold and heat) contain some excellent control options for the reader. The three common zoonotic diseases of major concern in the beef and small stock processing industry are outlined: Q Fever, leptospirosis and brucellosis. The significant hazard of skin cancer is noted, and it is pointed out in the slips, trips and falls section that one may sometimes control one hazard and provide a platform to improve an employee's work height, but create another hazard in the process, that of a trip hazard.

The section on mechanical hazards refers to the *Code of Practice for Plant*, while the hazardous substances section impresses on the reader the importance of up-to-date and recent Material Safety Data Sheets. In addition the issue of decanting and labelling is touched on and a variety of control measures are offered. The section on confined spaces correctly points out that these dangers are often underestimated, ignored or not understood, leading to tragic accidents in the past. The risks associated with confined spaces are noted, i.e. toxic vapours, flammable vapours and suffocation. The control measures include a team approach, permits and effective communication strategies.

The Queensland Workplace Health and Safety legislation is explained, including the general duty of care, the issue of practicability, the responsibilities for the employer, designer, manufacturer, importer and supplier, the principal contractor and the employee. The penalties for OHS legislative infringement are outlined including fines and imprisonment. An explanation is given of the legalities of the Queensland Regulations and Codes of Practice.

Two appendices are provided, one an example of health and safety policy for a small plant and the other the starting point for a hazard checklist.

For copies of this product contact Division of Workplace Health and Safety, (07) 3225 2000.

10.2 Meat Processing Industry Audit Report

This report, found at the Queensland Government Workplace Health and Safety web site at www.detir.qld.gov.au/hs/audit/audit26.pdf outlines the results of the 1999 Meat Industry Audit program conducted by the Department of Employment, Training and Industrial Relations (DETIR) in Queensland. The meat industry was selected for the purposes of the Workplace Health and Safety Industry Audit Program due to its high workers compensation claims experience. The audit involved three inspectors auditing nine workplaces in the South West Region of Queensland.

Key issues identified included safe use of plant, record-keeping and proactive risk management practices, ergonomic issues and falls from heights. While in general it was found that health and safety was a high standard, and that processors had a good understanding of their legal obligations, a total of 38 statutory of notices, comprising of 37 improvement notices and one prohibition notice were issued during the audits.

The primary aim of the Workplace Health and Safety Target Industry Audit Program is to seek compliance with health and safety legislation. The terms of reference covered some activities under the ANSZIC code 2111 (Meat Processing), and included slaughtering, boning and slicing, packing (including freezing) and rendering, but excluded game slaughtering, animal oils or fat manufacturing, meat manufacturing or preserving, and dehydrated meat manufacturing.

Although the Queensland meat processing industry is recognised as one of the State's vital industries, many occupational health and safety problems persist. While the prevalence of lacerations and abrasions has declined in recent years, injuries from ergonomic hazards, such as occupational overuse and back injuries, appear to be increasing, particularly in the boning and slicing areas.

The report outlines the Queensland meat processing industry statistics in terms of major categories of compensable injuries from 1994 - 1998. The statistics presented are compatible with other States and Territories with nearly one-third of injuries associated with muscular stress of some type.

In addition previous studies affirmed a lack of a proactive approach to health and safety and suggested that a genuine commitment from senior management was required to ensure ongoing

improvements. Other assessments conducted by Workplace Health and Safety Inspectors in the northern regions of the State in 1996 and 1997 also found issues of non-compliance in the areas of manual handling, hazardous substances, plant (in particular guarding), confined spaces training, access and workplace health and safety training.

Methodology

The methodology used included a stratified sampling strategy to select nine workplaces from the 23 beef and small stock processing plants operating in the South West region of Queensland. The audit checklist covered the following elements:

- Management issues including health and safety consultation, managerial commitment and training and supervision.

- Administrative issues including notification, reporting and investigation, prescribed occupations, emergency planning, fire precautions and first aid.

- Workplace issues including noise, plant and equipment, ergonomics, hazardous substances and dangerous goods, handling animals, zoonotic diseases, confined spaces, personal protective equipment and workplace amenities.

In addition noise assessment was undertaken at four of the nine workplaces, where no assessments had taken place in the previous two years.

The duration of the assessment was dependent upon the size of the workplace and appropriate risk management principles were applied to identify and evaluate risk areas, including discussions with management and workers, review of previous risk audits, review of training records, incident reports, task analysis and observation reports and review of relevant legislation and standards.

Entry and exit meetings were held with key stakeholders to explain the process, answer any questions and provide feedback on any statutory notices that may have been written.

Client feedback was sought via a questionnaire covering the audit process, auditor performance, outcome evaluation and recommendations and comments. The feedback questionnaire was conducted by telephone by an inspector who was not involved in the audit process.

Some limitations of the audit were noted; i.e. the assessments were not exhaustive, they only provided a static picture of each workplace on the specified audit day and assessments were only conducted during day shift, therefore the hazards and associated risks of afternoon and night shift work remained largely unidentified.

Results

The document elaborates on the results, with findings of note outlined as follows:

Risk Management - it was noted that several workplaces had not adopted any proactive risk management system.

Drug and Alcohol Policy - all except two workplaces had documented disciplinary and dismissal policies for workers, including reference to being under the influence or possession of alcohol and or non-prescription drugs on the premises.

Training and Supervision - for general on-the-job training all of the workplaces conducted "buddy" or "grandfather" schemes where new employees were placed with an experienced worker for a probation period. One workplace had created a separate work area (called the "training room"), where new workers, workers returning from extended breaks and workers on return to work or rehabilitation programs could perform light duties. This room was equipped with a rise and fall platform for boning of carcasses and conveyors operating at a slower pace than the boning room conveyor. Packing tasks were also incorporated into the room with an allocation of supervisors and trainers to provide supervision and support. Only one large workplace had the luxury of employing supervisors who had no additional work responsibilities other than their supervisory duties.

First Aid - in several workplaces there was no evidence that first aid facilities and supplies were based on a risk management approach, i.e. to identify and assess the causes of workplace injuries or illnesses, and allow for the appropriate selection of facilities and services. Analgesics, in particular, were freely available to workers at two sites.

Noise - only two workplaces had considered engineering controls, such as replacing noisy machinery with newer equipment and introducing sound barriers to minimise exposure to excessive noise, rather than just relying on the mandatory hearing protection strategy utilised at all the other workplaces.

Plant and the Equipment - in most workplaces the condition and maintenance of plant was of a high standard. Inadequate guarding of "nip", entanglement and entrapment points, including conveyors, fans, V-belts, augers, cookers and feeders were observed in six workplaces. Other areas of non-compliance were found with plant poorly or incorrectly maintained, including lack of inspection and maintenance records, inadequate emergency stop procedures, modifications to plant not in accordance with manufacturer's standard (resulting in a prohibition notice), no tag out/lockout system in place for maintenance and cleaning of plant and inadequate emergency provisions for blast freezers. Further, in the majority of cases, the knife sharpening grindstones were set to turn towards the operator, whereas knives should only be ground when the direction of travel of the stone is away from the cutting edge of the knife blade.

Electrical Equipment - in four workplaces electrical equipment was found to be either out of test date or never tested in recording with regulations, and in two workplaces electrical leads were found to be lying across access ways or otherwise creating trip hazards.

Personal Protective Equipment - in all workplaces management provided personal protective equipment such as mesh gloves, gauntlets, cut resistant gloves, aprons, boots, hair nets, hearing protection, work gloves and eye protection. Slaughtermen, boners and slicers were required to provide their own tools (knives, and steels, etc.). In all the workplaces the employer met the cost of laundering and issuing personal protective equipment. Two workplaces also provided woolen inserts for rubber boots to provide cushioning for the feet. Cut resistant gloves, for the knife hand, we're issued as mandatory personal protective equipment at five workplaces.

Prolonged Standing - anti fatigue matting, footrests, woolen boot liners, sit-stand stools and job rotation were examples of controls implemented in the workplaces visited. However it was noted that in three workplaces anti fatigue matting was not considered as an option due to the workplace's perceptions of health regulations stipulated by an external organisation (AQIS). However, AQIS requirements are not an obstacle to the implementation of anti fatigue matting to prevent injury from prolonged standing.

Slips, Trips and Falls - three workplaces had applied slip resistant coating in the slaughter floor and boning areas, but most workplaces relied on signage, training and worker caution in areas where slippery floors were identified as hazardous.

Access - the practices of climbing on the and over belt conveyors, using faulty ladders and using ladders as permanent working platforms were observed in four workplaces.

Hazardous Substances - hazardous substances in use in the meat industry include formaldehyde in small quantities for testing meat products, caustic for cleaning hooks and rails and cleaning substances. Eight workplaces registered non-compliance for: no evidence the risk assessments having been conducted, lack of training and induction to employees exposed to hazardous substances and Material Safety Data Sheets (MSDS)'s not available to employees who may be exposed to the hazardous substance. In addition four workplaces had inadequate provision of material safety data sheets.

Dangerous Goods - advice was given at three workplaces where inadequate emergency provisions and bunding of storage areas for dangerous goods (including flammables such as paint, LPG and other fuel, and large quantities of corrosives) existed.

Legionella - cooling towers for air-conditioning systems were in operation at five of the workplaces visited. Regular maintenance and inspection was being conducted, however accurate records of the inspections were not maintained in four of the workplaces.

Q Fever - all workplaces visited had some form of Q Fever policy. However at two workplaces, it was evident that certain workers or visitors may have been exposed to Q Fever, particularly those workers whose religious beliefs precluded them from obtaining vaccination and for sub contractors. Recommendation was made to the two workplaces where potential problems were highlighted that workers refusing to participate in the Q Fever program and new workers appointed prior to testing be required to wear respiratory protection (minimum class P2 particular respirator) at all times on the plant. It was also highlighted to all workplaces that new workers to the industry should be tested as soon as possible after appointment and that respiratory protection should be worn prior to testing and for at least two weeks post vaccination, since it takes this long for immunity to develop. Furthermore, workplaces were advised that contractors and visitors should be required to show proof of immunity before being allowed on the plant, or be required to wear respiratory protection while on the premises.

Confined Spaces - all workplaces visited had some form of confined space in operation, such as the boiler/rendering section, maintenance work on roofs, silage storage areas, and/or chillers. Advice was given to two workplaces where training programs for workers required to work in confined spaces were inadequate.

Falls from Heights - in four workplaces the working platforms at first leg/changeover/second leg/changeover was observed to be at a height of over 2 m. There was no evidence of either guardrails, or a fall arrest system, or a risk assessment having been conducted to determine the level of risk of falling from these platforms. For each of these workplaces improvement notices were issued to conduct a risk assessment to determine the level of risk and implement appropriate controls to eliminate the risk of falling from the work platform.

The document concludes with two appendices: the target audit checklist, and the workplace feedback sheet.

For copies of this product contact Division of Workplace Health and Safety, ph (07) 3225 2000.

10.3 OHS in the Meat Processing Industry

This brief document consisting of five pages is found on the National Occupational Health and Safety Commission (NOHSC) web site. Brief information is provided on two common hazards found in the meat industry: Q Fever and manual handling. The Q Fever section briefly describes what the disease is and what one is required to do, including pre-screening and vaccination and where to go for more help and information. The document is very brief and is of value to employees who are time-constrained and are looking for quick solutions to common problems in the industry. The Q Fever sections also mentions the legal case in New South Wales where the courts awarded a $1.2 million payout to a meat inspector infected with Q Fever. The reader is referred to the Meat Research Corporation Q Fever Information Kit for the Australian Meat Industry for more information. Issues such as visitors to the workplace, employee refusal of vaccination, what employers are required to do and signs and symptoms of the illness are covered.

The manual handling section essentially refers the reader to the Western Australian product found at their Safetyline web site. The Western Australian package is summarised under No 5.2 in this collection of summaries.

For further information about this product, use the National OHS Commission's website at http://www.nohsc.gov.au

10.4 A Practical Occupational Health Guide for the Meat Industry

The Occupational Health and Radiation Control Branch of the South Australian Health Commission published this document in September 1987. It is aimed at helping the reader deal with problems found in abattoirs and slaughterhouses.

This document is out of date, but is of mild interest due to its historical context and the somewhat sobering fact that not a great deal has changed in the meat industry in South Australia.

In 1987 the meat industry in South Australia employed 2,500 people, and 29,000 people were employed throughout Australia. The long history of the meat industry is outlined, with the note that only in the last 80 years had much changed in terms of mechanisation and scientific advance. In the late 19th century, particularly with regard to standards of hygiene and pollution, public authorities moved to build centralised public slaughterhouses. The document is particularly aimed at offering advice on the establishment of occupational health services within those public slaughterhouses.

Statistically, in 1984 to 1985 the rate of injuries in the meat industry was five times the rate of other injuries in the workforce as a whole, with the point made, as has often been made in subsequent publications that this creates a massive loss for the industry, the individual, and the community. As is still found today, knives created approximately one-quarter of all injuries.

The document takes the stand that health and safety programs are essential to ensure productivity and good public and industrial relations with particular regard to the health and safety and well-being of employees, bystanders and the consumers of the product.

The mainstay of the program is deemed to be a health and safety policy that incorporates measurable objectives and the means for evaluation. It is interesting to note that at the time (1987) the document states that there was an opportunity for the then MATFA (NMA) and the AMIEU to pool their resources to enable the development of an OHS service that could then be useful to provide OHS expertise for small abattoirs, slaughterhouses and butcher shops. The document

proceeds to outline the perceived benefits of an occupational health service; this part is very focused on a medical model.

Occupational hazards are outlined including physical, chemical, biological and ergonomic hazards.

The document states that expertise can be called upon from the Health Commission Occupational Health Branch in South Australia to address the issues of back problems in the workplace, this is now out of date as this expertise is no longer available. In addition some outdated concepts such as a cold pack for burn treatment is espoused. However there is still some useful information, and as stated above there is a great deal to be gained by reviewing historical documents to evaluate current practices.

Issues such as chilblains, frostbite and hypothermia are outlined within the boning room environment, with some medical detail such as the type of behaviour that might be expected within the first signs of hypothermia, i.e. bizarre or non co-operative behaviour, followed by slowness and lethargy. With the issue of hyperthermia, i.e. excessive heat, the point is made that ample drinking water is needed, not salt tablets.

The author utilises an interesting approach to cuts and lacerations, stating that as a 27-person chain will make one million to 1.5 million cuts in a shift, the rate of even one laceration per million cuts will result in a substantial number of injuries per week. Lacerations from bone fragments are more likely to become infected. The author states that most cuts are to the non-knife hand, or into the abdomen or the leg, while the run through injury is considerably decreased by the modern design of knife handles. Unfortunately this is not the case, however it may be that the incidence of run through injuries was even worse prior to the 1980's.

The document appears to become increasingly medically based, as it goes into the types of treatments for cuts including the type of recommended antiseptic agents, the use of steri-strips and antibiotic spray and the need for tetanus immunisation. Further advice is given on the need for knife sharpening skills, with the point made that the worker who does not have a sharp knife will tend to slash or saw instead of cutting cleanly. Further, that a knife should always be kept in its scabbard when not in use, that knives should never be carried in the hand when moving from one workstation to another, that knives should not be loosely stored in lockers and that no attempt should be made to catch a dropped knife.

Skin disorders are outlined; with the distinction made between irritant dermatitis and allergic dermatitis, and comment that the frequent hand washing required of the meat industry employee can create some difficulties in this area.

Occupational overuse injury is briefly mentioned as a significant problem in the meat industry, with the impaired functions covering the usual problems such as tenosynovitis, carpal tunnel syndrome etc. Treatment involves avoiding activity that caused the problem and gentle muscle strengthening or stretching exercises.

The hazard of noise is mentioned, with the note made that the human ear has a remarkable range, therefore noise needs to be presented in a logarithmic unit, i.e. the decibel (dB). The socially isolating effects of noise induced hearing loss is outlined and the point is made that noise induced hearing loss is irreversible and incurable. The document advocates a hearing-testing program including audiometry carried out by an occupational health nurse or by an occupational health service, but only a brief mention is devoted to the need to provide hazard controls at source.

Zoonotic diseases are covered somewhat extensively, including brucellosis (where the document states that Australia will be brucellosis free by 1992), leptospirosis, Q Fever, skin infections, anthrax, fungal skin diseases, hydatids, erysipeloid (streptococci infections), orfs, salmonella, tetanus, tuberculosis, and warts. At this stage the document appears to lapse into something close to a text for a General Practitioner to the extent where different treatment modalities including different types of drugs are discussed as well as their efficacy. This is of mild interest to persons who have a medical background within the meat industry.

Finally a section on personal protective equipment is briefly offered.

For more information about the *Practical Occupational Health Guide for the Meat Industry*, contact SA Health Commission on (08) 8226 6000.

11 Other Meat Industry OHS Guides

11.1 Poultry Processing Industry Guide

This document has been reviewed in a minimal fashion - it does not relate to red meat but it does outline some applicable issues.

The document is not dated but was presumably written for the Queensland poultry industry before the update of the Act, as it refers to the *Workplace Health and Safety Act, 1989*.

The document commences with an outline of the duty of care under the legislation and goes on to outline the issue of practicability. The point is made than in terms of practicability, the greater the risk, the more likely it is that it will be reasonable to go to substantial time, trouble and cost to address it. It goes further to say that judgment is specific to each workplace, and the size or financial position of the employer is not relevant.

Routine issues are addressed within the risk management philosophy, i.e. identification of hazards, assessment of risks, and the application of control measures.

Practical guidelines on hazards within the poultry industry are then outlined. Manual handling issues and suggestions for control of hazards related to de-crating and hanging live birds, hanging plucked birds and operating electric saw/power rotating knives and boning room operations are offered. In general advice follows a similar outline, i.e. looking at design and redesign options, automating work processes, providing adjustable workstations and lowering or raising heights of workstations. Helpful advice and visuals are included on the use of sit-stand stools or “butt-rests” to reduce the effects of continuous standing, the use of trolleys to transport heavy containers, and the design of knives with the aim of keeping the wrist as straight as possible. Packaging and storage concerns are also covered including the use of pallet lifters, pallet turners, roller conveyors and vacuum lifters.

A small section is devoted to a pictorial guide on correct and incorrect knife handling methods with the aim of reducing unnecessary force on the index finger and thumb. Issues with the use of electric saw/power rotating knives are covered, as well as a brief mention of their maintenance.

The section on personal protective equipment advises the use of steel mesh gloves and arm guards or the same made from a cut resistant fibre to protect the non-knife hand. No mention is made of the knife hand except to recommend that a rubber glove not be worn on the knife hand due to the possibility of it creating an insecure grip. Where workers are required to work in close proximity to each other, again arm guards are recommended, particularly on the line when preparing wings.

Other hazards that are common to all aspects of the meat industry are covered, i.e. slips trips and falls, noise, mechanical hazards (plant), and hazardous substances. Further advice is given on working in extremes of temperature, including a helpful section on freezing chambers.

General advice follows outlining the needs of young workers entering the workforce and the need to develop a system to maintain information in relation to plant, equipment, and hazardous substances and work processes. Legislative administrative requirements are outlined, as well as emergency procedures and the Codes of Practice, Australian Standards and the relevant provisions of the *Workplace Health and Safety Act 19*89.

Finally some exercises for stretching and flexibility are outlined in order to work safely and efficiently.

Copies of the *Poultry Processing Industry Guide* can be obtained from Division of Workplace Health & Safety, Queensland, ph (07) 3225 2000.

11.2 Poultry Processing Guide - draft

This comprehensive document was recently produced by the MIAG in Queensland and updates the Poultry Processing Industry Guide (reviewed as No 11.1).

The document opens with an industry overview and an outline of injuries and diseases suffered by the Queensland poultry processing industry, with sprains and strains making up over 50% of the total workers compensation claims.

The legislative obligations under the Queensland *Workplace Health and Safety Act* are outlined and the term risk management is clarified as simply another name for a problem solving strategy. Hazard control measures are presented according to the hierarchy of control, which is outlined in table format in the document.

The case for managing health and safety is presented as in effective management of workplace health and safety making good business sense.

A number of manual tasks in the poultry processing industry are offered control options under the hierarchy of control. These tasks include lifting heavy trimming tubs and trays, pushing and lifting heavy cartons, using vibrating knives and saws, handling live birds, and activities which require repeated forceful gripping and turning actions, such as trimming around small bones.

Hand tools and other plant and equipment are dealt with in a likewise fashion including the need for maintenance programs, guarding and other general precautions such as ensuring that hair, clothing or jewellery cannot get caught in machinery.

Practical and specific control options are offered for specific pieces of plant found in the poultry industry such as screw conveyors, forklifts, mincers and mixers, gravity and horizontal fed slicers, sausage machines and meat tenderisers.

Hazardous substances and confined spaces are covered, as is the general work environment including electricity, lighting, floors, cold and heat. Control options are offered for all, including for sun, noise and hot water. Diseases and illnesses related to the use of dry ice and dust, occupational overuse syndrome, campylobacter and salmonella infections are addressed, as well as smoking and allergies.

Other health issues including violence at work, workplace bullying and needle stick injuries are covered, as well as a section on drugs and alcohol in the workplace.

Five appendices conclude the document: risk management overview, risk management form, stretches, first aid and reference material.

Copies of the *Poultry Processing Guide* can be obtained from Division of Workplace Health & Safety, Queensland, (07) 3225 2000.

11.3 Manual Handling and Noise in the Poultry Processing Industry

This flyer was sourced from the Worksafe Australia Library and has a number of solutions relevant to the red meat industry.

The first section outlines a systems approach to manual handling risks as well as problems and solutions seen in the industry. Manual handling is defined per the *Occupational Health and Safety (Manual Handling) Regulations 1988* and occupational overuse syndrome is defined per the *Code of Practice for Manual Handling (Occupational Overuse Syndrome) 1992*.

A preventative manual handling program is described as having four key components: development of strategy, preparation of the team (provision of training and information), implementation of the strategy and review and evaluation. Consultation with health and safety representatives and employees is an essential part of a successful systematic approach and should occur throughout all stages of the manual handling program.

A useful diagram closes the first section by illustrating a systematic framework through which manual handling risks should be addressed.

The second section outlines problems and solutions seen in the industry and opens with:

- The back landing area where employees manually lift, carry and place crates of live birds on a conveyor and hang live birds on the shackle slots. Solution ideas are offered such as a scissor lift to transfer crates at waist height and the installation of an automated system.
- Employees stand for most of the shift to inspect chickens after the bleeding and de-feathering process, suffering discomfort and tiredness in their legs. Solution ideas include matting to reduce discomfort from standing on cold surfaces and sit-stand stools or high chairs to reduce the amount of standing.
- In the evisceration area hand removal of the entire intestines requires repeated forceful gripping and pulling. Solution ideas include automation and redesign.
- In the spin chilling area ice is shovelled from the ground and tipped into the spin chill, which is at shoulder height. Solution ideas include ice being shovelled into a ground level entry screw conveyor which transfers the ice directly into the spin chill, the spin chill fitted with a refrigeration system to replace the ice, or the use of a dry chill process instead of spin chilling.
- Injuries in the boning, trimming and slicing section include wrist sprains and strains due to the repeated use of a boning, slicing or trimming knife. Issues related to the design of the knife handle, blunt knives and knife sharpening are discussed and other manual handling problems in boning areas are also discussed.
- Further manual handling issues in the packing area and the cold storage area are addressed as well as issues related to large birds (approx 2.25 kg) and slippery floors.

The second part of the flyer relates to noise and states that there is no cure for noise induced hearing loss. It covers noise management and examples of noise control measures specific to the poultry industry. A systematic approach for noise management includes taking noise into account at the design stage, carrying out risk identification, assessment and control in consultation with employees.

Copies of this product are available from the Victorian WorkCover Authority, Victorian WorkCover Authority, Level 24, 222 Exhibition Street, Melbourne 3000, Phone 9641 1555 or at their website, http://www.workcover.vic.gov.au

12 Hygienic Production of Meat

12.1 Australian Standard for Hygienic Production of Meat for Human Consumption

This document is of some relevance to this review because of the interchange between the hygienic production of meat for human consumption and OHS considerations. The document includes quality assurance programs, operational hygiene requirements, ante-mortem inspections, post-mortem inspections and disposition, slaughter and dressing, general hygiene in the processing plant and further processing.

The section on quality assurance programs outlines among other issues the seven principles applied through Hazard Analysis Critical Control Point (HACCP). The operational hygiene requirements section requires the outcome that hygienic controls exist for all operations to prevent contamination of product. This covers numerous issues such as amenities for the use of employees and inspections staff, the cleanliness of equipment, implements, tables, utensils including knives, steels and knife scabbards, protective gear and containers. In addition the requirement that knives, brisket shears and other carcass contacting equipment used in slaughter or dressing be sterilised between carcasses is stated. Other issues such as pest control and requirements for animal control are outlined, as are requirements for the hygiene and health of personnel. Of particular relevance in the use of cut resistant gloves and mesh gloves is the section requiring that protective gloves for use in the handling of meat be maintained in a sound and clean and sanitary condition, and that gloves must be of a colour that allows the detection of visible contamination.

The section on ante-mortem inspection outlines requirements for all animals presented for processing, such that they be handled in a humane manner, adequately rested, and held in secure, clean larriages with an adequate supply of drinking water. In addition the inspection of animals is required to cover the issue of notifiable diseases with the course of action to be followed determined under relevant State or Territory legislation.

Section Seven covers post-mortem inspections and disposition and requires the outcome that only wholesome meat is passed for human consumption.

The section on slaughter and dressing outlines the requirements for stunning and bleeding animals and abattoirs in accordance with the Code of Practice for the Welfare of Animals at Abattoirs. The sometimes difficult issue of avoiding contamination of the khakis within jester is outlined as is very requirements that stunning and sticking for religious slaughter again be carried out humanely according to the above code of practice. Specific requirements follow for dressing of the carcass that frequently have implications for occupational health and safety.

Section 9 outlines requirements for general hygiene in the processing plant where consistent and routine applications of effective disinfection and sanitation prevent microbiological contamination of the meat. Further processing is covered in section 10 such as requirements for breaking out, boning out and packing.

Five appendices then cover specific inspection details for microbiological standards, physical contamination standards, ante-mortem procedures and preventive action, post-mortem observations and dispositions and residue standards.

Copies of the Standard are available from CSIRO Publishing, PO Box 1139, Collingwood, Victoria, 3066, phone (03) 9662 7500, or through their website at: http://www.publish.csiro.au

12.2 Effectiveness of Knife Sterilisation Between Spear Cuts

This document has no direct relevance for OHS in the meat industry, however it outlines the fact that hygiene issues often constrain OHS practices within the industry. The Victorian domestic meat processing sector were concerned that an interpretation of certain clauses within the *Australian Standard for Hygienic Production of Meat for Human Consumption* meant that the knife must be sterilised between each opening cut when penetrating the pelt or hide, irrespective of any visible evidence of contamination.

The MRC commissioned research to identify if there was any statistical difference in microbial levels between the two methods of operators washing their hands and washing and sterilising their knife between each carcass, and when the knife became visibly contaminated; and operators doing all of the above and additionally sterilise their knife following each penetration of the pelt.

There was no statistical difference, and the results of this trial suggested that the sterilisation of knives after each pelt-opening cut on the same carcass by the operator had little or no impact on the final microbial status of the carcass.

Copies of this publication are available from Meat and Livestock Australia, ph (02) 9463 9166.

13 Injury Management and Rehabilitation.

13.1 National Best Practice Rehabilitation Model

This project was part of a number of projects aimed at assisting the meat industry to adopt OHS best practice principles. This project aimed to provide a national best practice model for rehabilitation in the meat industry.

The key features of the model are that rehabilitation commences early, is workplace based, is managed by a team, coordinated by a rehabilitation coordinator, and actively supported by the workers compensation insurance company and the OHS authority. In addition, rehabilitation needs to be a documented process reviewed at regular intervals, measured against performance indicators and supported by consistent human resource strategies. And finally, staff need to be aware of and understand the process of rehabilitation, and rehabilitation needs to be part of a proactive accident prevention strategy.

In the initial part of the research report the consultants noted that the meat industry is spread throughout Australia with a proportion of companies in rural areas with limited access to or choice of support facilities for rehabilitation. In addition the management teams tend to be small and frequently cover a number of roles, and the general practice and knowledge of rehabilitation was found to be variable.

The methodology included a literature review and field research, including site visits to large, medium and small meat facilities. Using the Australian Best Practice Demonstration Project findings the consultants cross-referenced the main elements to the Meat Research Corporation best practice elements for OHS. Sites visited were assessed against the joint best practice indicators of strategy and management commitment, structure and integrated OHS systems and risk management approach, measurement and control systems, development of positive performance indicators, people management, training and employee empowerment and participation. In addition items specific to the Australian Best Practice Demonstration Project were external relations, technology, process improvement and change leadership.

Items specific to injury management were noted within each category such as within strategy and management commitment where it was noted with some concern that three of the six sites were holding back on commencing formal injury management programs until claims were determined. However some companies demonstrated a sound approach based on task analysis and identified the specific duties that would be suitable for specific injury types, while other sites used what appeared to be a generic list of “light duties” which limited the return to work options.

Within the structure/integrated OHS systems category it was noted that where team approaches to case management existed they were reported to be working well. Within people management/training and communication two sites stated that they continue to use the “gate recruitment” method for selecting casuals. When external relations were assessed all sites stated that their relationships with their local doctors had a significant effect on return to work outcomes. Change leadership assessment found that while management commitment is stated, most of the sites did not follow through with action by measuring or rewarding good performance in OHS and rehabilitation. When employee empowerment and participation was tested it was found that the degree to which employees were consulted about health or safety, rehabilitation and changes to work processes was variable, but in most cases was low.

The document then enlarges on the model, supplemented by a diagrammatic presentation of the model and a further flowchart outlining the rehabilitation process model. A rehabilitation process model is outlined in full with specific practical advice on documentation, referral to local doctor or hospital, the role of the rehabilitation coordinator and formal rehabilitation plans. Pointers are also provided on a process for return to usual duties, permanent alternative duties and for an evaluation of the rehabilitation program.

An implementation plan presents strategies to implement the best practice rehabilitation model and recommendations for uptake that require leadership to sustain and activate the initiatives.

Three appendices provide details on the literature review, the site visits summary and the research interview tool.

13.2 Feasibility Study – NSW Injury Management

This project, titled *Feasibility Study – NSW Injury Management regarding the need to assist NSW Meat Processors to manage injuries at the Plant Level - final report 1998* aimed to confirm the then injury management practices of the New South Wales meat processing sector and develop a strategy for reducing the cost and number of injuries, then eventually reduce the premiums.

Workers compensation tariff rates in New South Wales had escalated and in April 1998 the NSW Attorney General announced recommendations for reform that had a primary focus on the early intervention and injury management at an enterprise level.

Objectives

The NSW Country Meatworks Association (CMA) feasibility study set out to identify major stakeholders who could assist the industry to improve injury management, confirm commitment from the industry for the adoption of an injury management project and help the industry to improve their injury management practices. Further the objectives were to identify strategies for plants to reduce their premiums, review data collection and analysis methods, identify methods of improving quality and timeliness of the data available from WorkCover and provide for other data collection measurement tools such as positive performance indicators.

Methodology

The CMA gathered a total of 17 meatworks for participation in the study. Each company was surveyed and each organisation was visited. Data from the surveys was aggregated to provide trends and specific recommendations were made both while debriefing companies and within this report.

Survey results

The survey found that the number of claims had reduced while the premiums had increased. However while claims reported to WorkCover had decreased, it was probable that the number of actual injuries had not decreased, but they were being managed more effectively on-site. Approximately 5-10% of claims were serious injuries or challenged claims where workers often stayed off work up to the New South Wales 26 week cut-off point, then had their employment terminated. This led to significant ongoing costs in the premiums level. In 1-2% of cases legal action had a significant impact on premiums.

General findings

Overall findings from the project included the feeling that the cost of WorkCover premiums in New South Wales were financially unsustainable, and CMA members generally supported a move away from WorkCover to private insurers for workers compensation.

Many managers did not understand the cost benefit of investing time and resources to closely monitor the claims estimates process, and legal action by the worker against the Company in some cases had involved significant costs. WorkCover inspectors had prosecuted 10% of sites, 90% of injuries were minor, and 40% of minor injuries involved lacerations. Generic training in claims management and rehabilitation had not been found to reflect the needs of the New South Wales meat industry. Many smaller sites did not have an OHS policy and sought guidance to develop one, and accountability for OHS was not well accepted at the supervisor level.

OHS was generally seen as responsibility of the OHS committee or the WorkCover/first-aid person and no abattoir felt that the OHS committee served any benefit as a focus to consultation on OHS issues.

Abattoirs with lower claims costs had close communication with the treating doctor and made efforts to find alternative duties, but often when rehabilitation failed both parties waited out the 26 weeks then terminated employment, despite the fact that WorkCover costs continue to affect subsequent premiums for three years.

Recommendations

Recommendations outlined included:

1. That the CMA project on OHS and injury management should proceed, and that a range of services would be required to meet the expectation of all CMA members. Initially the project should secure management and supervisor commitment, then conduct a program to explain in simple terms the cost benefit of good claims management and rehabilitation.

2. In the medium-term a simple OHS kit and set of tools to cover the risk management process should be collated and disseminated and liaison should be initiated with the Rural Division of General Practitioners.

3. In the longer-term a workplace culture should be developed that acknowledged that good OHS is everyone's business.

4. Further the project should source relevant publications, develop a glossary, review the functions of the current safety committee process, develop a simple question/answer program either in hard copy or via Internet or e-mail, and finally arrange for regional based OHS/injury management workshops and develop simple generic systems to ensure emergency management systems were in place.

In conclusion the authors found that the feasibility study confirmed the genuine need and interest for an extensive OHS and injury management project for the NSW CMA abattoir members.

Two appendices were provided with the report, the first outlined New South Wales WorkCover data for abattoirs from 1990/91 to 1996/97 and the second provided a copy of the survey questions.

13.3 NSW Meat Processors Injury Management Project Resource Pack

This excellent and comprehensive resource pack was put together for all New South Wales meat processors in March 2000 following funding from MLA and AMPC.. The geographical location of the meat processors involved in this project required an alternative to face-to-face communication; therefore an e-mail forum was developed. Priorities for the development of resources to be added to the forum were based on needs identified through an initial round of workshops, site visits, individual processor action plans and initial queries on the email forum. The resource materials placed on the e-mail forum are specific to injury management and include sample policies and procedures, sample tools and forms, background information on injury management principles, guidance notes, and tips for the development of systems.

A synopsis of the resources provided in this pack is as follows:

- Information on short and long-term performance indicators is provided both for the New South Wales meat processors' own use and for benchmarking purposes. The direction one would hope to see the claims figures heading is also included.

- Information on collecting and analysing performance data outlines what the injury management system needs to clearly document, as well as makes the point that a computer database may be helpful.

- Roles and responsibilities of all personnel including the Injury Management/Rehabilitation Coordinator's presumed knowledge and skills are outlined. Employer responsibilities are outlined as our employee rights and responsibilities. The responsibilities of the Workers Compensation Officer are outlined with the salient point clearly made that to avoid a conflict of interest the processor should separate the roles of Rehabilitation Coordination and that of the Workers Compensation Officer.

- A system for injury management document control is outlined, both in terms of basic document control rules and in terms of implementing and deploying policies and procedures. New South Wales specific documentation issues required by legislation for rehabilitation and injury management are comprehensively outlined, i.e. the maintenance of a register of injuries and treatment, notification of serious injuries to WorkCover, notification of injury to the insurance company, individual case files and the confidentiality of rehabilitation information.

- A job description for a first-aid officer is provided and a sample register of injuries and treatment is outlined.

- The resource pack continues with a sample letter to a doctor and an employee information sheet, as well as a sample authority form to obtain information. The difference between a Return To Work (RTW) plan and an injury management/rehabilitation plan is outlined as well as points on understanding the need for an early return to work and getting commitment from all parties. The term “suitable duties” is clarified and pointers are given on when to identify suitable duties and how to find suitable duties. Information is provided when the worker cannot do any of their previous duties and pointers are provided on implementing, monitoring and upgrading the RTW plan and program and closing the case.

Appendices include a sample return to work plan, a sample return to work weekly review format, a sample daily monitoring report, and a sample case closure and evaluation format.

External stakeholders are discussed with an explanation of what accredited means, who can refer to a provider, why to use a provider, when to refer and selecting a provider. Average charges are given and important points are provided on evaluating provider performance. The types of services that providers should offer are outlined and a sample service agreement form is provided.

The contents of an employee induction handbook are outlined including general information, grievance procedures, workplace safety, hygiene requirements, workplace anti-discrimination and quality assurance.

A sample information sheet explaining the company medical centre to employees is provided as are sample induction procedures. A sample employee induction record and sign off form is included as well as a general induction checklist and a checklist specific to the orientation of a new employee to a boning room.

Points on evaluation and improvement include an explanation of audit programs, as well as the elements of and criterion for injury management audit tools. For an overall evaluation of the internal injury management program several checklists are provided including an individual injury management checklist.

The importance of ensuring documents are completed in a timely fashion is pointed out, with reference to the fact that injury management in NSW is tightly governed by legislation and that litigation can be a fairly common occurrence. A sample employee satisfaction form is provided and information on the evaluation of external services and the use of performance data offer the final touches to this very comprehensive package.

Copies of this publication are available from Meat & Livestock Australia, ph (02) 9463 9166.

13.4 NSW Injury Management Project - Final Report

This final report, titled *New South Wales Meat Processing Industry Injury Management Project - Final Report - March 2000* overviews the key achievements and learning from the New South Wales Meat Processes Injury Management project and makes recommendations for the future.

Processor involvement and commitment to the process increased during the project with feedback demonstrating that participants gained value from being part of the project and also took action as a direct result.

A significant transition was made for most processors from viewing themselves as victims of poor legislation, unhelpful doctors, indifferent insurance companies and inappropriate claiming by workers, to recognise that they could manage this area and reduce claims and costs. At the close of the project, processors had a higher knowledge base and a better appreciation of the complexities of injury management. They were proactively working internally (with more formalised procedures, line managers and workers) and externally (with doctors, physios etc). Importantly, workers at a number of processors were seeing the injury management system as fairer.

The project, funded through by Meat and Livestock Australia and the Australian Meat Processors Corporation set out to:

- Develop more effective OHS management systems, in particular workers compensation and rehabilitation systems that provide a cost benefit

- Share examples of best practice and effective tools

- Lay the groundwork for the transition by companies within the industry to change to private insurers.

Eighteen meat processing companies registered for the project, of which two subsequently closed, two withdrew and three new companies joined during the course of the project. The project built on work carried out in 1998 when a best practice claims management and rehabilitation model was developed for the industry. (Report reviewed as 13.2)

The four stages of the project included laying the ground work, consolidation (including the construction of an e-mail forum, called the E-forum), implementation of the E-forum and development of the injury management resource pack then finally winding up the project.

Significant and specific achievements included:

- Improved first-aid and first-aid systems and training, including the broadening of the role of traditional first-aiders.

- Increased use of more formal action planning processes to assist with managing systems

- Rekindled enthusiasm within safety committees

- More clearly defined accountabilities and responsibilities, particularly in line management, and increased involvement with employees

- Increased and clearer role, profile and kudos for injury management coordinators and greater confidence of coordinators to manage injuries

- Improvements in the induction process

- Increased levels of relationship building with external providers, doctors, physiotherapists

- Increased recognition of the need for prevention

- In most cases improvements in return to work rates [in particular an increased confidence to stop practices such as the 4 x 2 rule (four stitches = two weeks off work)].

Remaining weaknesses included:

- Even basic workers compensation and injury data is still not routinely kept and monitored

- Individual injury management plans still lack detail, are not updated, and injury management processes remain informal

- Little integration of injury management with other management disciplines due to a lack of systematic management in general.

The most successful elements of the project were:

1. The E-forum. To overcome the problems with distance and the difficulties of organising regular opportunities for face-to-face communication for the widely spread processor group, it was decided to develop a specific e-mail forum (E-forum) to assist processors to share and gain information.

2. The Injury Management Resource Pack (summarised as 13.4 in this collection of summaries)

3. Network Meetings - these very popular network meetings were introduced following the regional workshops held during Stage One. The meeting objectives were to update participants on project progress and other MLA OHS initiatives, clarify processor needs and how the project team could assist, enhance the discipline offered to the program, foster relationships between processors to improve networking, identify strengths and gaps in processes in the injury management programs and facilitate sharing of success stories. These face-to-face meetings gained significant support from participants and were critical contributors to the success of the E-forum by building personal links between processor representatives (NB. These meetings have continued beyond the project).

4. External audits were conducted in the third quarter of the project within three participating companies and findings were fed back to the whole group of processors at network meetings.

Key learning from this project included:

- All processors travelled at different speeds, leading to some frustration on the part of lead companies, and lag companies requiring more hands-on assistance.

- The scope and nature of the project was somewhat clouded by the distribution of two self-assessment questionnaires (MISHCIF and injury management), creating some confusion.

- The lack of documentation is likely to be an ongoing weakness at many sites

- Self-assessments on critical minimal project criteria were not very accurate, probably due to inexperience.

- Due to limited preparation in some cases, there were varying degrees of success in developing action plans during the workshops.

- Network meetings were sometimes rushed and perhaps attempted to cover too much in the time available

- The project coordinator spent several hours on one-on-one coaching of participants to develop the necessary skills and confidence to use the E-forum.

Recommendations for future actions:

1. Continue the E-forum and network meetings.

2. Conduct external audits of all processors who are part of a project at the start of future projects as well as after the project as a means of providing a clear the way forward for each processor.

3. Set up a hotline to support processors with difficult individual cases to provide independent advice on possible action.

Copies of this publication are available Meat & Livestock Australia, ph (02) 9463 9166.

14 Statistics

14.1 Occupational Health and Safety Performance Overview

Meat and Meat Products Manufacturing Industry Australia, 1994 to 1995 (Meat Research Corporation)

The Statistics Unit of the National Occupational Health and Safety Commission (NOHSC) on behalf of the Meat Research Corporation prepared this report. The reader is referred to the original document for reference to in-depth statistics.

For the purpose of this review, the data is somewhat out of date, being provided by the Commonwealth, State and Territory workers' compensation authorities for the financial year 1992 to 1993. The data only refers to lost time injuries where the worker is absent from work for one week or more. Data for the Australian Capital Territory were not available, with classifications followed the Australian and New Zealand Standard Industrial Classification 1993 (ANZSIC). Occupations were classified in accordance with the ABS classification, the Australian Standard Classification of Occupations (ASCO). The ANZSIC industry codes of Group 211 cover meat and meat product manufacturing and are further broken down into meat processing, poultry processing, and bacon ham and smallgoods manufacturing. Data was collected from all Australian jurisdictions apart from the ACT, but as there are very few persons working within the meat industry in the ACT, this omission is considered negligible. However, Victoria changed its compensation system from 1993-94 onwards to cover only cases involving more than 10 days lost time from work, whereas other jurisdictions provided data for five days or more. This has led to an understated group of data for Victoria, however similar injury/disease patterns were evidenced in the data, and the author is confident that their analysis is a reliable reflection of the complete Australian picture at the time.

The publication focuses on the Meat Processing Industry Class, largely as the funding came from the Meat Research Corporation, but the author does provide comparative analysis with the poultry industry and the bacon ham and smallgoods industry as a means of outlining the full picture.

Number of Occurrences

The analysis commences with the number of occurrences, and the sobering fact that there were six fatalities in the Meat and Meat Product Manufacturing Group during 1994-95, more than the three cases reported for 1993-94, but less than the eight reported for 1991-92. Five of the six fatalities in 1994-95 occurred in the meat processing class.

The document points out that the statistics from 1994-95 imply that a worker in the meat processing industry class has almost one chance in five of experiencing a serious work-related injury over the course of their working year. When this is further projected to a worker spending their working life in the industry, on the balance of probability, they are almost certain (99.96%) to experience a serious, compensated work-related injury/disease over the course of their working life.

When considering new injury/disease occurrences, 38% of all cases were experienced in Queensland, 24% of cases occurred in New South Wales and these two jurisdictions accounted for nearly two-thirds of national occurrences.

Injury/Disease Incidence Rates

The meat industry's performance is poor in comparison with other industry sectors, with an incidence rate 7 times the National all industry rate. The meat industry at that stage was one of the worst performing industry classes in Australia in terms of incidence rates. Again the statistics appeared to identify Queensland as having the most serious problem, apparent since 1991-92 with the Queensland incidence rates being markedly higher than other jurisdictions. One suggestion is that in Queensland the heavier average carcass weight of animals processed contributes to the problem. However both South Australia and West Australian experienced rapid rates of growth in incidence rates, and forward calculations estimated that if the incidence rates they were experiencing continued to grow they would, by 1996-97, overtake Queensland as the worst performing jurisdictions.

Gender Comparison

At the time of reporting males accounted for 86% of occurrences, while females accounted for 14%. This was not reported in terms of rate.

Injury/Disease Occurrences by Occupation

Trades Assistants and Factory Hands accounted for more than half of all cases, with the second highest number of cases suffered by Meat Tradespersons. Together these two occupations accounted for more than three-quarters of the industry cases. Cross-classification by occupation with nature of injury/disease identified Trades Assistants and Factory Hand as being most affected by sprains and strains of joints but also suffering significant problems with open wounds, burns and zoonoses. Alternatively, Meat Tradespersons had almost as much of a problem with open wounds as they had with sprains and strains.

Distribution of Injury/Disease by Age Group

The data showed that most occurrences involved employees in the 20 to 24 year old age group, closely followed by the 25 to 29 year old age group. Open wounds and zoonoses were more frequent in the younger workers, however deafness was more frequent after age 45. The point was made by the author that strategies for improving health and safety in the industry might well be targeted on the younger age group to achieve quantifiable results.

Nature of Injury/Disease

The most frequently occurring injury/disease was sprains and strains of joints and muscles, with incidences increasing significantly between 1993-94 and 1994-95.

Bodily Location of Injury/Disease

The most frequently affected bodily location was hands, fingers and thumbs followed by back, forearm and wrist.

Mechanism of Injury/Disease

Muscular stress of some kind was involved in almost a third of all cases. Hitting objects with part of the body was also a significant problem as was being hit by moving objects (i.e. contact with knives). In total the data from the period 1991-92 to 1994-95 indicated a continuing, strongly

growing problem with muscular stress (more lifting than handling), a growing problem with slips trips and falls and a relatively static but significant problem with contact with knives.

Agency of Injury/Disease

The agency most frequently reported was knives. The next most frequently reported agency was animal parts including offal.

Cross-classification

A more complete picture emerges when the mechanism of injury is crossed with the agency of injury. This assists the industry to identify its main hazards and allows it to focus on the areas where it most needs to make improvements. Sprains and strains of joints and adjacent muscles, i.e. manual handling was indicated in over two fifths of cases and the reader was referred to the *National Guidelines for Health and Safety in the Meat Industry* as providing useful controls to manage those hazards. Again the slips trips and falls were linked with suggestions from the National Guidelines, as were strains involving working with knives and open wounds involving working with knives. Of all burns almost a half involved contact with hot water or steam with the lower leg, ankle or foot, suggesting the age-old problem of a hot water hose down a gumboot. The incidence of zoonoses again entailed reference to the National Guidelines suggestions for controls.

Time and Day of Accident

It is of interest to know that the most substantial numbers of occurrences occur between 7 am and 8am, peak between 9am and 10am, remain high until peaking again between 1pm and 3pm, then steadily drop-off. In terms of dates employees are more likely to be injured between 10am to 11am on Thursday, just ahead of a Monday between 8am and 9am.

Cost of Work Related Injury

The statistics point to a strong economic imperative to improve health and safety in the meat industry. The document links costs to premium payments and considers it valid to use risk as the primary determinant in premium variability. This does not always apply, as in South Australia, where the premium is set at 7.5% and requires an act of Parliament to go higher, whereas in New South Wales premiums for the meat industry have soared in some cases to close to 20%.

Cost information has been synthetically estimated by NOHSC, and the reader is warned to treat the results with caution. The figures showed that the States wearing the highest cost of poor health and safety performance during 1993-94 were Victoria followed by Queensland, New South Wales, and South Australia. Then, in terms of cost per employee, again Victoria bore the highest cost, followed by a South Australia, Queensland then New South Wales. The estimated cost of $1,859 per employee is more than three times the all industry's average cost of $598 per employee. This makes this industry class one of the most costly per worker in Australia. Further, the paper states that if the current escalation and rates continue, by the year 2000 the meat industry class will have an incidence rate more than 12 times the National rate.

Taking the above into account, the paper suggests that if the meat industry were to reduce costs to the level of the all industry average per employee the industry group would save $42 million per year. Alternatively if the higher cost States/Territories improve their performance so as to equal the lower cost State/Territory this would save the industry $36 million per annum. It is pointed out that the figures provided are direct costs only and do not taken into account the other substantial indirect costs associated with lost production, retraining, recruitment etc.

Another aspect is presented based on the findings of the Industry Commission *Work, Health and Safety, Inquiry into Occupational Health and Safety, Sept 1995*, which looked at the cost of overheads per worker on an annual basis. The overheads for the meat industry, at the time of reporting, were in the order of between $11,000, to as high as $20,000 per annum, per employee. This equals a total burden of poor OHS performance to the order of one-quarter of $1 billion annually.

Summary of Significant Occupational Health and Safety Issues

The current position clearly indicates that the meat industry performs poorly and employees in the meat industry have a high probability of experiencing serious disease or injury related to work.

- Knives are still connected to nearly one-quarter of all injuries and focus on this area is advised.
- Only 5% of injury is related to plant, with the author making the interesting point that perhaps the absence or under-utilisation of more technically advanced plant might be a contributory factor to high injury rates.
- Noise is a growing problem and merits attention.
- Manual handling remains disproportionately represented, with 40% of cases associated with muscular stress. Ongoing attention needs to be paid to manual handling, including a large proportion of muscular stress cases associated with handling knives.
- Slips, trips and falls have reduced in incidence, however it is still worthwhile to pay attention to this issue.

Copies of this publication are available from Meat and Livestock Australia, phone (02) 9463 9166.

15 Existing Literature Reviews related to OHS in the Meat Industry.

15.1 Injury Prevention in the Red Meat Processing Industry - Bibliography

The reader is referred directly to this document, as a summary of a bibliography is not considered to be particularly useful.

This is not to imply that the document is not useful, indeed it is extremely useful as it focuses on the occupational health and safety issues in the international red meat processing industry. It includes New Zealand literature irrespective of the year of publication, and overseas literature published since 1985. It incorporates reference literature such as guidelines and manuals, periodical articles and conference papers.

The bibliography was produced in 1996 by the Accident Rehabilitation and Compensation Insurance Corporation, PO Box 242, Wellington, New Zealand.

16. Appendices

16.1 Appendix One - World Wide Web resources for OHS in the meat industry.

Within Australia:

Australian Federal Government entry point - http://www.fed.gov.au/
National Occupational Health and Safety Commission - http://www.nohsc.gov.au/
Comcare - http://www.comcare.gov.au/
Australian Emergency Management Authority - http://www.ema.gov.au/
CSIRO - http://www.csiro.au/
Industry Commission report work, health and safety - http://www.pc.gov.au/inquiry/47workhe/index.html

State jurisdictions within Australia:

ACT - http://www.workcover.act.gov.au/
Northern Territory - http://www.nt.gov.au/wha/
NSW - http://www.workcover.nsw.gov.au/
Queensland - http://www.detir.qld.gov.au/hs/hs.htm
South Australia - http://www.workcover.com/
Tasmania - http://www.wsa.tas.gov.au/
Victoria - http://www.vic-workcover.com.au/vwa/home.nsf
West Australia - http://www.safetyline.wa.gov.au/

International:

ILO - http://www.ilo.org/
WHO - http://www.who.int/
NIOSH - http://www.cdc.gov/niosh/homepage.html
OSHA - http://www.osha.gov/
USA Dept of Labour - http://www.dol.gov/
USA Centre for Disease Control - http://www.cdc.gov/
European Agency for Safety and Health at Work - http://europe.osha.eu.int/
OSHA Ergonomic Reports - http://www.osha-slc.gov/SLTC/ergonomics/ergonomicreports_pub/index.html
Ergoweb - http://www.ergoweb.com/
Ergonomics Lists - gopher://nisp.ncl.ac.uk/11/lists/ergonomics

16.2 Appendix Two - OHS in the meat industry - Some useful research documents from an international web-based literature review.

- Q Fever in an abattoir, Significant Incident Summary, Worksafe Western Australia, 1998, www.worksafe.gov.au
- A randomised, controlled, double-blind crossover clinical trial of Q Fever vaccine in selected Queensland abattoirs, R. A. Shapiro, Worksafe, 1996, www.worksafe.gov.au
- Safety and health of meat, poultry and fish processing workers, Shizue Tomoda, ILO, www.ilo.org/public
- Health and safety priorities in the meat processing industry, HSE information sheets, www.hse.gov.uk
- Ergonomics Program Management Guidelines for Meatpacking Plants, US Department of Labour, Occupational Safety and Health Administration, OSHA 3123, 1993 (reprinted) www.osha.gov/
- Meat industry audit reports, research update, Worksafe, 1998, www.worksafe.gov.au
- Manual handling risk assessment in manufacturing industries - a focus on women, research update, Worksafe, 1998, www.worksafe.gov.au
- Suitability of ergonomic methodologies used to assess meat boning technologies, research update, Worksafe, 1998, www.worksafe.gov.au
- Thoracic back pain in workers at a poultry processing plant, research update, Worksafe, 1998, www.worksafe.gov.au
- Example Ergonomic Evaluations - slaughter and butcher of hogs, Occupational Safety and Health Administration, US Department of Labour, date unknown, www.osha.gov
- Elements of Ergonomic Programs, Centre for Disease Control, 1997, www.cdc.gov
- International Journal of Occupational Safety and Ergonomics, Central Institute for Labour Protection, Poland, 1998, www.louisville.edu
- Evaluation of machine guarding as a risk control option for fixed machinery - a project carried out at the National Safety Council of Australia Queensland Division with funding from Worksafe Australia, research update, Worksafe, 1998, www.worksafe.gov.au
- The Centre For Sleep Research, Drew Dawson, worksheets on sleep, shiftwork etc, www.unisa.edu.au
- Increased risk of soft tissue sarcoma malignant lymphoma, and acute myeloid leukaemia in abattoir workers, Neil Pearce, Worksafe, 1996, www.worksafe.gov.au

16.3 Appendix 3 - Literature Review - OSHROM - selected texts

This summary of literature is not complete without mention of a number of magazine and journal articles found while searching through OSHROM, the occupational health and safety database of articles, in this case related to OHS in the meat industry. A very large body of literature is available from this source, however the selected texts presented here are confined to a very few of those produced since 1995.

NIOSHTIC
Source - American Industrial Hygiene Association Journal, Vol 58, No 2, pp 127-131, 1997
Author - Moore-JS; Garg-A
Title - *Participatory Ergonomics in a Red Meat Packing Plant, Part 1 - Evidence of Long Term Effectiveness*

The effects of a participatory ergonomics program implemented in 1986 at a red meat packing facility on employee injury/illness rates and workers compensation claims were analysed. Details of the plan were described. The crude annual incidence rate of injury/illness increased more than 60% between 1988 and 1992 and decreased between 1992 and 1993. Similarly, the lost time incidence rate increased about 70% between 1988 and 1992 and decreased significantly in 1993. In 1988, 26% of the total lost or restricted days was due to restricted days compared with 60% in 1993. Although no consistent patterns in the percentage changes in severity rates were identified, a suggestion of a progressive decrease in recent years was seen. The percentage of conditions considered ergonomically related remained at about 40% between 1988 in 1993. Inflation adjusted annual workers compensation expenses demonstrated a clear pattern of decline between 1987 and 1993. The authors conclude that ergonomics programs may alter injury/illness statistics and workers compensation costs.

Source - American Industrial Hygiene Association Journal, Vol 58, No 7, pp 498 - 508, 1997
Author - Moore-JS; Garg-A
Title - *Participatory Ergonomics in a Red Meat Packing Plant. Part 2: Case Studies*

The problem solving methods employed by two participatory ergonomics teams in the kill and cut dept of a red meat packer were examined. The phases of the problem solving process included problem identification and evaluation and solution development, implementation, and evaluation. Based on videotape observations, the workers engaged in 18 hand exertions per minute during the pulling leaf lard task. The strain index score indicated that the workers were at risk of distal upper extremity disorders. Based on the team's recommendations, two leaf lard starters were installed. The leaf lard starters appeared to reduce the biomechanical stresses on the workers without complications.

During the snatching guts job, the workers engaged in 4.5 exertions per minute. For the hand that held the knife, the exertions were constant and light, while for the hand that grabbed the guts, the exertions were brief and very hard. The strain index scores indicated that both hands were at risk of distal upper extremity disorders. The team advised the division of the gut snatching job into three separate cutting tasks, which would allow the viscera to fall passively from the carcass onto a conveyor belt. During a simulation of the renovation, the biomechanical stresses on the workers were attenuated.

The pulling ribs job was also assessed by the ergonomics teens. The workers engaged in 26 somewhat hard exertions per minute. The hand and wrist postures were rated as bad. The strain index score revealed that the workers were at risk of distal upper extremity disorders. Based on the

team's assessment, layout and work practice changes were planned. The knife handle was redesigned, tested, and found to need further modifications.

The authors conclude that participatory ergonomic teams that employ structural problem solving methods work effectively towards the improvement of musculoskeletal hazards and workplace.

Source - Occupational Medicine, Vol 47, No 4, pp 197 - 202, 1997
Author - Lillington-T; Shanahan -EM
Title - *Cutaneous Infection in Meatworkers*

A prospective cohort study gathered data about the incident rate of cutaneous infection in abattoir workers who processed beef, mutton, and goats for market in Australia. The follow-up period was 12 months. Clinical data were recorded at the time of presentation at an on-site treating doctor. Workers were divided into three groups: those who handled hides, such as slaughterman; those who occasionally handled hides, such as slaughterfloor labourers; and those who never handled hides, such as boners and slicers.

There were 51 cases of compensable cutaneous infection in a total of 79,386 person days worked, and an overall incidence rate of 0.65 per 1000 person days worked. The infection rate and those handling hides frequently (30/51) was significantly greater than those handling hides occasionally (3/51) or not at all (18/51). Beef slaughterers had the highest rate of infections (4.16 per 1000 person days), both with and without lacerations. The mean-time away from normal duties were 7.9 days, and mean time from work was two days. Gloves were not worn to protect against soil and faeces contaminated hides. *Staephylococcus-aureus* was cultured in 16 of 33 cases.

To reduce the incidence of infections, the authors suggest hosing cattle before slaughter; wearing high strength gloves; antiseptic hand washing; and cleaning of tools. The authors conclude that compensable cutaneous infection in abattoir workers constitutes substantial time loss from normal duties, and this cost is preventable with protective measures.

Source - Applied Ergonomics, Vol 28, No 2, pp 129-137, 1997
Author - Grant-KA; Habes-DJ
Title - *An Electromyographic Study of Strength and Upper Extremity Muscle Activity in Simulated Meat Cutting Tasks*

Electromyographic (EMG) changes in upper extremity muscles during a simulated meat cutting task were examined in 15 right-handed male volunteers, mean age 26.1 years. The authors conclude that their study indicates that handle position has a significant effect on the ability to exert force and the EMG/force ratio of all upper extremity muscles. The study data also supported the view that redesigned tools and workstations can alter musculoskeletal stresses associated with meat cutting.

Source - American Industrial Hygiene Association Journal, Vol 56, No 11, pp 1127 - 1132, 1995
Author - Stuart-Buttle-C
Title - *A Case Study of Factors Influencing the Effectiveness of Scissor Lifts for Box Palletising*

The effectiveness of scissor lifts for a conveyor to pallet manual materials handling task at a meat processing facility was evaluated to determine why employees did not use the lifts. One male subject, experienced at the job, was observed while performing the palletising task without the scissor lift, with the scissor lift, and with a modified scissor lift. The subject wore a lumbar motion monitor while performing the task at a typical pace of 104 boxes per hour. The lifting index was calculated using the NIOSH 1991 equation. For the floor palletising task the lifting index was 4.8; for the task using the scissor lift, the lifting index was 2.7 for origin and 3.1 for destination.

However, the workers said that the task was more difficult using the scissor lift. Observation of the original scissor lift indicated that several factors may have made the task more difficult: there was a 2 inch raised lip along the side of the conveyor; there was a 32 inch high rail around the scissor lift; pedals for lift height were too far from the conveyor; no stop at the end of the conveyor; pallets slipped on the lift; and anticipation of the product coming next on the conveyor was limited.

The scissor lift was modified by removal of the raised lip and lowering the rail. The pedals were moved, and a stop was added to the conveyor. The modified scissor lift reduced the probability of higher risk for lower back disorder. Workers reported that the modified scissor lift made palletising easier.

Source - American Journal of Industrial Medicine, Vol 27, No 3, pp 389 - 403, 1995
Author - Johnson - E S; Dalmas - D; Noss - J; Matanoski - GM.
Title - *Cancer Mortality among Workers in Abattoirs and Meat packing Plants: An Update*

In order to examine the effects of exposure of abattoir and meat packing workers to pathogens such as bovine leukaemia virus, bovine papilloma virus, and other animal born viruses, a study was conducted on cancer mortality among such workers. All workers without death certificates were assumed to be alive. The race and sex factors were considered where such information was available. Workers without racial identity were randomly assigned one based on racial distribution by occupation. Mortality was assessed in a previously studied cohort consisting of individuals who had ever worked in the meat industry between 1949 in 1989.

Standardised mortality ratios, proportional mortality ratios, and mortality odds ratios were calculated and analysed. Standardised mortality ratios were significantly increased for all cancers in the studied workers as well as for cancers of the lung, oesophagus, kidney, bladder, buccal cavity, pharynx and bone in workers in abattoirs or meat packing facilities. Analysis of mortality odds ratios also revealed increases in cancers of the lung, oesophagus and colon; workers and the pork packing industries demonstrated the highest rates of oesophageal and colon cancer.

The authors conclude that the incidence of lung cancer can be implicated with the occupational exposures such as killing/dressing, smoking and curing of meat, and wrapping/labelling; however, the significance of other cancers is not known due to missing factors such as smoking habits, alcohol consumption, and diet of the subjects.

CISDOC

Source - FGB - Forum, Feb. 1995, No 1, p6-7
Author - M@
Title - *Freezing Installations - Biting and Truly "Cool"* (translated from German)

Freezers used in the meat industry to deep freeze meat require ammonia as refrigerant. Because ammonia is caustic and explosive, rooms containing meat freezers need to be equipped with sprinklers. The water mist produced by the sprinklers binds and dilutes accidentally released ammonia. The emergency exit may at no point be further away than 20 m. In rooms in which more than 100 kilograms ammonia are in use as the refrigerant at least two self-contained respirators and 2 protective overalls need to be readily available in all times. Employees need to be informed about the hazards posed by ammonia. In addition, employees need to be protected from the cold and moisture by the wearing of protective gloves and shoes and from lifting and carrying heavy loads by the use of elevating platforms. Anti slip floors are needed to prevent falls.

Source - Office for Official Publications of the European Communities, 2985 Luxembourg, Grand Duchy of Luxembourg, 1995.xviii, 93p.
Authors - Nossent - S; de-Groot - B; Verschuren - R; European Foundation for the Improvement of Living and Working Conditions
Title - *Working Conditions in the European meat processing industry*

The aim of this report was to identify risks, risk factors and groups at risk in the European meat processing industry, together with possible measures for further improvements of the working embalmment. A network of researchers from national OHS organisations and 10 European member states was set up, i.e. Belgium, Denmark, France, Germany, Greece, Ireland, the Netherlands, Portugal, Spain and the United Kingdom. After a presentation of the socio-economic characteristics in this sector, the occupational health and safety of workers was examined. Main risk factors and related health problems were identified in the physical, organisational and social work environments. Main risk groups are: slaughterhouse workers, production line workers and boners. The more frequently reported risk factors were: noise, climate factors, biological agents (skin diseases and infections), musculoskeletal loads and unsafe conditions. Recommendations are also outlined with policy options for improvements in different areas. They are aimed at meat companies, sectoral organisations and national governments.

HSELINE

Source - Safety and Health. June 1997, Vol 155, No 6, 78 - 81.
Author - Davis -M
Title - *Repetitive Strains still Plague European Meat Industry*

Abstract - looks at the implementation of the European Union Framework Directive provisions in the meat processing industry. Repetitive strain injuries are widespread, particularly among workers in abattoirs. The handling and de-boning of carcasses are identified as high-risk tasks. An inspector for the Irish Health and Safety Agency outlined industry improvements that would lessen the risk of the strain injuries. Provides a table of risk groups, hazards faced and main health problems.

MEDLINE EXPRESS

Source - Australian & New Zealand Journal of Public Health, 1997 Dec, 21 (7): p 722 - 7300
Author - Garner -MG; Longbottom -HM; Cannon -RM; Plant -AJ
Title - a review of Q Fever in Australia 1991 - 1994

Q Fever continues to be an important disease in Australia. Despite the development of an effective vaccine that has been commercially available since 1989, the number of cases notified has continued to increase. This study reviewed national notifications of Q Fever between 1991 and 1994, together with demographic, socio-economic and occupational information, to investigate temporal and spatial disease patterns. Based on notification data, Q Fever can be considered primarily a disease of adult males that occurs in eastern Australia; Southern Queensland and northern New South Wales have the highest levels of activity. A significant association between Q Fever activity of areas and the presence of livestock was found. A strong association with the meat industry was also confirmed. Q Fever is conservatively estimated to cost Australia around $1 million and more than 1700 weeks of work time annually. There is a need to increase awareness of this disease and its prevention. An extension program in rural communities and provision of vaccine to all abattoir workers would appear to be sensible public health approaches.

Source - Arh-Hig-Rada-Toksikol. 1997 June; 48 (2); 211-7
Author - Krapac -L; Sladoljev - M; Sacer - D; Sakic - D
Title - *Rheumatic complaints and musculoskeletal disorders in workers of a meat processing industry* (translated from Croatia)

The effects of unsatisfactory micro-climactic conditions and forced body position on the occurrence of fatigue and pain at work and disorders of the musculoskeletal system were evaluated in 19 female workers employed in the meat processing industry. The control group consisted of 95 workers whose work did not involve repetitive operation patterns and took place in a satisfactory microclimate. The mean age of both groups was 35 years. The data on symptoms were collated through questionnaires. Further medical and functional examination of the locomotive systems was carried out in both groups. Compared to the control, a significantly higher percentage of the exposed workers complained of fatigue and pain during work and manifested marked disorders. Most of degenerative rheumatic diseases of the spine were diagnosed in both groups. Other disorders found in the exposed workers and higher prevalence than in the control were: extra-articulatar rheumatic diseases as fibromyalgia, humoro-scapular periarthritis, and epicondylitis. This paper proposes primary and secondary prevention of rheumatic diseases or workers in the meat processing industry.

Source - New Zealand Medical Journal, 1997 Sep 26, 110 (1052): 358 - 61
Author - Laing - RM; Burridge - JD; Marshall - SW; Keast - DE
Title - *Hand and lower arm injuries among New Zealand meat workers and use of protective clothing*.

The aim of this project was to characterise work-related hand and lower arm injuries among New Zealand meat processors and to identify the practices used for protecting the hands within this group of workers.

The methods used involve identifying and describing, from the Department of Health national data, hand and lower arm injuries sustained by meat workers in New Zealand, which resulted in hospitalisation during the period 1979 to 1998, examining injury case records from selected meat processing plants for the period 1987 to 1993 and identifying protective clothing practices in the meat processing industry.

The results showed a significant increase in hospitalisation rate for the period 1979 to 1998 (3.3 per 1000 to 5.3 per 1000, chi (2) = 33.14, df = 1, $p < 0.001$) with cutting and piercing being the most common injury event. Reported use of protective gloves and covers for the lower arm by meat workers was high (93% and 66% respectively) and also probably increased.

In conclusion the authors stated that the reasons why injury rates rose during a period in which use of protective gloves reportedly increased was unclear. Possible explanations are discussed.

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