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Article 1

CONVERTING GOVERNMENT DATA INTO WORKPLACE PREVENTIVE ACTION

Issues involved in improving mechanisms for sharing causal information on South Australian work-related injuries

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ABSTRACT

An enormous body of information is recorded by the government agencies with responsibility for occupational health and safety on the circumstances and causes of work-related injuries in South Australia. However, little of this information has been directly available to or disseminated to industry. Causal information from past injuries or accidents, if available and taken up by industry, would enable problems to be better predicted, control measures taken and recurrences avoided. In addition, industries could be alerted to significant hazards requiring urgent preventive action in the workplace. Workplaces could learn from the experience of other workplaces who share the same plant, equipment, chemical substances and work processes where these have been the causes of injuries or dangerous occurrences.

In view of recent advances in computer capability and computer-mediated communication it was considered appropriate to examine opportunities on offer to improve the sharing of causal information possessed by government agencies with industry.

The aim of this dissertation was to examine existing arrangements for collection, processing and dissemination of causal information, articulate criteria for improved sharing arrangements, and make recommendations on an information system embracing the criteria which has most potential for uptake and application by workplaces.

The theoretical framework underpinning utilisation of causal information was investigated by studying literature selected from computerised bibliographic databases. Present mechanisms for collection, processing and dissemination of causal information by government and private organisations in South Australia, Australia and internationally were investigated by studying government literature, browsing the World Wide Web, and interviewing administrators of these information systems in person, by telephone or by e-mail. From theoretical considerations, and practical features identified in example systems, an improved information-sharing system for South Australia was defined.

It was found that to be useful for predicting and controlling accident causes information provided to workplaces needs to be based on the detailed account of individual occurrences rather than aggregated statistical information, consist of both narrative information and coded information, be derived from both recording activity and follow-up investigations, contain information on any specific plant, equipment or substances involved, emphasise knowledge of processes rather than measurement of outcomes (ie safety performance), and involve hazards and tasks familiar to the industry, accompanied by simple and practical guidance.

The WorkCover workers compensation database appeared to provide a suitable foundation for causal analysis of accidents especially if combined with information obtained by the Department for Industrial Affairs through accident investigations. It was possible to define information which could be utilised as a decision support system by industry personnel with some expertise in data or accident analysis, such as workplace occupational health and safety coordinators or advisors. Usefulness of information on individual occurrences could be enhanced if attention were given to the quality, completeness and structuring of this information. Consideration should be given to developing additional OHS surveillance methods to augment information currently gathered on severe injuries.

For the most efficient and effective implementation of an information-sharing system there are advantages in taking an industry sector approach, targeting those industries with a high injury rate. This would increase the relevancy of information as it would relate to work environments, processes and plant which are held in common. Furthermore, industry networks may be utilised to support dissemination of information.

The need was highlighted for the Department for Industrial Affairs to actively produce information on fatalities, severe injuries and dangerous occurrences in the format of Significant Incident Reports and Hazard Alerts. In particular, communicating task-specific causal information to high risk industry sub-sectors through use of hazard alerts and significant incident reports is likely to be a successful means of reaching small business. This type of information is most likely to be of interest and use to line managers, health and safety representatives, health and safety committee members and workers.

It was concluded that a public resource should be part of a suite of information-exchange facilities modelled on EXIS in Western Australia and the intranet run by BHP, incorporating hazard alerts and discussion groups. An industry based internet service or an industry intranet appear to be the most promising communication vehicles in the longer term, but in the short term (ie next 2 to 5 years) a variety of communication means should be used, including mail-outs and facsimiles. In particular, the choice of internet technology has the potential advantages of user-friendly search engines, active participation by users in industry, and the opportunity for decentralisation and ownership by the industry. It is also accessible by all levels of companies including workers and health and safety representatives who may choose to use the internet or intranet from home.

Only one of the five model strategies analysed for sharing causal information included a formal evaluation of its impact on prevention decision-making, therefore it is difficult to judge success of these strategies in rigorous terms.

Further research is needed through a pilot test of an information-sharing system in a high risk industry sub-sector. Investigations have shown that suitable candidate industries exist eg metal products manufacturing. The trial should assess uptake of the resource, how it is actually used by industry personnel, and its impact on prevention decision-making in workplaces.

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1. INTRODUCTION

1.1 Origins of the idea

In 1984, when primitive PCS had only just arrived on a few privileged desks, the Mathews Report espoused the benefits of establishing and developing a comprehensive professional and technical databank to ensure ready accessibility to OHS information. The Report proposed that files be established 'on all likely health hazards to be found in South Australian workplaces and related environments, so that information requested on specific sites would be readily available'. The Report foresaw the potential of information technology to share information on workplace hazards and their causes.

In 1997, thirteen years later, after some 650,000 work-related injuries have occurred and after about 200 traumatic work-related fatalities, we find that in spite of the explosion in information technology, almost no information is available to workplaces on the circumstances and causes of injuries which have occurred in South Australia. Causal information from past injuries or accidents, if available and taken up by industry, would enable problems to be better predicted, control measures taken and recurrences avoided. In addition, industries could be alerted to significant hazards requiring urgent preventive action in the workplace. Workplaces could learn from the experience of other workplaces who share the same plant, equipment, chemical substances and work processes where these have been the causes of injuries or dangerous occurrences.

Advances have been made recently in many respects through the computer databases introduced at the WorkCover Resource Centre and the detailed statistical reports produced from workers compensation data. However, South Australia has not yet produced anything resembling the models cited by the Mathews Report, namely the databases of the Canadian Centre for Occupational Health and Safety (CCOHS) and the Alerts and Current Intelligence Bulletins issued by NIOSH (US).

A wealth of information is gathered by government agencies responsible for occupational health and safety (OHS) on the circumstances and causes of work-related injury. A significant amount of information resulting from many investigations of severe injury occurrences and fatalities resides in paper files of the inspectorate but is generally inaccessible to workplaces. In addition, information on compensable injuries is conveyed to WorkCover through the *Worker Report Form* and/or *Employer Report Form*. Much of this is 'processed' into coded information for statistical purposes, and used for measuring the overall statewide burden of injury and disease, determining state priorities, and evaluating the effectiveness of OHS agency interventions. But the potential has not been fully realised for using such causal information for guiding workplace-based preventive action. One wit has described government injury records as a 'data cemetery'. The challenge is to take government data and convert it into workplace preventive action.

Because of recent rapid advances in computer capability and computer-mediated communication it is likely that opportunities exist to improve the initial gathering of causal information by OHS agencies, the recording and processing of the information, and the sharing of the information with workplaces. This dissertation was prompted by the thought that just as large employers use their own database of injuries to identify causes and take preventive action within their own organisation, access to an information system of non-confidential government data which is shared with industry may be used for the same purpose within a whole industry but taking advantage of the increased predictive power of a much larger body of information.

1.2 What is 'causal information'?

Before discussing the improved sharing of 'causal information' this term needs to be defined. The concept of 'cause' in accident analysis and risk control is discussed at length by Viner (1991). Viner has strong views on the use of the word 'cause' stating that 'to perpetuate the terms *cause* and *causation* holds no promise of benefit to the student or to the growth of the field of study [of accident analysis]' (p 18). Even so, use of this terminology is well accepted in other contexts such as in the field of epidemiology. Beaglehole et al (1993) describe a cause (of a disease) as 'an event, condition, characteristic or a combination of these factors which plays an important role in producing the disease'. They note the common multifactorial nature of causation and the 'need to focus prevention strategies on those factors that can be influenced'.

Though no definition is equally appropriate in all contexts, for the purposes of this dissertation 'causal information' is defined as:

> *information which assists in identifying those factors contributing to accidents which, if predicted and controlled, will lead to prevention of these accidents.*

Causal information may come from two main sources: activities of recording, and investigation of an occurrence. Viner (1996) defines the process of recording as:

> *the gathering of particular defined items of data from an occurrence and consequence for the purpose of information and statistical returns,*

while investigation is defined as:

> *an in-depth consideration of the occurrence-consequence sequence to identify as accurately as possible the relevant mechanism, event, outcome and consequence paths, the role of the people, design and organisational factors and the influence of circumstances. (p 93)*

While the foundation for the resource explored in the dissertation is likely to be causal information derived from recording activity through the workers compensation system equal consideration should be given to information obtained from investigations. If an accident is seen as comprising an *occurrence* and a *consequence* then the emphasis is on the occurrence, in contrast to workers compensation information where the emphasis is on the consequence.

2 AIMS AND OBJECTIVES

2.1 Aim

The aim of this dissertation was to examine existing arrangements for collection, processing and dissemination of causal information, articulate criteria for successful sharing arrangements, and make recommendations on an information system embracing the criteria which has most potential for uptake and application by workplaces.

2.2 Objectives

The objectives for achieving the above aim were to:

- identify and describe the current sources of causal information collected and recorded in South Australia;
- investigate the mechanisms for processing and disseminating this injury information by government agencies in South Australia;
- explore and discuss issues, opportunities and obstacles with respect to the improved sharing of the above causal information;
- in light of the above discussion, identify and critically analyse selected examples of existing methods for presenting and disseminating causal information, drawn from South Australia, Australia and overseas;
- draw conclusions and make recommendations on appropriate mechanisms for sharing causal information which are likely to be of most benefit to South Australian workplaces for predicting and controlling causal factors.

2.3 Scope

To define the boundaries of this project emphasis is placed primarily on electronic sharing of information on causes of traumatic work-related injuries occurring in South Australia with South Australian workplaces. Systems which may be implemented more widely, eg a national system, are not closely considered. No attempt is made to address well-recognised deficiencies of many databases with respect to work-related illness and disease (see analyses in Gun et al (1996)).

3 METHODS

A review was carried out of primary and secondary scientific literature identified from CD-ROM based bibliographic databases, namely SilverPlatter OSH-ROM incorporating NIOSHTIC, CISDOC and HSELINE databases, and from computerised library catalogue search facilities at the WorkCover Resource Centre, SA Health Commission Library, and the Barr Smith Library. Similarly, government literature was reviewed, including reports, legislation, notification forms and recording standards, identified from the same bibliographic sources, references from other literature and personal communications with government staff.

Interviews were held with staff of WorkCover Corporation and the Department for Industrial Affairs, including those with responsibilities for administering computerised systems for compiling data, conducting statistical analyses and disseminating occupational health and safety information to industry and the public.

In the course of the above review the nature of causal information was defined, sources of causal information in South Australia were identified and described, and arrangements for sharing of such information by WorkCover and the Department for Industrial Affairs were characterised. A number of issues associated with information sharing emerged and several were analysed with respect to their significance as indicators or criteria for success of an information system. In addition, Takala (1993) provided a good international overview and list of existing occupational health and safety databases covering all types, ie bibliographic, full-text, factual, multimedia or mixed, and from this some examples of injury databases available overseas were identified for analysis and comparison with South Australian arrangements. A further promising system employed by a large international employer based in Australia was identified through a *National catalogue of state and industry based OHS data* published by Worksafe (1997), and the nominated contact person telephoned.

In order to locate and examine additional examples of computerised information-sharing systems elsewhere in Australia and internationally the World Wide Web on the Internet was browsed using Microsoft Explorer. Moore (1995) was used for introductory guidance on the operation of the Internet and on health and safety resources available. Websites of major OHS agencies in Australia and internationally were visited to identify sites which presented data on injury occurrences or issued hazard alerts. Further, it was possible to make some concomitant qualitative assessment of the use of the Internet itself as a communication medium for sharing information. It was also thought that organisations might conceivably have access to data on injuries or alerts following significant incidents by way of subscription to a mailing list on the Internet. The existence of publicly accessible mailing lists was investigated using a general search engine at *www.neosoft.com/ cgi-bin/paml_search/post*, and by viewing the list of mailing lists available through the CCOHS at *www.ccohs.ca/resources/ listserv.html*. Subscriptions were made to two Mailing Lists to observe message traffic and one discussion group called 'OHS Talk' was visited at the ACGIH website. In a few instances the World Wide Web was employed as a research tool on some specific subjects using the Alta Vista search engine.

Interviews with administrators/contact persons were unstructured but were broadly based upon the following questions:

- What is the objective of the information system ie what is it intended to achieve?
- Who are the target users?
- What information is provided?
- How is the information disseminated or access achieved?
- How is it intended to be used by the target group?
- Has effectiveness been evaluated by the implementing body?
- Is there evidence that the resource makes a difference?
- What are any practical obstacles to implementation?

In addition, where possible written information or examples of information were obtained and scrutinised. Strengths and weaknesses of the approaches were analysed in light of the indicative criteria for success suggested by the earlier examination of issues. Through consideration of general issues, the indicative criteria for a successful system, and the strengths and weaknesses of the examples examined it was possible to arrive at conclusions on the features and operation of a South Australian system which would be most likely to achieve uptake and application by workplaces.

4 RESULTS

The results of this review are divided into four sections for clarity as follows:

- an account of current sources of causal information in South Australia;
- a description of current mechanisms for sharing of causal information by OHS agencies in South Australia;
- a discussion of issues relevant to improved information sharing; and
- a description and critique of selected Australian and international models for sharing of causal information.

4.1 Sources of causal information in South Australia

This section presents an overview of sources of information on causes of work-related injuries in South Australia. The manner in which the information is collected, recorded and processed (eg coded) is described and some preliminary remarks are made on the usefulness of some types of data for predicting causes of injuries which are work-related, especially on any value which might be added to the data routinely gathered on compensable injuries and diseases.

4.1.1 Workers compensation-based data

Information on compensable injuries is obtained through three main sources under the workers compensation system:

- background employer and location information through the Employer Registration Form (lodged with WorkCover when the employer first registers);
- worker and injury information through the Worker and Employer Report Forms; and
- medical information on each injury through the Prescribed Medical Certificate (which must accompany all claims for compensation).

WorkCover Report Forms

WorkCover has two forms to meet reporting requirements under s51 and s52 of the Workers Rehabilitation & Compensation (WR&C) Act, 1986. These are the *Worker Report Form* and the *Employer Report Form*. The *Worker Report Form* (see Appendix A) comprises a Notice of Injury or Disease (or 'notice of disability' as it is referred to in the WR&C Act) and a Claim for Compensation. If it is not intended at the time to lodge a claim only the Notice of Injury or Disease is filled out by the worker and given to their employer. The employer lodges the *Worker Report Form* with the WorkCover claim agent along with the *Employer Report Form*. The details are then entered into the central WorkCover database by the claim agent. In the case of a self-insurer the data is entered into their own computer system and the data then supplied to WorkCover through electronic data exchange. From 1 April 1996 'single channel reporting' arrangements have been in place between WorkCover and the Department for Industrial Affairs, giving the DIA direct access to relevant injury data on WorkCover database. This has made redundant the former *Work Injury Report* form of the DIA for 'generally notifiable work-related injuries'.

The Employer Report Form is a prescribed form under the WR&C Act and therefore must be gazetted; the Worker Report Form need only be approved by the WorkCover Board. Requirements for provision of workers compensation data by self-insurers are specified in the Fourth Schedule to the Workers Rehabilitation & Compensation (Claims and Registration) Regulations, 1987.

Coding of workers compensation data

Data from Worker and Employer Report Forms is coded centrally by a group of trained coders within WorkCover. Coding of injuries is carried out in accordance with the 'Type of Occurrence Classification System' (NOHSC, 1990). Other coding is carried out in accordance with conventions of the Australian Bureau of Statistics or the National Data Set for Workers Compensation-Based Statistics (Worksafe, 1987).

The guided narrative on WorkCover Report Forms

Both WorkCover Report Forms require a description of the circumstances surrounding the injury event or disease in the form of a 'guided narrative', similar to that required in Australian Standard AS 1885.1, *Workplace injury and disease recording standard* (Standards Australia, 1990).

Three questions are asked:

- What were you doing at the time?
- What led to the injury or disease?
- What exactly caused the injury or disease?

The third question also asks for the name of any chemical, object, process or equipment involved. Simple examples for filling out the description are given on the forms.

The text description for each injury is stored on the central database as a memo field of 'limitless' length. Most descriptions occupy at most about 250 characters. This may be compared with the requirements of the National Data Set (Worksafe, 1987) which specify a 150 character field for the narrative.

4.1.2 Workplace injury and disease records

In addition to injury information which is provided centrally to WorkCover, individual workplaces conduct their own recording of work-related injuries and diseases. Under the OHSW legislation the minimum standard for workplace injury and disease recording is specified by AS 1885.1 (Standards Australia, 1990) which is an Approved Code of Practice under the OHSW Act, 1986.

While a survey has not been conducted in South Australia one can safely say that most medium to large employers would keep records in accordance with the Australian Standard, and many have computerised records using software developed in-house or available commercially. In contrast, it is likely that few small businesses keep records in accordance with the Standard. A survey recently carried out in NSW by Jayasuriya et al (1997) showed that only 13.5% of businesses in that district were aware of AS 1885.1, and where workplace records were kept it was primarily for fulfilling legislative requirements rather than for their own use, especially for small businesses.

WorkCover has no arrangements in place or planned to centrally collect data from workplace recording systems. If WorkCover wished to disseminate non-confidential workplace records it would need to make special arrangements with the relevant employers, or with their industries in those rare cases where employers in an industry consolidate their records. It should be noted, however, that for compensable injuries the WorkCover Report Forms collect most of the information required by the Australian Standard.

4.1.3 Notifications to the Department for Industrial Affairs

Under Division 6.6 of the OHSW Regulations 'immediately notifiable work-related injuries' and 'dangerous occurrences' must be notified to the Departmental for Industrial Affairs. Some notifications occur though not strictly required under the OHSW Regulations ie where the injured person was self-employed, a volunteer, a retired person or a child.

Information from the notification is recorded on employer files, with no computerisation at present. As 'immediately notifiable work-related injuries' under the OHSW Regulations would, with rare exception, also be 'compensable disabilities' under the WR&C Act, the central WorkCover database should ultimately receive data on the injury through a claim for compensation. However, notifications to the DIA can supplement WorkCover data with information on severe injuries and fatalities to the self employed and visitors to worksites and on dangerous occurrences in workplaces which did not actually result in injury or disease and may be viewed as significant 'near misses'.

Information on injuries to the self employed can be of particular significance to industries with a high proportion of self employed such as agriculture, forestry, fishing and mining where 58% of the 'employed workforce' are self-employed, or the construction industry where 36% are self-employed (Australian Bureau of Statistics, 1996).

4.1.4 Accident investigation files (Department for Industrial Affairs)

In 1995/96 3,563 notifiable work-related injuries and diseases were reported to the DIA, of which about 700 to 800 were 'immediately notifiable work-related injuries', and 110 'dangerous occurrences' were reported (DIA, 1996). All the immediately notifiable work-related injuries and dangerous occurrences were investigated to some extent, even if only to determine whether a detailed investigation was necessary. Serious injuries to the self employed were also investigated by DIA inspectors.

In a small percentage of cases - less than 1% - the DIA pursues a prosecution for a breach of the legislation. In 1996/97 there were about 17 convictions. In most instances a variety of other options were used to bring about improvement at the workplace including prohibition notices (34 in 1995/96), improvement notices (222), verbal requirements and advice. Although prosecutions and convictions are relatively rare, information on these has special value in generating commitment from employers through the desire to prevent the risk of legal action. Though many would regard the level of fines as being relatively small, prosecution involves significant embarrassment to companies, affecting their standing in the community, and reflecting personally on management at the company.

4.1.5 Hospital data

An analysis of data available through hospital recording systems is given in Worksafe (1995).

A National Minimum Data Set (NMDS) has been defined for hospital inpatient (morbidity) data covering nearly all hospital separations for acute hospitals in Australia. It does not appear at this time that the NMDS is well suited to analysis of work-related injuries. There are major problems with coding of occupation and there is no narrative. The NMDS does not appear to add significantly to the data available through workers compensation reporting.

Injury data is also routinely collected through hospital emergency departments. The National Injury Surveillance Unit (NISU) is the body with function of coordinating and disseminating information on injury and injury prevention. NISU supports users of ISIS (Injury Surveillance Information System, also referred to as the Inpatients Separations Information System). This system was developed as a means of obtaining more detailed information on injured persons presenting at hospital emergency departments. Although it is a rich source of information it suffers from limited representativeness and high cost. A National Data Standard for Injury Surveillance is being developed structured on three levels. Level 1 is a National Minimum Data Set, NMDS (IS); Level 2 is an expanded version of the first with extended classifications and additional items; Level 3 comprises specialised data items and classifications needed to conduct in-depth studies. In comparing the data items for Levels 1 and 2 it would appear that ISIS data would be of little use by itself for work-related injury unless at least Level 2 is applied. Level 2 includes substantial coding (eg major factors, major breakdown events, type of protective devices) and a structured narrative of unlimited length. According to Gun et al (1996) ISIS records at present do not have any text field on circumstances of injury.

If there were a high participation rate in ISIS and Level 2 were adopted there could be much potential use of hospital data for identifying causes of work-related injuries. There could be scope for cross-matching with the workers compensation database. ISIS has an advantage over the workers compensation database where children and the self employed are concerned and consequently has been found to be useful for OHS research in the agricultural sector. It could be useful for special analysis of specific causes/hazards, or for supplementing the workers compensation database with respect to the self employed, children or injuries where there has been no workers compensation claim. Gun et al (1996) commented on the high potential of ISIS for extracting information on details of accidents, but indicated that in fact ISIS is not collecting any more data and NISU is having its activities curtailed. This recent development means that ISIS is probably a lost opportunity.

The Injury Surveillance and Control Unit of the South Australian Health Commission receives notifications from two public hospitals. Its coverage is probably not wide enough to be of consistent value for analysis of work-related injury.

4.1.6 Coroner's records

Worksafe (1995) contains a review of information available on Coroner's files. A National Coronial Information System is being developed. Though South Australia has numerically few work-related fatalities each year of about 20 to 25 cases the opportunity should be taken to extract information on these cases and add it to the information available on workers compensation files. The extensive narrative provides rich prevention information and recommendations which are likely to be of great value in the workplace.

4.2 Sharing of causal information by OHS agencies in SA

This section presents the methods found to be employed by the two South Australian OHS agencies, ie WorkCover Corporation and the Department for Industrial Affairs, to share or disseminate causal information with industry.

4.2.1 Statistical publications

WorkCover produces the following:

- an annual statistical supplement to its Annual Report (WorkCover 1996a);
- detailed industry analyses for a fee on request from the industry;
- special analyses such as one by sectors in the *Small Business Passport* in 1992.

4.2.2 WorkCover study of agency of accident and claim narratives by industry ('Setting the Scene')

WorkCover has published the results of a detailed analysis of the primary agencies of accident and the claimant narratives for each of 56 industries in SA (Worksafe, 1995). The purpose of the study was to provide the basis for preventive action, identifying areas where preventive action can reduce the cost and severity of injuries and reduce overall number of injuries in each of the industries studied. Research analysts perused the text narratives for injuries in each industry to obtain information additional to that provided by the coded agency of accident information.

The format for each industry was:

- Overview of industry
  – Annual remuneration paid
  – Number of employers
  – Proportion of industry which is 'exempt' (self-insured)
  – Overall breakdown of claims including total cost to date.
- The major agencies of accident for the industry presented separately for income maintenance claims (which at that time were those involving 5 or more working days absence from work - it is now 10) and 'minor' claims.
- Claimant comment examinations shown separately for income maintenance claims and other claims.

A separate table at the end of the publication provided fatality statistics by industry for the period July 1991 to June 1994, including the text description of what happened for each fatality.

This publication marked WorkCover's first attempt on a major scale to use claim narratives to advise industry on causal factors for injuries (though WorkCover consultants had used claim narratives for many years for examining the main causes of injury for assisting individual employers).

4.2.3 WorkCover Claim Profile Statements

WorkCover has also endeavoured to provide causal information on work-related injuries through distribution of a Claim Profile Statement to 1,500 to 1,800 employers in each of two years in South Australia. WorkCover's aim was to provide workers compensation statistics which would allow those employers to review their workplace injury record and that of their industry, and to prompt action aimed at preventing further workplace injury and disease (WorkCover, 1994).

The Claim Profile Statement was a simple one sheet document containing two bar graphs showing the 'Mechanism of injury or disease' claims reported to WorkCover for the industry group of the employer and for the operations of the employer in that industry group. Each graph plotted the percentage of reported claims against the codes for the ten most frequent mechanisms of injury and disease.

The Claim Profile Statement was accompanied by a booklet entitled *How to use your Claim Profile Statement* (WorkCover, 1994). The Statement served as a prompt for questions to ask in the workplace. For example, an employer might identify 'Being trapped in or between moving machinery' as the primary mechanism of injury or disease relevant to their workplace. By referring to the booklet the employer would be pointed to things in the workplace which could indicate a risk of this type of occurrence occurring (eg unguarded moving parts of machinery) and the steps which could be taken to stop such occurrences from happening (eg all moving parts of machinery are guarded and the guards cannot be removed). In addition, contact details were given for organisations who could give more information and help in preventing the given type of occurrence.

An example of a Claim Profile Statement and accompanying material is presented in Appendix B.

4.2.4 WorkCover Home Page on Internet

A regularly updated list of all reported workplace fatalities since 1992 (including the self employed, visitors to worksites and children) are presented on WorkCover's Home Page on the internet at *http://workcover.sa.gov.au/stat96/s_gcs_06.htm.*

4.2.5 WorkCover Health and Safety Bulletin

Summary details of work-related fatalities which occurred in SA are presented quarterly in the WorkCover Health and Safety Bulletin. The Bulletin gives the month and year of the fatal injury occurrence and then a brief text description of the occurrence, eg:

> *July 1996 - Two children were sitting on the forks of a reversing tractor when one slipped, resulting in the rear right and front right wheels passing over the child (Female aged 6 years).*

The narrative is about 125 - 150 characters in length in the case of each fatality description.

In addition, outcomes of prosecutions are reported in the Bulletin, eg:

> *'Prosecutions - Allied Engineering Pty Ltd was convicted for a breach of Section 19(1) of the Occupational Health, Safety and Welfare Act, 1986 following an incident on 2 August 1993 in which a worker suffered serious injuries. The worker's injuries consisted of two broken arms, seven broken ribs, a fractured shoulder, a punctured lung and his spleen and kidney were removed after falling some 19 metres through a skylight onto a concrete floor at the Port Adelaide premises of SACBH. He was wearing a safety harness and three lanyards joined end to end to give a combined length of some 21.8 metres. He was not effectively supervised. Fined $9,000 plus total costs of $1,324.'*
> (September 1996 Bulletin)

The narrative above is 550 characters in length.

4.2.6 Hazard Alerts (WorkCover and DIA)

Hazard Alerts are produced by WorkCover and the DIA. Hazard Alerts address a specific hazard which the inspectorate or WorkCover consultants have identified as an emerging problem and/or has potential for significant reoccurrence in other workplaces. Examples presented in Appendix C are: the practice of 'garbage running' when using domestic garbage collection vehicles (DIA, April 1995); and the explosion risk when re-using old 200L drums which had contained flammable material (WorkCover, November 1995). The Alerts include a description of the hazard, preventive information and sources of further information.

Hazard Alerts are published on an ad hoc basis, usually prompted by a significant incident such as a very severe injury or fatality or by a spate of a particular type of injury. The first example of a Hazard Alert above was prompted by the serious injury of a garbage runner received when riding on the rear step of the lead truck. The other vehicle following ran into its back end, crushing both the employee's legs between the two vehicles. The second was prompted by a fatality occurring when a farmer attempted to weld an old 200L drum and was killed by the ensuing explosion.

The DIA produces about five to eight Hazard Alerts each year while at present WorkCover produces them only sporadically. The DIA has employer listings from databases for dangerous substances and plant registrations and therefore mails out new Hazard Alerts widely to these employers, though the audience is generally targeted with Alerts only sent to those know to be using that type of substance, plant or equipment. Hazard Alerts received from interstate which are relevant to South Australian workplaces are also disseminated in South Australia by the DIA. (S. Bath, pers comm)

4.2.7 Safeguard Sheets (DIA)

About a dozen Safeguard Sheets are produced by the DIA each year on a range of topics. An example is presented in Appendix C. As well as distribution in a paper form the Safeguards may be viewed on the Internet at *www.workcover.sa.gov.au/bulletin.htm.*

4.2.8 Significant Incident Reports (DIA)

South Australia has agreed to participate in the National Significant Incident Reporting System for Australian Mines (Worksafe, 1990), and the Mining & Petroleum Branch of the DIA produces several Significant Incident Reports per year. An example is shown in Appendix C.

In June 1995 a broader National OHS Significant Incident Reporting System was adopted by the National Occupational Health and Safety Commission. Such reports in SA would be prepared by the DIA using information acquired through accident investigations. As yet the DIA has not begun to produce them, and has no plans in the immediate future. (S. Bath, pers comm)

Under the National OHS Significant Incident Reporting System the definition of what constitutes a significant incident is not standardised, nor is the reporting format. However, in general, similar information would be produced as for the system for Australian Mines. An example of a significant incident report prepared by WorkSafe Western Australia is shown in Appendix C.

4.2.9 Cooperative Development of Solutions Database

At the April 1997 meeting of the National OHS Administrators all jurisdictions including South Australia (represented by WorkCover) agreed in principle to establish online solution databases on their Internet sites and to adopt a format used by Western Australia as a consistent template for solutions. As agreement has only just been reached South Australia has not yet implemented a local system.

4.2.10 Special investigation Reports

B V Collison (1994) carried out on behalf of the Mining and Quarrying Occupational Health and Safety Committee an investigative study of fatal accidents in the SA mining and quarrying industry. The study involved an Essential Factor Analysis of ten fatalities. For each fatality human behaviour, machine and environmental factors were examined and listed along with recommendations to prevent reoccurrences. The Appendix to the report also presented the coroner's file summary which included text descriptions of the injury event; machinery involved; the work environment; the cause of death; time on the job; any training; supervision; police examination report; and the Mines Inspector's Report. An example of an Essential Factor Analysis Summary is presented as Appendix F.

4.3 Discussion of issues for improved information sharing

In this section discussion is presented on a range of issues identified with respect to methods for collecting, sharing, processing, sharing/disseminating, using and evaluating causal information on South Australian work-related injuries.

4.3.1 Empowerment of workplaces to take responsibility for OHS

It is evident from sections 4.1 and 4.2 that South Australian government agencies possess substantial databases and have skilled analysts to produce reports on behalf of industry. Why, then, should one even bother providing industry access to the 'raw' data and disseminated information?

Section 19 of the OHSW Act places a duty of care on employers with respect to health and safety in the workplace (a duty which also exists under common law). Under Robens-style legislation the role of government is to assist, inform and support employers and workpeople ('those who create the risks and those who work with them') to jointly contribute to ensuring safe work environments and safe systems of work (Robens, 1972). There is a philosophical argument that even if government agencies have the expertise and resources to carry out OHS work on behalf of industry (eg statistical analyses of injury data) they should still as far as possible equip workplaces with the means to exercise their own initiative towards improving OHS. This means that OHS agencies should actively innovate and introduce OHS tools for use by industry. It then becomes a matter of the willingness and capacity of workplaces to apply these tools, which again can be enhanced by efforts of the OHS agencies.

By making the database publicly accessible it allows workplaces to become more actively involved in the analysis and interpretation of the data for their own purposes. At present reliance is placed on government intermediaries: expert staff of the OHS agencies who access, code and analyse data to produce statistical reports. Much of this analysis is for the use of the OHS agencies themselves for guiding statewide strategies for OHSW, with some capacity to provide industry-specific analyses at request. While statistical expertise is important it could be argued that analysis of narrative information on injury occurrences is qualitative and just as effectively done by people who manage or work in the relevant industrial environments. As a general principle the decentralisation of information is empowering for individuals and, in this case, for their workplaces.

Sometimes injury occurrences indicate that industry needs to be urgently alerted of a hazard. Once again reliance is placed on staff of OHS agencies to develop a hazard alert and disseminate the information. While this is fine in theory, in practice staffing limitations and other priorities mean that hazard alerts are rarely produced and released in South Australia. The existence of an information system, perhaps supplemented by a database of industry association, union and workplace contacts, may allow government bodies to routinely and automatically release information on severe injuries or dangerous occurrences which meet predetermined criteria. Though the quality of information disseminated in this way is not likely to be as good as a professionally prepared hazard alert it is better than no information at all which is usually the case now. More importantly, though, if causal information is publicly accessible it allows industries or workplaces to identify for themselves injury causes or hazards relevant to their workplaces and take action for themselves without passively relying on intermediaries at the OHS agencies.

4.3.2 Consolidation of information from recording activity and investigations

As indicated in Chapter 4 'causal information' may come from two main sources: activities of recording, and investigation of an occurrence. The database which presents causal information in the richest form is one which combines both sources for each occurrence. This may be achieved in practice by consolidating the information from the South Australian workers compensation database with the information from accident investigations by the OHSW inspectorate.

WorkCover has proposed to the Department for Industrial Affairs that a 'seamless' information system be shared by both agencies (WorkCover, 1997) as an extension of WorkCover's workers compensation database. The new system is called 'FOCUS' (Field Operations and CUstomer Service).

Additional fields for each compensable injury would allow recording of causal information acquired through accident investigations conducted by the Department for Industrial Affairs. WorkCover is also developing a Decision Support System (DSS) which can greatly assist in the analysis and retrieval of data. Development of dissemination networks is enhanced by the existing linkage of the workers compensation injury database with employer registration details and health and safety committee and representative notifications. Possibilities for electronic data exchange are broadened considerably by use of facsimile numbers, e-mail addresses and WorkCover's presence on the Internet.

4.3.3 Coded versus narrative information

It is proposed that to be most useful for informing strategies for practical prevention of injury at the workplace level information available on injury occurrences needs to be both coded and textual. Only uncoded narrative/text data can retain the original richness of causal information. Coded and text data complement each other, and, together, allow one to learn much more about specific hazards and risks than either alone (Stout, 1996). This represents a move away from the current emphasis which is on coded data for statistical purposes.

Textual descriptions of injury occurrences have an immediacy and personal relevance which is greater than that arising from the abstract nature of coded, statistical data. It is therefore envisaged that greater emphasis on textual information will improve the perceived relevance of the data by workplaces and the motivation to take action.

The considerable effort directed at coding injury information means that often the intrinsic value of the narrative information is overlooked. According to Dr Nancy Stout (1996) of NIOSH:

> *The inclusion of narrative fields in injury surveillance data allow us to identify specific hazards and injury cases that we would not otherwise find. One reason NTOF is so useful is that it contains narrative data that allow us to examine detail that is not typically available, because most databases solely consist of coded data . . . the inclusion of narrative text fields in surveillance systems and databases is infinitely valuable, and strongly encouraged.*

Extensive use has been made of narrative/text data in Worksafe Australia and US studies of fatalities. In the United States in particular, the limits of coded data have been exceeded to obtain better understanding of the circumstances and causes of injuries, prompting hazard alerts and dissemination of preventive information, driving changes to health and safety standards and most importantly preventing deaths in the workplace (Stout, 1996).

Dr Stout further expounds the value of narrative data:

> *Injuries represent a class of disorder for which accurate and detailed information about the circumstances of the event which resulted in the injury are generally available. These details can be provided either by the injured person and/or others who were present. Although the information is usually coded for quantitative analysis, injury prevention workers would argue that the inclusion of a narrative description of the circumstances of the event is an important component of an effective injury data base. The utility of such qualitative data to provide additional information on subgroups of cases is demonstrated by analyses of the National Traumatic Occupational Fatalities (NTOF) maintained by NIOSH in the USA. [93] The additional detail and insight provided by these text fields can be used to overcome the limitations inherent in formal coding systems.*

Worksafe (1995) indicate that workers compensation data could be used to focus on causal factors associated with particular injuries and disease through more detailed cross classification of the coded data, but also indicate that the qualitative analysis of narratives for conditions where the coding scheme does not provide sufficient detail may also be informative.

The importance of narrative information is also supported by Larsson (1990):

> *If we accept that prevention only can be done with information that we understand - then we ultimately need the free-text description of human activities and involved products. A product information module should be based on language. As computer capacity has increased, the information retrieval systems have developed and established the principle of language as the code. (p 18)*

The advent of computerised coding machines means that in the future it may well be that only text data will be entered on computer with subsequent coding carried out automatically by machine. The original data will therefore be retained and should coding/classification systems change (as happens regularly) the coding algorithm can be applied to the original data thereby avoiding interruptions in trend analyses.

4.3.4 Aggregated statistics versus injury information

Worksafe (1995) expresses the balance that needs to be obtained between reporting of statistics based on aggregated data and information on individual injuries:

> *There is often a trade-off between broad, representative coverage for statistical reporting and detailed information on the factors associated with an outcome. The first approach indicates the extent of a problem and helps to identify priorities, whereas the second can directly inform prevention activities.*

Small 'high risk' groups or particular hazards are difficult to identify in highly aggregated data, but may become apparent through closer examination of the information.

Larsson (1994) remarked on the benefits of detailed data on individual cases in comparison with aggregate statistics:

> *A common assumption is that injuries can be prevented with the help of statistics. But aggregate statistics don't normally contain information that can be of direct use for preventive action. A more constructive use of overview injury and disease data will require that these systems are turned into tools for decision support.*
>
> *A statistical approach is quantitative and aggregate, whereas a decision support approach is qualitative and selective. The former can be used for general information, but the latter is an absolute requirement for efficient and measurable prevention. The ideal injury and disease information system contains such exact and detailed data on each individual case that the intelligent selection of a limited number of cases, where similar conditions of environment, occupation or exposure prevail will yield reasonably precise indications on where, what and how preventive measures should be applied.*
>
> *. . . Prevention . . . can only be performed locally; it is an applied activity, changing and rectifying systems, situations, products and substances, eliminating hazards and protecting human beings from harmful exposure. (p 12)*

Further support for the above comes from Gun et alia (1996) who express the view that 'prevention of occupational disease and injury requires attention to details about each individual problem'. If generic features of a group of related injuries are identified and then controlled, such injuries will be prevented from occurring. To allow such identification:

> *... it is necessary to look at the fine details of what happened in a sample of such cases. Most accident statistics are useless for these purposes. Collation of data for statistical purposes means loss of information. At the very least we must have a narrative field, so that we know what task the worker was doing and with what materials, what unanticipated event happened, and how the injury (energy transfer) resulted.*

4.3.5 Safety performance versus prevention action

Part of the reason for the emphasis on statistical aggregated information and the lack of effort directed towards recording and dissemination of detailed information on occurrences is that the primary application of the data has been the measurement of safety performance, whether at the State level for OHS agencies or at the company level for management. This applies equally to recording at the State level using workers compensation reporting and at the workplace level using AS 1885.1 (Standards Australia, 1990). It is apparent from the above discussion that to decide on preventive action analysis of the *processes* leading to the injury are important, that is the details of the occurrence, rather than the *outcomes* or consequences. Outcomes tell you that something has gone wrong but do not tell you what to do in response. The matter is expressed eloquently by Brown (1990):

> *... accident reporting systems which aggregate data across different tasks and thus profess to represent organizational safety via global statistics will contribute little to the understanding of human error, or the design and development of accident countermeasures. They will merely index organizational safety, in a far from meaningful sense, since risk will largely be unquantifiable, although they may provide management with a crude overall measure of the cost benefits of accident prevention and reduction. If accident data are to be more meaningful than this and contribute usefully to safety improvements, they must be recorded in a task-specific form and not aggregated across dissimilar tasks until an initial data analysis has been completed on the different behavioural contributions to accidents involved in those tasks.*

4.3.6 Using the data

Predictability

As defined earlier 'causal information' is that information which assists in identifying those factors contributing to accidents which, if predicted and controlled, will lead to prevention of these accidents. The concept of 'predictability' along with 'controllability' are discussed by Viner (1991, pp 97 & 98). Under this definition the usefulness is founded principally in the ability to predict from the information preventable contributory factors. If such prediction is not possible then analysis of occurrences is of little value. One may as well concentrate on the consequences, that is, the injury outcomes, for the purposes only of workers compensation and rehabilitation.

Gun et alia (1996) examined this issue of predictivity in their analysis of risk factors for chemical-related work injury. Currently-available statistical systems were evaluated for their utility in predicting this type of injury. Several existing data sets of industrial accidents were interrogated using keywords descriptive of accidents examined in a case series of 19 chemical-related injuries. If the analysis 'were to discover similar accidents in the past, the implication is that an employer interrogating the data set would have been made aware of the risk, and could have taken action to avoid a recurrence. The practical consequence would be to demonstrate the potential to use existing data bases as a preventive tool'.

For interrogation purposes administrators of the databases were supplied with details of each injury in the case series including 'a one-sentence summary of the accident and resulting injury and keywords in relation to each of the following variables: industry, hardware, process and chemical agent. In case other keywords were needed a one-paragraph summary of each case was given'. For example:

> Extensive burns from caustic soda from separation from a submersible pump in an electroplating shop.
>
> Industry: Electroplating
> Hardware: Submersible pump
> Process: Pumping out tank.
> Agent: Caustic soda.

Some judgement needed to be applied so that all important related injuries were detected without producing an unmanageably large number of injuries. The full algorithm is explained in the paper.

Of the databases examined it was found that the workers compensation database of WorkCover (SA) provided what was 'probably the most usable data. 5 years in injury statistics, analysed according to the algorithm suggested, enabled a number of predictive events to be identified', conceding that the 'prediction' was retrospective only. Significantly for this dissertation Gun et al concluded that 'it is probable that this data base is worth using on a pilot basis for helping some selected industries to identify particular problems', and furthermore, that the data could be of 'day-to-day use of industry in South Australia' if applied as above.

Gun et al went on to recommend the establishment of a national information system whereby employers 'could access by keywords descriptive of variables relating to particular industries - what chemicals, what industrial process, what hardware is being used, what is the industry. The information would consist of details of how accidents had occurred in such situations in the past, so that employers could anticipate any recurrence in their own workplaces'.

The researchers also recommended a number of improvements to collection of data, coding, costs and administrative responsibility, some of which are referred to in section 4.3.8.

The remarks of Gun et al about the value of the WorkCover compensation database are consistent with the conclusions reached by Larsson (1994) after making a general comparison between comprehensive information collected on injuries and diseases by hospitals or medical treatment facilities; public/legal authorities; and insurance systems. He concluded that the 'optimal case for valid information on harmful exposures and consequences of injury and disease is the compensation system' and argued that claims data should be used to create a 'decision support system for prevention', or 'expert system of information exchange', to assist the local preventer (Larsson, 1991, 1994).

From the viewpoint of this dissertation the main implications of the research by Gun et al and the comments by Larsson are:

- the WorkCover workers compensation database constitutes 'causal information';
- the WorkCover database would probably be of day-to-day value to industries in anticipating particular problems;
- claims data provide a basis for a decision support system for information exchange with the local preventer; and
- the capacity needs to exist for industry to interrogate the database according to an algorithm using keywords descriptive of variables covering the hardware, process and chemicals used.

As the above research was carried out by motivated researchers and the database interrogations were made by experienced data analysts, the question still remains whether workplaces would have the motivation and the expertise to utilise a database resource, and how they would actually use it in practice to anticipate problems and design prevention strategies.

Decision-making for prevention action

Kjellen (1987) studied the feasibility of making information about injury occurrences and near misses available to decision makers at various parts of a company via a computer. This work is now ten years old and use of computerised injury databases within companies is commonplace, however this is the only study which was uncovered that actually examined the process of using such a database by industry users. Though the study looked at a company database it is likely that the processes involved will be the same for an industry system, therefore the findings of the study can be translated to an industry context.

In his study Kjellen simulated the use of a computerised information system in decision making regarding measures to improve occupational health and safety. Prototype information systems were developed at an airline and a steel mill. The airline database consisted of observations of about 150 injuries while the steel mill database consisted of observations of about 180 injuries and 138 near accidents. Each record consisted of 18 coded data items; 9 semi-structured data items; and one unstructured data item: the sequence of events. Coded data were represented by numerals or a fixed number of classes, with semi-structured and unstructured data represented by free text descriptions.

A total of 27 subjects participated in the simulations; 13 at the airline and 14 at the steel mill. The subjects were selected to represent various potential user groups of an information system. They comprised line organisation staff (operation and maintenance), technical staff (purchase, design, planning, quality assurance), personnel staff (planning, education), health and safety staff, and safety representatives of workers. Except for safety representatives, subjects typically had a college or university degree in technology. Subjects representing health and safety staff, supervisors and safety representatives had been exposed to information about injuries on a routine basis, while subjects representing technical and personnel staff did not have this experience.

A total of more than 100 'decisions' concerning proposals for health and safety measures were made during the simulations.

The overall findings were:

- various categories of subjects indicated different information needs in making decisions;
- information about injuries and near accidents at the company had a high priority for all categories of subjects except technical staff;
- the identification of accident/near miss reports of relevance to a proposal and the display of parts of the contents represented a frequent use of the information systems;
- black-spot analysis ie the identification of concentrations of injuries and near accidents represented another frequent use;
- a relatively small fraction of the total number of available observations about each injury was actually used in the 'decision making';
- the results demonstrated the need for free text descriptions of observations as well as of coded information;
- differences between the results of the two companies indicate that the solutions regarding computer support should be adapted to the characteristics of the individual company.

Table 1 below is taken from Kjellen's paper. The table ranked types of observations with respect to the number of times that they were addressed in searches or displays at the two companies. It is noteworthy that the 'sequence of events' features highly in all four columns, ranking at least third in each column. 'Type of machine/materials' and 'type of injury-inflicting energy' are also frequently used as the basis for the search or for display. The first type is recorded in both coded and free text forms, while the latter type is in a coded form only.

Kjellen found that the searches of the free-text description of the sequence of events proved efficient in identifying accident reports that searches of other types of observations had failed to identify due to a low response rate. Table 2 below shows three examples of searches with respect to the number of 'hits'.

The study results demonstrated benefits as well as difficulties in the use of structured and coded observations. Coded observations proved valuable in cases where a relatively high number of reports were processed. On the other hand, a low response rate of selected observations of a structured or coded type result in a poor reliability in searches for reports. The relevant information could alternatively be documented in a less structured way, such as the free-text description of the sequence of events, but then retrieval takes longer. It may be inferred from this that a public database at the industry level would need to have at least 200 to 300 events to assure usefulness for company decision making.

Kjellen concluded the following with regard to the design of a database:

- It should contain relatively few observations (ie data items). This allows a concentration of effort toward quality of data input. Furthermore some users of the database will have difficulty comprehending and applying a complicated set of data items.

- It should contain free text descriptions of structured observations as well as of the sequence of events, and a selection of these observations should be coded.

- Powerful computer capabilities are recommended for free-text search and delimiting, sorting and summarising the desired information.

Advances in computer technology since this study was carried out mean that the requirement of the third point is now readily achieved.

Note that the public resource explored by this dissertation goes one step beyond the concept studied by Kjellen and the South Australian workers compensation database by enriching that injury data with causal information gathered through follow-up investigation of the injury occurrence.

Table 1 *Types of observations ranked according to the number of times addressed in searches or displays (Kjellen, 1987)*

Rank order	Searches		Displays	
	Airline	Steel mill	Airline	Steel mill
1.	Occupation of victim	Department	Sequence of events	Activity of victim
2.	Type of machine	Type of energy	Place of occurrence	Sequence of events
3.	Sequence of events	Sequence of events	Type of machine	Type of report
4.	Type of energy	Place of occurrence	Activity of victim	Number of days of absence
5.		Type of machine	Description of injury	Type of energy
7.[sic]		Type of report	Nature of injury	Type of machine
8.				Deviations
9.				Nature of injury

The table only shows those types of observations that were involved in 10% or more of the searches/displays at each company.

Table 2 *Searches of free text versus using structured or coded observations (Kjellen, 1987)*

Search concept	Company	Type of observation		Total number of hits
		Type of machine (number of hits)	Sequence of events (no. hits)	
'Crane'	Steel mill	7	32	32
'Truck'	Airline	2	4	4
'Post'	Airline	2	7	7

The aim of the searches was to identify reports concerning: crane accidents; truck accidents; and accidents involving equipment from the Postal Administration.

4.3.7 Type of information provided

In view of the previous comments some thought was given to the type of causal information which could be shared with industry.

Aggregate industry information

While the comprehensive statistical reports produced by WorkCover are too bulky to distribute it would be feasible to disseminate a summary of coded information in a form similar to the WorkCover Claim Profile Statement, by agency of accident; mechanism; nature of injury/disease; and body part, with cross tabulation if possible. WorkCover could continue to produce for selected industries analyses of causes derived from narrative data as presented in 'Setting the Scene' (WorkCover, 1995).

Information on individual injuries

Because of resource implications detailed information should be compiled on serious injuries only eg those that satisfy the definitions of an 'immediately notifiable work-related injury' and, ideally, 'dangerous occurrences'. As far as possible coverage should be extended to injuries involving more than two weeks absence from work (which would result in 'compensated days lost' claims or 'income maintenance' claims). A workable cut-off level of injury severity will need to be defined above which supplementary information is sought using investigation reports or other options listed so as to maximise information available but consistent with resources available. Similarly a cut-off level will need to be defined for preparation of Significant Incident Reports and Hazard Alerts.

For serious injuries textual information should be provided from both WorkCover claim forms and DIA investigation reports. Historical information could be sought through retrieving old DIA files and performing data entry (after editing of reports) though this would probably be prohibitively labour intensive. It may be necessary to accumulate a database over a few years.

One could include coded information for each injury record but in expanded text form (and possibly have numbers have well).

Information on severe injuries (say, those involving two weeks or more absence from work) could be supplemented from follow-ups based on several options:

- a telephone call using a structured set of questions (Carstensen et al, 1995)
- a written questionnaire by mail/fax
- an OHS surveillance form to supplement the WorkCover claim form.

The approach of follow-up telephone calls was used in a study by Carstensen et al (1995). In their research a telephone interview was conducted with the injured person two to four months after the time of accident. Interviewers were two medical practitioners, one a qualified specialist in occupational medicine and the other a trainee. The interview was conducted using a structured questionnaire with 22 questions supplemented by qualitative injury data. The questionnaire was not piloted, but was read and evaluated by a group of 20 farmers. During and after the interview the information was coded into approximately 70 variables.

Alternatively, where a severe injury is not investigated by the DIA additional causal information could be obtained by sending an additional OHS report form to employers. This would seek OHS surveillance information including preventive action taken and seeking any innovative solutions applied. Extra information could be that defined in AS 1885.1, but not collected on the WorkCover claim form, as well as an expanded description including equipment used, any chemicals involved and personal protective equipment used.

Data items

From examination of the WorkCover Report Form and coding system the data items below may be identified for a comprehensive injury record based on current workers compensation records supplemented by a brief investigation report from the DIA. All of these could fit onto one computer screen for each injury record.

- Industry classification (SAWIC) (numerical coding and text description)
- Occurrence category ie fatality; severe injury/disease; or dangerous occurrence
- If involves a fatality or injury: Affected person(s): employee; self employed; visitor; retired; child (ie age under 15 years)
- If dangerous occurrence: Dangerous occurrence category ie failure of load bearing part; collapse of excavation; accidental ignition of explosives etc.
- Date of occurrence: month and year of occurrence eg 8/96.
- Sex/Age group
- Occupation (ASCO)
- Injury/disease suffered
- Codings in accordance with the Type of Occurrence Classification System (NOHSC, 1990):
  – Nature of injury or disease (numerical coding and text description)
  – Agency of accident (ditto)
  – Type of accident (ditto)
  – Bodily location (ditto)
- Summary description (narrative from claim form)
- Investigation information (from DIA)
  – detailed description
  – essential or contributing factors
  – recommendations.

It is likely that information in the above form represents an effective basis for a decision support system and would be most used by industry personnel with some expertise in data or accident analysis, such as workplace occupational health and safety coordinators/advisors.

4.3.8 Quality of data

'Comment' fields on workers compensation database

Narrative information from Employer and Worker Report Forms is entered in comment fields on the workers compensation database. Unfortunately the comment fields have not always been appropriately used and other information has been entered. This means that resources may be needed to check and edit information stored in comment fields. (J Kennedy, pers comm)

Use of narratives from Employer and Worker Report Forms

The narrative is based upon the information entered by the injured worker on the Worker Report Form. Unfortunately the worker is untrained in the provision of such information for the purposes of identifying the causes of accidents. Although the employer can refine the worker's description of the occurrence on the Employer Report Form, using the experience of, for example, an OHS Coordinator,

health and safety representative or OHS nurse, in practice the employer almost invariably repeats the worker narrative verbatim. (K Hobson, pers comm) This deficiency with respect to the quality of the narrative information is noted in Gun et al (1997).

Information on chemicals and equipment involved

Although the WorkCover Report Forms seek information on 'any chemical, object, process or equipment involved', such information is not reliably forthcoming. According to Gun et al (1997) 'it is crucial that control measures be directed at industrial hardware wherever possible'. WorkCover needs to examine ways to encourage more of such information on the Report Forms. Perhaps a separate box could be added on the Forms, bearing in mind that competition for space on the forms is intense (one of the disadvantages of using the one form to serve both workers compensation and OHS purposes). In the case of immediately notifiable injuries such information could be gathered by the DIA inspector and entered on the merged database. For other significant injuries telephone follow up could be carried out with the relevant employer using a structured questionnaire (see Carstensen et al, 1995) though this is not likely to be practical on a routine basis. This may be more feasible if concentrating on certain types of injuries or for targeted industries where a smaller number of injuries is involved.

Structured narratives

The WorkCover Authority in NSW uses narrative text similar to that used by WorkCover SA. The difference is that their coders go one step further by taking the accident description from the Accident Report and rewording it according to a predetermined structure. The text is normally structured as follows:

<Occupation> at <accident location> was <activity at time of accident>> when <accident event and factors> and worker <mechanism of injury and factors> and sustained <nature of injury> to <bodily location>.

Examples provided by the WorkCover Authority (C Le Nevez, pers comm) are:

- Tractor driver for water management authority was assisting to unload a tractor from a truck when he got caught between the tractor and the fastening chain and sustained a fractured rib cage.

- A boner at sheep abattoir was walking up stairs to tea room when he slipped on the stairs and fell straining his left knee.

- Textile worker at wool blending factory was using the cargo lift and at level 5 the lift failed and the cage fell 6 floors crashing to the basement and he sustained contusions to his right foot, thigh and upper arm.

The Accident Report, which is for OHS surveillance purposes, also contains preventive information, in contrast to the WorkCover Report Forms which are primarily for workers compensation purposes.

The restructuring of the textual information provided on report forms by trained coders is also an approach adopted by the Injury Surveillance & Control Unit of the South Australian Health Commission for the narratives from hospital forms.

Larsson (1994) outlined the information which should be gathered to describe the sequence of events for occupational accidents as three steps as presented in the following table.

Table 3 *Describing the sequence of events for an occupational accident*

Action (verb)		**Item** (noun)
Activity of victim at time of accident eg operating, maintaining, driving, walking	*Activity*	**Item associated with activity of victim** eg power press, tool, vehicle, floor
Action of deviation from normal eg explode, fall, trip, struck by, strike against	*Mechanism*	**Item associated with deviation** eg pressure vessel, wall, cable, vehicle, machine, tool
Action leading to injury eg struck by, fall (from height), crushed	*Injury*	**Agent of injury** eg brick, ground, machine

Source: Larsson, 1994

It is apparent that to optimise the quality of the causal information as much of the above information as completely as possible should be obtained, presented in structured narratives, and coded.

4.3.9 Who is the information aimed at?

Size of business

Large organisations are those who are least likely to find the information useful as they often have a sufficient pool of occurrences within their own workplace to adequately analyse causal factors. It is therefore essential that the needs of medium and small businesses are served, not the least because small businesses account for about half the workers compensation costs of the WorkCover Scheme.

In examining strategies for motivating OHS prevention in small business Powning & Bowes (1996) found that ways need to be explored to get practical information to small business at a workplace level. Assistance and information for the small business sector needs to be practical and at an industry, hazard and even task-specific level. They argued for an injury surveillance approach to analysing workers compensation data 'to enable a more detailed understanding of injury causation and the development of user friendly, practical, solutions-orientated information and guidance'.

Mayhew (1997) in looking at barriers to implementing known OHS solutions in small business concluded that 'OHS prevention strategies should be directly targeted at high risk equipment, procedures and substances that are used by, and familiar to, each owner/manager in the industry sub-sector, and accompanied by simple and practical guidance'. Brief information products should 'focus on particular hazards in a specified industry sub-group eg written information on how to avoid contact dermatitis in hairdressing should be combined with photographs of appropriate PPE [personal protective equipment], and a local phone number to call if further hazardous substances information is required. The focus should by away from the individual and on to a hazard or process of doing a particular task'. According to Mayhew, 'hands on, concrete examples' are of crucial importance, making use of familiar contexts.

The use of workers compensation records and investigation information to concentrate on the detailed and particular rather than the generic and statistical is therefore more consistent with the approach needed to reach small business. Furthermore, the description above of the type of brief information product most needed by small business is very similar to the composition of Hazard Alerts, Significant Incident Reports and Solutions sheets, which are both spin-offs from and contributors to a causal information system.

Industry bodies

Though workplaces are the ultimate target of the information, a major role is played by industry bodies, such as industry associations, unions, industry training advisory boards, skills and training centres etc.

Industry associations deserve special mention in relation to small business. Mayhew (1997) found that industry sub-group specific associations are a focal point for reaching member businesses, and small business

owners/managers prefer to communicate with their associations rather than 'government' personnel and departments. Even if small businesses are not users of a database resource but receive OHS information derived from the database and disseminated by the association this would be a major advance. Issues relating to OHS information dissemination through trade unions and employer associations are discussed on pages 40 & 41 of Mayhew.

Viner (1991) makes the point that an overall body such as an industry association may also act on behalf of industry by learning the lessons from accidents and influencing manufacturers, suppliers, designers, contractor organisations and other parties to supply and install safe plant, equipment and chemical processes. Furthermore, they may act as a pathway between 'the experiences of industry and the educators of trades and professional staff in industry' (p 144).

Workplace personnel

The information should be produced in a form which is useable by workplace-located staff with some OHS background but not requiring an 'expert' such as someone with tertiary qualifications in OHS. As such it should be suitable for health and safety representatives, health and safety committee members, informed human resources managers and OHS officers/coordinators.

It is likely that different users would use different aspects of a system. OHS experts might carry out predictive analyses on the database using the full breadth of data items suggested in 4.3.7, but workers and occupational health and safety representatives might be more interested in Significant Incident Reports or Hazard Alerts.

Candidate industries for introducing a system

One may ask how an industry might be identified for establishing an information sharing system, and whether suitable industries are likely to exist.

Industries most suited to introduction of a database resource should satisfy the following criteria:

- a high injury rate so that there is the greatest potential for impact/benefit and to justify the investment of resources in establishing the resource;
- a large enough pool of injuries to allow prediction of causes;
- a mixture of small and medium businesses without domination by a small number of large employers;
- possessing an industry association as a focal point for a dissemination network; and
- likely to be targeted by WorkCover or DIA programs so that it is supported, at least initially, by a 'package' of other OHS services.

According to WorkCover (1996) the industry division with the highest average claims incidence rate for non-exempt employers is Manufacturing which is 6.6, compared to the State average of 3.9. It was decided to identify some SAWICs or SAWIC groupings within Manufacturing which could be suitable candidates for establishing a database resource.

The main industries identified were:

– Metal products manufacturing (comprising Basic Metal Products and Fabricated Metal Products);
– Meat products manufacturing (including poultry products and bacon, ham and smallgoods); and
– Industrial machinery and equipment manufacturing.

Further details as obtained from WorkCover (L Bowes, pers comm) are presented in Table 4 below. At the time of writing each industry is being considered by WorkCover for participation in a proposed WorkCover industry program. All three have a mixture of small and medium businesses with a number of large employers in Metal Product Manufacturing. Large employers do not dominate in any of the three industry groupings. All three have a large pool of relatively severe injuries (ie those resulting in two weeks or more absence from work) and a further pool of less severe injuries (in fact the industries could possibly be broken down further and still retain a sufficient pool of injuries for analysis).

As an example, relevant industry bodies were investigated for Metal Products Manufacturing and found to be:

- Engineering Employers Association of South Australia
- Architectural Aluminium Fabricators Association of South Australia
- Sheet Metal Manufacturers' Association of SA
- Australian Manufacturing Workers Union
- Australian Workers Union
- Engineering Industry Training Advisory Body
- Port Adelaide Training & Development Centre.

Other organisations have some connection with the industry such as the Civil & Construction Skills & Technology Centre, the Welding Institute of Australia and the Electrical Manufacturers Association of SA.

Metal products manufacturing therefore has the basis for an excellent dissemination network with a range of industry bodies to support small businesses.

Table 4 *Candidate industries for establishing a database resource*

Industry	SAWICs	No. registered locations	Total remuneration ($M)	Total no of claims	Claims with com days lost*	Incidence rate (cl/$M)
Metal products	294101-316801	804	263	2765	305	**10.5**
Meat products	211501-211701	173	79	1241	244	**15.7**
Industrial machinery	336001-336901	558	179	1481	156	**8.3**

* Claims with compensated days lost ie resulting in two weeks or more absence from work.
Source of data: WorkCover Corporation

4.3.10 Options for providing the information

Some options for making causal information available to the industry dissemination network are:

- regular hardcopy reports (say quarterly);
- on floppy disk (updated quarterly), or CD-ROM, with software attached for local user;
- a separate data file made accessible to external users through modems eg on Internet (World Wide Web) with ISYS search and retrieval tool (using, say, the WorkCover 'Decision Support System' which is under development);
- post on a Mailing List on the Internet;

- distribute as electronic file on e-mail; and/or

- regular distribution of Hazard Alerts and Significant Incident Reports by mail, fax or by Internet.

Information could be disseminated to all employers, industry bodies, health and safety representatives and/or health and safety committees. WorkCover has a database of health and safety representatives and committees, though information directed to these would mainly reach only medium to large companies. In the case of small businesses dissemination could be via industry bodies rather than direct.

In Pisaniello & Brooks (1996) and two earlier papers by the same authors, the status of the Internet as an OHS-related tool and resource is described from the user's perspective. They have concluded that 'the Internet is potentially a powerful mechanism for the advancement of OHS'. The Internet, therefore, should receive serious consideration as a means of computer-mediated communication of causal information to industry.

Mayhew (1997) reported on the finding of an ACCI survey in 1996 that at present many small businesses do not own a computer. Mayhew therefore reasoned that 'while the internet is of enormous potential utility for OHS professionals in industry, small business is unlikely to access OHS information or guides from it - even though they are relatively free'. Despite her comments it may well be that the uptake of information technology and in particular the Internet is so rapid that the situation in 1996 has little bearing on the situation likely in 2 to 5 years from now. Increasing quantity and quality of services by OHS agencies on the Internet may also drive an increase in usage for OHS, that is, OHS agencies can create the demand in a positive feedback loop.

Statistics were sought on the size and usage of the Internet in Australia and obtained at *www.admedia.aust.com.* It was found that the number of people in Australia who had accessed the Internet had increased from 1.4 million to 3.5 million in the space of one year from August 1995 to July 1996. In July 1996 an estimated 37% of Australians aged 18 and above had accessed the Internet from work and 28% from home (AGB McNair survey). 40% of World Wide Web users have started access in the past 6 months ('www.consult' survey). These figures indicate the rapid rise in the use of the Internet. However, figures relating to the United States suggest that uptake of the Internet is slow in small business with less than 10% of small businesses (defined as '<101 employees') having Internet access. In the short term (ie next 2 to 5 years) the Internet may not be fully effective alone at reaching small business. However, it may be that many managers, health and safety representatives, health and safety committee members and workers will access the Internet from home and take information gained there back to the workplace.

4.3.11 Willingness and capacity to use system

The simple availability of an information-sharing system does not guarantee that it will be used. Workplaces need to be willing or motivated to decide to use the resource, and they need to have the capacity or ability to utilise it. These are large areas of consideration and could not be adequately explored in the course of this dissertation, though Mayhew (1997) provides useful insights on these challenges with respect to the response of small business to occupational health and safety generally. Some general remarks, however, are possible. It is likely that willingness and capacity will be increased if:

- the system is readily accessible, not requiring special software or hardware;

- information products (eg Hazard Alerts) and tools (eg text search facilities) are simple to use and do not require special expertise;

- information is seen to have immediacy and relevancy to the specific work environment and processes of the particular workplace;

- the system does not inundate workplaces with information (eg if Hazard Alerts are too frequent they may receive the status of 'junk mail');

- workplaces can actively participate rather than merely receive information;

- the system is as decentralised as possible with ownership as much as possible with an industry rather than being perceived as a 'government system'.

4.3.12 Confidentiality

Much of the information residing with WorkCover and the Department for Industrial Affairs is not accessible to the work community because of confidentiality and legal restrictions. However, it is likely that this information could be filtered in such a way that causal information on individual injuries is retained while still meeting these other requirements. This is already done to a large extent with workers compensation data supplied to Worksafe Australia for the National Data Set (WSA, 1987) where unit record data does not identify the injured worker or the employer.

Legal requirements for confidentiality are covered by sections 112 and 112A of the WR&C Act and section 55 of the OHSW Act.

Injury information should **not** include:

- names of injured worker, co-workers, witnesses or any others;

- name of employer;

- any address details of employer or worker (perhaps not even postcode);

- any financial information eg cost of claim, employer levy rate etc;

- any suggestion of blame of worker, co-workers or employer;

- medical records (eg Prescribed Medical Certificate), except for broad statement of injuries suffered.

Resources may be required to edit/censor records which may contain any of the above information. Data entry rules will need to be established to ensure that only non-confidential information is entered in some fields.

If the above guidelines are followed it is not anticipated that confidentiality would be a significant obstacle to accessibility to the data. If extra protection is needed to satisfy the targeted industry passwords could be introduced for added security, though this would not be the desired path because of the extra restriction to access.

The informal nature of discussion groups such as a Mailing List on the Internet poses additional issues with regard to confidentiality. Users of the Mailing List, including health and safety representatives, members of health and safety committees and consultants - all of whom are specifically mentioned in s55 of the OHSW Act - will need to be warned (eg at registration) that they are not to share information about commercial or trading operations, or personal circumstances of any individual. Such restrictions apply of course to any form of communication.

4.3.13 Legal issues

Information on occurrences subject to prosecutions may not be available for the order of years after the event. However, this is not likely to result in undue restriction on information on other occurrences. Government agencies have a clear role and obligation to inform employers and the public of risks to health and safety, and maximise release of such information. (S Bath, pers comm)

Risks of legal liability may be associated with information disseminated, including:

- factual errors;
- suggestions of blame (which is somehow identified to a company or individual);
- criticisms of commercial products;
- criticisms of company management procedures.

A legal disclaimer will be needed, examples of which accompany some existing electronic means for disseminating information such as Internet Mailing Lists.

4.3.14 Evaluation methods

Evaluation of an information-sharing system could comprise a mixture of quantitative and qualitative methods consisting of a telephone survey; a written questionnaire; focus groups; observation; and monitoring of access.

Telephone survey

A telephone survey should be aimed at company management using questions similar to those used by WorkCover in its evaluation of the Claim Profile Statement (see section 4.4). This survey would illicit information on level of uptake, action taken and satisfaction across the industry. Health and safety representatives and/or health and safety committees could also be surveyed, bearing in mind that such an approach would tend to exclude small businesses.

Written questionnaire

A written questionnaire is an alternative to a telephone survey.

Focus groups

Several focus groups could be held separately with employee representatives (union and health and safety representatives); representatives of management from within the industry, and OHS professionals (eg OHS Coordinators, OHS nurses), to determine the extent to which the resource impacted on design of prevention strategies and alerting the industry to hazards.

A further focus group could be held for staff from the OHS agencies regarding the generation of information (resources, timeliness etc) and administration of the resource.

Useful advice on conduct of the focus groups, particularly in relation to the involvement of blue collar workers, is given in Ritchie & Herscovitch (1995).

Though not strictly a focus group any industry reference group established by WorkCover or the DIA to represent employers and workers in the implementation of an industry program is also a source of comment.

Observation

Several key users of the database in the industry could be identified and observed in their use of the resource for decision-making. Ideally the study by Kjellen (1987) should be replicated except using an industry database rather than employers' databases. This could be the subject of a university dissertation/research project.

Monitoring of access

In the case of the Internet access to the database can be readily monitored on an on going basis using various means such as the number of visits to the Internet site and the number of downloads; number of subscriptions/registrations to the service; and/or number of purchases of any relevant software.

4.4 MODELS FOR SHARING OF CAUSAL INFORMATION

4.4.1 Examples for critical review

Five examples of information-sharing systems were found using the methods outlined in Chapter 3 and selected for analysis in this dissertation. These were:

- *CCINFOdisc* databases (Canadian Centre for Occupational Health and Safety);
- WorkCover *Claim Profile Statement*;
- National Incident Reporting System for Australian Mines;
- WorkSafe Western Australia - Significant Incidents and Solutions on Internet; and
- Internal injury information sharing by BHP.

For each system, information gathered as described in Chapter 3 is first presented, followed by a table outlining strengths and weaknesses in light of previous discussion.

Being of special interest Mailing Lists on the Internet were also investigated. Such a communication method would constitute a adjunct to a system rather than a system in itself.

4.4.2 CCINFOdisc databases (CCOHS)

Takala (1993) listed 100 existing occupational health and safety databases of all types ie bibliographic, full-text, factual, multimedia or mixed. Of those listed the ones of most interest to this study were those which were of full-text type presenting 'OSH information' (as opposed to chemical information, MSDSs, toxicology etc) and were preferably in English. Only two met the criteria being MINING INCIDENTS and FATALITY REPORTS, both available as a CD download on *CCINFOdisc*. These databases were also available in French.

CCINFOdisc, available from CCOHS, in fact consists of several database sets to which users can subscribe for a fee. MINING INCIDENTS and FATALITY REPORTS are two of 12 databases on *OSH CanData Disc (B1)*. The other databases are: CANADIAN STUDIES; CANADIANA; CASE LAW; DIRECTORY OF OSH LEGISLATION IN CANADA; ESSENTIALS; MOLINDEX; NOISE LEVELS; OHS SOFTWARE PACKAGES; RESOURCE ORGANIZATIONS; and RESOURCE PEOPLE. CCINFOdisc is available at the WorkCover Resource Centre but the Centre does not subscribe to the CanData Disc.

According to *Your Guide to CCINFOdisc/DOS* (CCOHS, 1996) the FATALITY REPORTS database provides reports from inquests into occupationally related fatalities across Canada. These reports may be from Coroners, Medical Examiners, or health and safety organisations concerned about work-related fatalities. Information in the reports includes the circumstances surrounding the fatality and the recommendations resulting from the inquest. Fatality reports identify unsafe work practices and equipment which contribute to work-related fatalities. It is intended that similar tragedies be avoided through analysis of the causes and trends in fatalities and by following the recommendations of inquests.

The MINING INCIDENTS database contains descriptive information on OHS incidents in mining, such as fatalities, lost-time injuries, explosions, fire, equipment accidents, collapse of structures, and electrical failure. Also recorded for each incident are the breakdown of safety systems, personal hoisting equipment and ventilation systems.

Sample Records/Record Summaries for FATALITY REPORTS and MINING INCIDENTS databases are presented in Appendix D.

Search facilities with written instructions are provided for each database. FATALITY REPORTS allows simultaneous searching for terms from CIS descriptors and the full text reports (see example in Appendix D). Searches can also be conducted by various dates, eg date of fatality, and by the name of the jurisdiction where the report was prepared. MINING INCIDENTS allows searches by words drawn from Site Type, Incident Type, Jurisdiction/Donor, CIS Descriptors and Report Details fields.

The Technical Analyst with the Customer Service group of the CCOHS was contacted by e-mail on the Internet and asked the following questions:

- Has CCOHS (or any other agency) evaluated the above databases for impact on the incidence of injury and disease in the workplace? And are the results available?

- What evidence is there of uptake of the information by the relevant groups?

- Who is best able to use the information in the workplace, ie who is the information designed for?

The Technical Analyst was not aware of any systematic analysis of the effects of these databases on injury and disease prevention in the workplace. Although CCOHS had carried out usage surveys, responses were at best anecdotal. As there are a number of different types of databases on the same CCINFO disk it is difficult to tell who is using what databases and to what effect. The only thing that the various databases have in common is that they contain 'Canadian' information.

According to CCOHS, MINING INCIDENTS is intended primarily for mining health and safety personnel and inspectors. The content is based on reports of 'unusual incidents' in mines, reported to the chief inspectors of mines in various Canadian jurisdictions. As indicated above, the intent of the database is to provide information on incidents that have occurred under specific circumstances, so that similar problems and/or mistakes may be avoided in the future. FATALITY REPORTS consists of summaries of coroners' reports on occupational fatalities.

Because these two databases are included within a collection it is hard to determine who is using them and for what purpose. The B1 survey (a survey of users of the CD-ROM containing the databases in question) only ranked databases in terms of their 'value' to users and frequency of use. It did not provide a strong picture of each database.

Some data is available from inquiries into who has asked about FATALITY REPORTS and as expected it is very diverse. Both the strength and the weakness of these types of databases is that because they provide direct information they can have multiple uses. This is also why it is difficult to target potential users. For example, with FATALITY REPORTS, coroners, lawyers, worker advocates, employer advocates, inspectors, workers compensation specialists, researchers etc could potentially use the information. Although the average worker could get useful information from it, it is really designed for persons who are responsible for safety and can analyse accident/incident data. The same could be said for MINING INCIDENTS.

Strengths and weaknesses of the system are outlined in the Table below.

Table 5 *Strengths and weaknesses of MINING INCIDENTS and FATALITY REPORTS on CCINFOdisc*

Strengths	Weaknesses
● Comprehensive full text descriptions ● Causes identified, including details of any plant, equipment or chemicals involved ● Preventive actions recommended ● Excellent, easy to use full-text search facilities ● Multiple uses to a wide range of users	● Does not present Australian incidents - Canadian only ● Must be able to afford CD-ROM to access on site, or be able to travel to a library/ resource centre. ● Need for CD-ROM limits number of users ● Use is not interactive or involving active participation ● No targeted group of users therefore difficult to evaluate usage

4.4.3 WorkCover (SA) Claim Profile Statement

The WorkCover Claim Profile Statement (CPS) is described in section 4.2.3 and an example is shown in Appendix B.

WorkCover carried out an internal evaluation of the CPS in 1996 and a copy of the report was obtained from the Occupational Health and Safety Services Department as a personal communication for the purposes of this dissertation (WorkCover 1996c).

The objectives of the CPS project were:

- to produce claim information products as a customer service, and in such a format that can be used as a tool for identifying hazards and the prompting of prevention action; and

- to distribute claim information products to employers who met defined criteria and to their employee representatives as part of a two year pilot commencing in 1994.

The aim of the CPS was to present WorkCover clients with claims information with a prevention focus rather than for financial reporting of workers compensation claim numbers and costs.

The target group was defined as active non-exempt employers (ie WorkCover-insured employers) who had incurred in a two year period either:

– 5 or more claims with a total aggregate cost in excess of $10,000; or
– 10 or more claims with a total aggregate cost in excess of $500.

A total of 3,289 employers received CPSs in the two-year life of the program. Of these 1,018 received it twice.

In addition, elected health and safety representatives received a copy of their organisation's CPS on both years of the program.

As described in section 4.2.3 the CPS was a simple one sheet document containing two bar graphs showing the 'Mechanism of injury or disease' claims reported to WorkCover for the industry group of the employer and the operations of the employer in that industry group. Each graph plotted the percentage of reported claims against the codes for the ten most frequent mechanisms of injury and disease. The CPS was accompanied by a booklet entitled *How to use your Claim Profile Statement* (WorkCover, 1994).

The CPSs and accompanying booklets were distributed by mail using employer registration details on the WorkCover database and election notification details on the health and safety representatives database.

The CPS was designed as an information product which would act as a prompt for organisations to start questioning their performance in terms of health and safety. It was anticipated that organisations would reconcile the data on the CPS with their own workers compensation records and feed the information into a hazard management approach to health and safety. Additionally the CPS was designed to encourage communication between management, health and safety representatives and employees on specific issues. Ideally the CPS would have been discussed at the health and safety representative level and strategies discussed at the health and safety committee level and strategies discussed in order to reduce the incidence of injury in the specified areas. It was intended that the industry graph enabling organisations to compare their performance with that of their industry as a whole would lead to motivation for action in health and safety.

The evaluation of the CPS was centred on the product, that is, how the information in the CPS was perceived and used by employers. The evaluation did not examine the impact on claim rates as there were so many influencing factors eg legislative changes. Feedback from employers was sought primarily through telephone surveys. Some information was obtained thorough personal contact, but this was not found to be an efficient method. Employers were furthermore invited to a two-hour briefing session on the CPS and attendees asked to complete a questionnaire following the briefing.

The survey questionnaire was administered by telephone to 879 employers (26% of the 3289 employers who received CPSs). In contacting employers the interviewer asked to speak to either the manager or the safety coordinator in the first instance, and where that was not possible, spoke to someone else who could comment on the CPS products. Sixty-two (62) attendees of the CPS briefing filled in a questionnaire (50% of the total group).

Questions addressed understanding of the CPS, its value in assisting prevention of workplace injuries, the usefulness of the information, action prompted in the organisation, suggested improvements, and whether the organisation would like to receive the CPS in the future and with what frequency.

The following action was prompted in sample organisations by the CPS:

Distribution to employees	57 (15%)
Discussed at staff or safety meetings	118 (31%)
Contacted WorkCover for more information	14 (4%)
Used information to identify hazards	95 (25%)
Used information to form prevention strategy	89 (24%)
Other	4 (1%)

It may be seen that the CPS prompted at least some action in most organisations.

Table 6 below lists some reported types of use by sample employers of the products in the categories of: awareness raising; ongoing education; administrative; prompting of specific action.

It was recommended on the basis of feedback from employers that the CPS continue. It was thought that the product would be more effective if an appropriate format was developed for ‘basing information on using narrative descriptions of the workplace accident to supplement the coded mechanisms of injury or disease information’. In addition it was recommended that the CPS be used on a more ‘targeted’ basis achieved through consultancy services provided as part of existing WorkCover programs.

The strengths and weaknesses of the CPS are summarised in Table 7.

Table 6 *Reported types of use made by sample employers of CPS products (WorkCover, 1996c)*

Type of use	The products were reported as being of use:
Awareness raising	● in raising general awareness of OHS
As a tool	● in confirming employers' beliefs about their OHS problems (for some employers his was perceived as a benefit; for others as an insult to their intelligence) ● in prompting prevention ideas ● as a complement to other prevention tools they used ● as a general safety tool to highlight/identify hazards, cause of injury, prevention needs and possible prevention actions ● in quantifying their OHS problem ● in determining the issues to consider when designing their new workplace
On-going education	● as a source of discussion at safety and other meetings. (For example, one employer mentioned using a different chapter in the book to lead discussion at each safety meeting)
Administrative	● as a prompt to carry out an in-house hazard survey ● as a general hazard checklist ● as a starting point to the development of OHS policies and as part of the enterprise's reviewing of existing policy ● as a proforma graph
Prompting of specific action	In identifying/implementing prevention of injuries by: ● repainting floor to make them non-slip and not polishing floors ● relocating power points to reduce the distance between power points and machines and the lengths of electrical cords; stopping power leads from running along floor; installing safety switches on power points ● posting warning signs in workplace and on wet floors ● clearing grounds and improving on housekeeping ● improving lighting ● providing personal protective equipment ● installing welding screen ● filling in of holes in the ground ● setting up a training program ● cleaning of machines ● getting safer ladders ● starting an exercise program ● using of lifting equipment ● marking of walkways ● maintenance of tools ● the purchase of relevant hazard specific safety video

Table 7 *Strengths and weaknesses of WorkCover Claim Profile Statement*

Strengths	Weaknesses
● can be produced using standard report from database ● targeted to employers with high industry numbers or costs ● health and safety representatives also received copies of CPS ● was actively used by at least one-quarter of workplaces ● accompanied by explanatory material in user-friendly format ● contained contact details for more information on specific hazards ● allows some benchmarking of safety performance with industry ● a formal evaluation was conducted ● a good prompt or awareness raiser for preventive action	● accompanying information was very generic ● no use of industry bodies ● targeting criteria mean that small businesses were essentially excluded from strategy ● causal information only provided at aggregate level; no information on individual occurrences ● coded information only provided on agency of accident ● no opportunity to learn from experiences of other employers ● guides prevention decision-making only at the broadest level

WorkCover could continue to produce the Claim Profile Statements for targeted industries. It may be possible to tailor the guidance publication, *How to use your Claim Profile Statement,* to address the 15 to 20 most common agencies of accident in the industry, rather than the 37 presently included, and use examples directly relevant to that industry.

4.4.4 National Incident Reporting System for Australian Mines

Reference was made to the National Significant Incident Reporting System for Australian Mines in section 4.2.7. Worksafe (1990) describes the system and gives guidelines for preparing reports for circulation. The following headings should be used when writing the significant incident report:

- situation (underground or surface);
- mine type (coal, iron ore etc);
- description of incident (outline essential factors, include classification/skill of employees involved);
- what damage/injury occurred (to person/machine/environment, including potential damage/injury); and
- what remedial action was taken.

When stating what remedial action was taken, information is to be given to enable other mines to consider taking similar action. A reporting and distribution network is presented in the publication as shown in Figure 1.

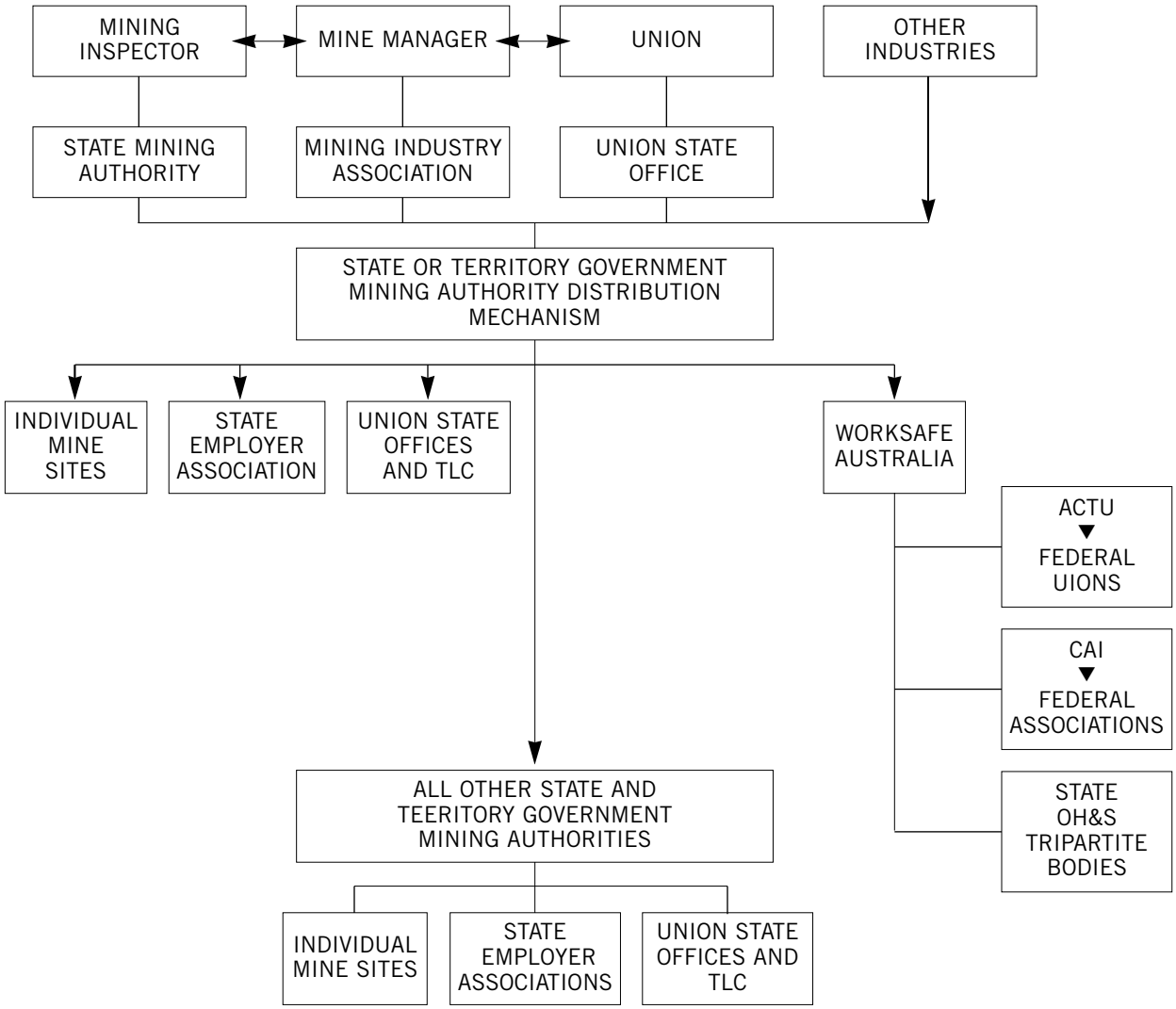
Worksafe Australia was contacted and they were not aware of any evaluation which had been carried out of the National Reporting System. As Western Australia appeared to be one of the more enthusiastic participants in the system I contacted the Department of Minerals and Energy to ascertain their contribution and whether they had conducted any evaluations at the state level.

The Department had not carried out a formal evaluation of the impact of the significant incident reporting system, but it was revealed that in March 1997 they had introduced a database resource for the Western Australian mining industry. Called 'EXIS' (External Information System) it was developed to enable the mining industry to access the multitude of data pertinent to safety and health in mining held by the Department (M. Brown, pers. comm.). It consists of nine databases including Significant Incident

Reports. A customer with a suitable PC and modem may purchase and install Lotus Notes software (cost: $150 rrp) and register as a user. The customer can then use Lotus Notes to make a dial-in connection to the Department's EXIS server. This results in any updates to the EXIS database being downloaded into the customer's PC. The customer may then interrogate the databases at their convenience without requiring a direct active link to the central database repository. Access is available 24 hours/day and 7 days/week.

Some 45 of the approximately 200 groups of mining sites in WA are registered, with about 15 of the 45 actively using the databases. Although uptake is at present small it is anticipated that this will increase as awareness of the database and its benefits increases throughout the industry. Although at present EXIS is mainly used by OHS professionals the target audience is wide including site managers, health and safety representatives and workers generally. It is thought that the absence of specific background or skills in analysis of injury data will not disadvantage workers using EXIS.

Figure 1: *National Significant Incident Reporting System for Australian Mines: Reporting and Distribution Network (Worksafe, 1990)*



Customers can locate relevant Significant Incident Reports (SIRs) by using the SIR number, the topic, or the in-built search facility. Information can be downloaded in the form of text or photographs. Confidentiality is maintained by removing company names and individual names from reports (as specified by Worksafe, 1990). SIRs are supplemented by Safety Bulletins, FYIs (For your information) and a Discussion database. The FYI database each week collates all incidents (eg fires, electrocutions) and is convenient for companies to use for discussion at weekly 'toolbox' meetings. Reports or discussion on occurrences and successful control measures can be initiated from mining companies as well as from the OHS agency.

As well as general industry information client-specific information on lost-time injury rates is provided. This has parallels with the WiseLink system once employed by WorkCover to provide employers with client-specific claims data. Reporting of occurrences may also be done electronically. Other databases include MineSafe journals, and Mines Safety & Inspection Act, Regulations and Guidelines in an electronic form.

The databases above bear strong resemblances to Mailing Lists and Newsgroups on the Internet. Although the advantages of using the Internet were acknowledged and may be exploited more as time goes by the Department considered that at this stage the Internet is not sufficiently secure to allow electronic exchange of confidential employer information.

Although Internet technology is spreading rapidly an article in LAN Magazine (Richardson, 1996) suggests that Lotus Notes may have a future where an intranet is being established from scratch or may even be 'the giant that swallows the Internet'. Because WorkCover already has established Web server software it is unlikely that it would want to use Lotus Notes, but an industry could consider Lotus Notes if setting up its own intranet.

Note that although South Australia does not have a similar database resource for its mining industry a survey of 64 quarry sites in South Australia revealed a high degree of support for an industry database of 'incident' reports with 89% responding positively and only 5% indicating no support (Mining & Quarrying OHS Committee, 1997).

Table 8 *Strengths and weaknesses of National Significant Incident Reporting System (NSIRS) and EXIS*

Strengths	Weaknesses
● NSIRS has established distribution network ● detailed information on individual injuries ● advice on remedial action ● industry based ● EXIS has suite of services including SIRs, Safety Bulletins, discussion facilities ● EXIS is downloadable with search facilities ● EXIS allows industry to initiate reports, alerts and discussions ● frequent updates of EXIS repository ● concept of a database of 'incident' reports has in principle support from the SA quarrying industry	● NSIRS is generally paper-based therefore hard to search for reports on particular subjects ● NSIRS generally relies on inspectorate producing SIRs ● Cost of and need for special software for EXIS may limit uptake, especially amongst health and safety representatives and workers

4.4.5 Worksafe Western Australia SafetyLine

Several sites visited on the World Wide Web had lists of injuries or significant incidents in some form. The most developed in Australia appeared to be the WorkSafe Western Australia website at *www.wt.com.au/safetyline*.

WorkSafe Western Australia has established an online solutions database on its Internet site, SafetyLine. Through the National OHS Administrators all jurisdictions including South Australia (represented by WorkCover) have agreed in principle to establish similar online solution databases on their Internet sites adopting the format used by Western Australia as consistent template.

The standard format, which occupies one A4 page is (see example in Appendix G obtained from address *http://www.wt.com.au/ safetyline/d_pubs/solution/sol97_01.htm*):

- Title (eg Reducing cuts and amputations from masonry power tools)
- Category (eg Machine guarding)
- Industry (eg Construction)
- Problem (short paragraph)
- Solution (short paragraph)
- Benefits (dot point list)
- Costs (Eg Approximately $2,000 per unit)
- Potential suppliers
- Supplier of information.

A photograph or diagram may be included on the page.

In addition, SafetyLine includes an online database of one-page Significant Incident Summaries, in the format: incident description; contributing factors; and recommendations.

SafetyLine has a user-friendly search facility which allows information to be found on the whole of SafetyLine. A copy of the search screen is presented in Appendix G, along with the search results after using the keywords of 'carbon and monoxide'. This produced nine matches drawn from Solutions, Significant Incident Summaries, Regulations and other information. The Significant Incident Summary for the incident in November 1995 referred to the electrocution of a carpenter while using a portable generator, a carbon monoxide hazard in confined spaces. Examples relating to the Significant Incident Summaries and SafetyLine Solutions are also presented in Appendix G.

No formal evaluation of the uptake and/or impact of SafetyLine has been conducted (C. White, pers comm). The aim has essentially been to exploit the technology of the Internet to the maximum by providing as much information as possible in the categories.

The strengths and weaknesses of SafetyLine with respect to sharing of causal information are summarised in Table 9 below.

Table 9 *Strengths and weaknesses of SafetyLine*

Strengths	Weaknesses
● detailed information on individual occurrences ● preventive information at task-specific level eg Solutions and recommendations of Significant Incident Summaries ● User-friendly search facility using keywords ● takes advantage of Internet networks and links to other sites providing OHS information ● can readily monitor access (visits/ downloads)	● at present many businesses (especially small) do not have computers or access to Internet ● size of Solutions and Significant Incident Summary databases is small at present ● not industry-focused ● workplaces are passive recipients of information ● no formal evaluation has taken place

4.4.6 Internal information sharing by a large organisation: BHP

NOHSC (1997) presents information on several industry based OHS data sets. The most promising for further investigation was the database maintained by BHP Pty Ltd which was reported as recording serious incident report forms, serious OHS incident/accident forms and fatalities. The serious incident reports comprise a summary of incident, investigation, conclusions about external causes (behaviour, plant, process, equipment failure, physical/environmental factors), recommendations and outcomes. A narrative is supplied for each. Dr Kilner Brasier, OHS Manager, BHP, was contacted for further information.

BHP Pty Ltd is a very large company with a number of industry divisions spread across over 20 countries throughout the world (with some presence in up to 50 countries). There are strong parallels between its challenges in sharing information amongst its many operations with those of a State jurisdiction endeavouring to facilitate information sharing between a large number of employers in an industry.

BHP has chosen the Intranet as the vehicle for a cooperative approach to sharing information between its many business groups. Though the system for exchange of OHS information is managed and standardised centrally by the OHS Manager, its operation is essentially decentralised, which makes the Intranet ideal. Databases vary between business groups, ranging from Excel spreadsheets to Unix-based mainframes. Software is being standardised so that it is ORACLE based or interfaceable with ORACLE. The system now has only one e-mail group whereas it used to have five separate groups.

Each business group has a Safety Intranet Page embracing safety performance; best practice; safety management systems; summarised minutes of safety meetings; summary injury and fatality reports; incident reports ('serious' incidents as defined by company similar to jurisdictional definitions of 'dangerous occurrences'); safety alerts; legislation (internationally and for all nine Australian jurisdictions); and resource links (to WA SafetyLine, ILO, WHO, OSHWEB). In addition, the system incorporates a facility for Safety Discussion Groups. A contact list is provided containing every OHS professional in the company.

The system is aimed at employees generally, not just OHS professionals. It is of particular interest to line managers with respect to safety performance because bonuses are linked to this measure of business performance.

The best practice feature is aimed at occurrences which are sources of significant morbidity and mortality eg roof bolting in underground mining. An abstract is given with a contact name and e-mail link. The Safety Alerts likewise concentrate on a summary description and a contact person who can communicate the lessons learnt. The emphasis is on keeping the system simple.

BHP are looking to develop a client-server system where line managers can download and analyse data and produce various reports, starting with performance data. It is planned to provide information on, for example, workers compensation costs, which cannot be shared at present.

As the system is decentralised Safety Alerts originate from the business groups. The system is also ideal for those working in relative isolation in remote locations, who can tap into the experience of the rest of the organisation, through, for example, the safety management system feature. Travel safety security information is available in HTML form for those visiting high or medium risk countries.

The development of such a system was described by Dr Kilner as a long term proposition requiring some vision. The same could be said for implementation of a similar system by the OHS agencies in South Australia.

Table 10 *Strengths and weaknesses of BHP intranet concept if translated to an industry based system*

Strengths	Weaknesses
● has suite of services including incident reports, Safety Alerts, discussion facilities ● decentralised except for standardised rules and software ● allows participants to initiate reports, alerts and discussions ● suited to small and remote sites for learning from experience of larger ones ● intranet idea may be good for industry groups ● narrative information on individual injuries and dangerous occurrences ● will be downloadable ● can have no involvement of OHS agency ● technically possible for WorkCover to facilitate an intranet from its Website	● translation to industry intranet may have complications eg ● easier to achieve uptake of system within one company than in many businesses in an industry ● an industry intranet would have greater complications with respect to confidentiality and legal issues than a company intranet.

4.4.7 Mailing Lists on Internet

As described by Moore (1995) e-mail access on the Internet allows one to subscribe to public Mailing Lists. These work the same way as private e-mail except that when a message is sent everyone who has subscribed to the list will get a copy of the message. The main idea is to exchange ideas and information.

Pisaniello & Brooks (1996) have described mailing lists as an example of 'asynchronous' communication. Unlike telephone conversations and videoconferencing, they do not require the simultaneous presence of two or more persons. Fax communication, electronic mail and newsgroups are also asynchronous. Pisaniello & Brooks identified scope for more OHS-related Internet activity in Australia and New Zealand, including the provision of OHS-specific mailing lists.

Only two mailing lists world-wide showed promise of presenting accident information on individual occurrences, these being: 'HAZMAT-L Hazardous Material incidents and discussions' at subscription address *hazmat-l@safnet.com;* and 'INJURY-L' on injury surveillance, control and prevention at address *INJURY-L-Request@wvnvm.wvnet.edu.*

INJURY-L was subscribed to along with a general OHS mailing list, 'HS-Canada'. The 'welcome messages' for INJURY-L and HS-Canada are presented in Appendix H. INJURY-L did not meet expectations and was a low-traffic list which was mainly used for sharing news rather than accident analysis or preventive information on individual occurrences. HS-Canada, however, was a vibrant listing which showed the potential of a Mailing List for alerting other companies to hazards and sharing solutions to specific workplace-based problems. An example of a dialogue on the subject of heat stress is presented in Appendix H.

In addition, the ACGIH Open Discussion was visited (*http:/www.acgih.org/*) on the topic of controlling of occupational health hazards. Open Discussion is used by industrial hygienists for discussion and debate on scientific and technical issues for three 'topic walls' of recognition, evaluation and control. Two screens from the Open Discussion are presented in Appendix H.

Mailing Lists is a promising communication and information dissemination vehicle to support a database resource of accident information. In particular, it fosters active participation by subscribers in sharing of information. If a Mailing List were industry based it would ensure relevancy of discussion to companies in that industry.

As a Mailing List would be a component of an information-sharing system rather than a system in itself its strengths and weaknesses are not analysed and tabled in the same way as the other examples in this chapter.

5 CONCLUSIONS AND RECOMMENDATIONS

(1) It was found that to be useful for predicting and controlling accident causes information provided to workplaces needs to satisfy the following criteria:

- be based on the detailed account of individual occurrences rather than aggregated statistical information;
- consist of both narrative information and coded information;
- be derived from both recording activity and follow-up investigations;
- contain information on any specific plant, equipment or substances involved;
- emphasise knowledge of processes rather than measurement of outcomes (ie safety performance).
- involve hazards and tasks familiar to the industry, accompanied by simple and practical guidance.

(2) The WorkCover workers compensation database in its present form provides a source of information which may be used for predicting causes of accidents. Previous research had shown that large company-based databases of a similar nature could be used within companies for decision-making on prevention measures. Using the WorkCover database as the foundation, it was possible to define a series of data items, in both coded and free-text forms, which would produce comprehensive records of non-confidential occurrence information for causal analysis. Data items drawn from workers compensation data were supplemented with information obtained by the Department for Industrial Affairs through accident investigations. This type of information could be utilised as a decision support system by industry personnel with some expertise in data or accident analysis, such as workplace occupational health and safety coordinators or advisors.

(3) The usefulness of information on individual occurrences could be enhanced if attention were given to the quality, completeness and structure of information. Consideration should be given to developing additional OHS surveillance methods for severe work-related injuries or dangerous occurrences to fill gaps in information obtained through workers compensation reporting and DIA accident investigations. These might be through report forms or through follow up telephone surveys.

(4) For the most efficient and effective implementation of an information-sharing system there are advantages in taking an industry sector approach, targeting those industries with a high injury rate. This would increase the relevancy of information as it would relate to work environments, processes and plant which are held in common. Furthermore, industry networks involving, for example, employer associations, unions and industry training advisory bodies, may be utilised to support dissemination of information. Any improvements in preventive measures in high risk industries are likely to have the most impact on the incidence and severity of work-related injuries.

(5) The DIA should actively produce information on fatalities, severe injuries and dangerous occurrences in the format of Significant Incident Reports and Hazard Alerts, these being linked to the workers compensation database and modelled on those produced by WorkSafe Western Australia. In particular, communicating task-specific causal information to high risk industry sub-sectors through use of hazard alerts and significant incident reports is likely to be a successful means of reaching small business, especially if the employer association is actively

involved in information dissemination. This type of information, which is already a product of some analysis, is most likely to be of interest and use to line managers, health and safety representatives, health and safety committee members and workers.

(6) Having examined examples of information-sharing systems it is concluded that a public resource should be part of a suite of information-exchange facilities modelled on EXIS in Western Australia and the intranet run by BHP, incorporating hazard alerts and discussion groups. An industry based internet service or an industry intranet appear to be the most promising communication vehicles in the longer term, but in the short term (ie next 2 to 5 years) a variety of communication means should be used, including mail-outs and facsimiles. In particular, the choice of internet technology has the potential advantages of user-friendly search engines, active participation by users in industry, and the opportunity for decentralisation and ownership by the industry. It is also accessible by all levels of companies including workers and health and safety representatives who may choose to use the internet or intranet from home.

(7) Only one of the five model strategies analysed for sharing causal information included a formal evaluation of its impact on prevention decision-making, therefore it is difficult to judge success of these strategies in rigorous terms.

(8) Further research is needed through a pilot test of an information-sharing system in a high risk industry sub-sector. Investigations have shown that suitable candidate industries exist eg metal products manufacturing. The trial should assess uptake of the resource, how it is actually used by industry personnel, and its impact on prevention decision-making in workplaces.

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7 ABBREVIATIONS

ACCI	Australian Confederation of Commerce & Industry
ACGIH	American Conference of Governmental Industrial Hygienists
ASCO	Australian Standard Classification of Occupations
CCOHS	Canadian Centre for Occupational Safety and Health
CPS	Claim Profile Statement (WorkCover Corporation)
DIA	Department for Industrial Affairs (SA)
NIOSH	National Institute of Occupational Safety and Health (US)
OHS	Occupational health and safety
OHSW	Occupational health, safety and welfare
OHSW Regulations	Occupational Health, Safety & Welfare Regulations, 1995
OHSW Act	Occupational Health, Safety & Welfare Act, 1986
PPE	Personal protective equipment
SAWIC	South Australian WorkCover Industry Classification
SIR	Significant Incident Report
WR&C Act	Workers Rehabilitation & Compensation Act, 1986
WSA	Worksafe Australia

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9 APPENDICES

A	WorkCover Worker Report Form
B	Example of WorkCover Claim Profile Statement
C	Examples of Hazard Alerts
D	CCINFOdisc databases on injury occurrences
E	Examples of Significant Incident Reports
F	Examples of material from WorkSafe Western Australia SafetyLine
H	Examples from Mailing Lists and Open Discussion List

The Appendices are presented in a separate volume.