

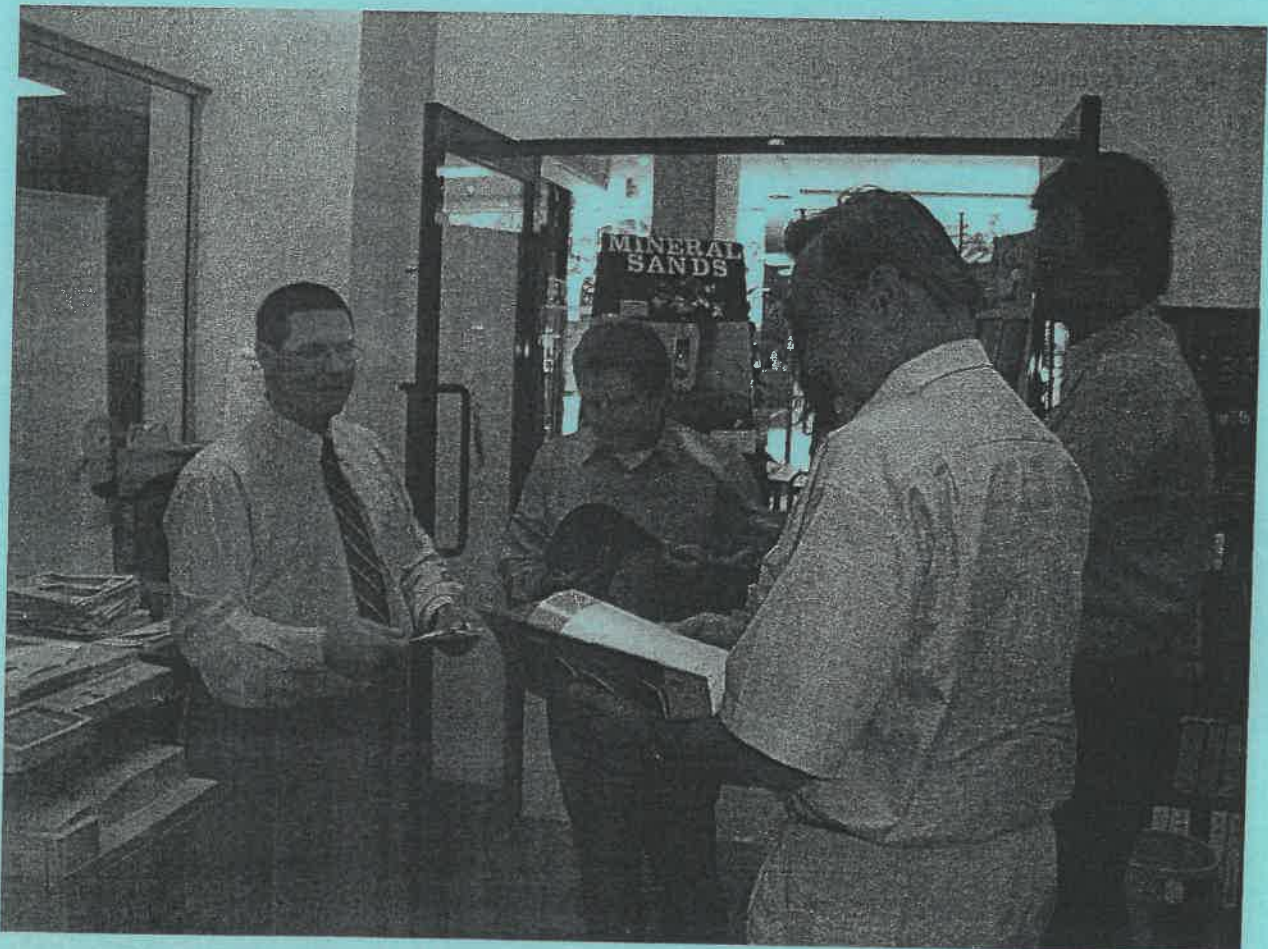
# WORLD SAFETY JOURNAL

ESP - Enhanced Safety Principles

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- **WSO' International Office For The Czech Republic Report**
- **Risk Management**
- **Reducing The Occurrences Of Patient Falls In Hospitals**
- **Terrorism: Biological Weapons & Disaster Preparedness**
- **Frontline Management Initiative In The Mining Industry**
- **Safety Working Practices For The Western Australian Ferry & Charter Boat Industry**



**Researching Mining Safety**

## WORLD SAFETY ORGANIZATION (WSO)

### Profile

The WSO was founded in 1975 in Manila, The Republic of the Philippines, as a result of a gathering of over 1,000 representatives of safety professionals from all continents at the First World Safety and Accident Prevention Congress. The WSO World Management Center was established in the United States of America in 1987 to be responsible for all WSO activities, the liaison with the United Nations, the co-operation with numerous Safety Councils, professional safety/environmental (and allied areas) organizations, WSO International Chapters/Offices, Member Corporations, companies, groups, societies, etc. The WSO is a not for profit corporation, non-sectarian, non-political movement to "Make Safety a Way of Life".

### World Safety Organization Activities

The World Safety Organization:

- ❖ Publishes WSO Newsletters, World Safety Journal - ESP, and WSO Conference Proceedings.
- ❖ Provides a network program linking various areas of professional expertise needed in today's international community.
- ❖ Develops and accredits educational programs essential to national and international safety and establishes centers to support these programs.
- ❖ Annual awards include the World Environmental/Occupational Safety Person Award, WSO James William Award, WSO Educational Award, WSO Concerned Citizen Award, WSO Concerned Safety Professional, WSO Concerned Company/Corporation Award, WSO Concerned Organization Award, Chapter/International Office of the Year Award, WSO Award For Achievement In Scientific Research and Development and International Award.
- ❖ Provides recognition for safety publications, films, videos and other training and media materials that meet the WSO required educational standards.
- ❖ Receives proposals from professional safety groups/societies for review and if applicable, submits them to the United Nations for adoption.
- ❖ Establishes and supports divisions and committees to assist members in maintaining and updating their professional qualifications and expertise.
- ❖ Chapters and International Offices located throughout the world provide contact with local communities, educational and industrial entities.
- ❖ Organizes and provides professional support for international and national groups of experts on all continents who are available to provide expertise and immediate help in times of emergencies.

### Membership Benefits

The World Safety Organization:

- ❖ Publishes the "WSO Consultants Directory" as a service to its Members and to the Professional Community. Only WSO Certified Members may be listed.
- ❖ Collects data on the professional skills, expertise and experience of its Members in the WSO Expertise Bank for a reference when a request is received for professional expertise, skill, experience.
- ❖ Provides a network system to its Members whereby professional assistance may be requested by an individual, organization, state or country on a personal basis. Members needing assistance may write to the WSO with a specific request and the WSO, through its Membership and other professional resources, will try to link the requester with a person, organization or resource which may be of assistance.
- ❖ Provides all Members with a Membership Certificate for display on their office wall and with a WSO Membership Identification Card.
- ❖ Awards a certificate of Honorary Membership to the corporations, companies and other entities paying the WSO Membership and/or WSO certification fees for their employees.
- ❖ Members receive WSO Newsletters, and other membership publications of the WSO.
- ❖ Members are entitled to reduced fees at seminars, conferences and classes, given by the WSO. This includes local, regional and international programs. When continuing Educational Units are applicable, an appropriate certificate is issued.
- ❖ Members who attend conferences, seminars and classes receive a Certificate of Attendance from the WSO. For individuals attending courses sponsored by the WSO, a Certificate of Completion is issued upon completion of each course.
- ❖ Members receive special hotel rates when attending safety programs, conferences etc., sponsored by the WSO.

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### Cover Photo:

*Mark Stirling, Dr. Mical Stibiz, Dr. Pavel Forint and Dr. Milos Palecek at the Chamber of Minerals & Energy in Western Australia.*

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### Issue Dates

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## EDITORIAL

By Dr. Janis Jansz  
Journal Editor

Promoting good health in employees is being proactive in keeping part of one of a workplace's most important assets, its employees, in good working condition. Like machines, if they are not well maintained, people can break down if not cared for, and work more productively, physically, mentally and socially, when their health is good. World Health Organisation has defined health promotion as "a process that enables people to increase control over and improve their health" (Playdon, 1997, p.18). Occupational Safety and Health is about protecting the safety and health of people at the workplace. Workplace rehabilitation is about bringing employees' health back to their pre injury or disease state as much as it is possible to do. Health Promotion combines both of these concepts in that it not only aims to protect people's health, but also to improve it.



Individual health is composed of many parts. There is physical health (the physical functioning of the body), mental health (the ability to think clearly and rationally), emotional health (the ability to recognise and express emotions), spiritual health (religious belief needs met) and social health (the ability to have friends and maintain relationships). Individual factors such as illness, injury and life style factors (including smoking, excessive alcohol intake, lack of exercise, stress), as well as organisational factors and environmental factors in a workplace can affect employees' health. Many workplace health promotion programs only try to change employees' behaviour. In a workplace this is called fitting the person to the job. People forget that the work environment, work tasks and management practices have a significant effect on the health of employees. For this reason Safety Professionals have an important role to play in successful health promotion at work.

Farnell (1987) defined a company's health as having three components; financial health; organisational health that includes employee trust, company openness, employee moral and the personal health of the employees. To achieve the highest level of personal health for employees Cooper (2001) recorded that an increasing number of employers are including safety and health promotion as a corporate value for the company with management actively involved in showing care for employee safety and well being. The results of effective employee health promotion programs are higher employee productivity and a more successful business.

The next World Safety Conference will be held at the Holiday Inn at the Denver International Airport Conference Center from the 3<sup>rd</sup> to the 5<sup>th</sup> of November 2003. At this conference there will be many opportunities to learn about effective safety and health promotion activities and programs that you can use to prevent injuries and accidents and to improve the health of employees at your workplace. Further information on this excellent conference is included in the Diary of Events at the end of this Journal. As well as many presentations related to improving occupational safety and health the conference also will include professional field trips to examine the latest industry work practices and recreational activities for accompanying family and friends.

### References

- Cooper, D. (2001, February) Treating safety as a value. *Professional Safety*. 46(2), 17-21.  
Farnell, L. (1987). Corporate culture change – the healthy way. *Journal of Occupational Health and Safety Australia and New Zealand*. 3(1), 46-52.  
Playdon, M. (1997). Promoting health in hospitals. *Australian Nursing Journal*. 4(7), 18-19.

## ARTICLE SUBMISSION

Articles for inclusion in this journal will be accepted at anytime. However there can be no guarantee that the article will appear in the following journal issue.

All articles shall be written in concise English and typed with a minimum font size of 12 point. Articles should have an abstract of not more than 200 words. Articles shall be submitted as Time New Roman print and on a 3.5" diskette with the article typed in rtf (rich text format) and presented in the form the writer wants published. On a separate page the author should supply the author's name, contact details, professional qualifications and current employment position. This should be submitted with the article.

Writers should include all references and acknowledgments. Authors are responsible for ensuring that their works do not infringe on any copyright. Failure to do so can result in the writer being accountable for breach of copyright. The accuracy of the references is the author's responsibility.

### References:

Articles should be referenced according to the Publication Manual of the American Psychological Association 2002: For example: Books are referenced as follows

Author, (Year of publication), *Title of publication*, Place of Publication: Publisher

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Author (Year), Title of article, *Name of Journal*, *Volume* (Issue), Page numbers of article

Internet information

Name of author, (Year of publication), Name of article, [on-line], Available [www:http://](http://www) and the rest of the Internet path address, [access date]

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Edith Cowan University, 100 Joondalup Drive  
Joondalup, 6027, Western Australia  
Or email to [j.mussett@ecu.edu.au](mailto:j.mussett@ecu.edu.au)

Articles, where ever possible, must be up-to-date and relevant to the Safety Industry.

All articles are Peer Reviewed by at least two referees before being accepted for publication.

### ISSUE DEADLINES

March	31 January	June	30 April
September	31 July	December	31 October



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**WO Membership:** The World Safety Organization has members that are full time professionals, executives, directors, etc. working in the safety and accident prevention fields and include university professors, private consultants, expert witnesses, research safety managers, directors of training, etc. They are employees of multinational corporations, local industries, private enterprises, governments and educational institutions. Membership in the World Safety Organization is open to all individuals and entities involved in the safety and accident prevention field, regardless of race, color, creed, ideology, religion, social status, sex or political beliefs.

**Membership Categories**

✓ **Associate Member:** Individuals connected with safety and accident prevention in their work or interest in the safety field. This includes students, interested citizens, etc.

✓ **Affiliate Membership:** Safety, hazard, risk, loss and accident prevention practitioners working as full time practitioners in the safety field. Only Affiliate Members are eligible for the WSO Certification and Registration Programs.

✓ **Institutional Member:** Organizations, corporations, agencies and other entities directly or indirectly involved in safety activities and other related fields.

**Annual Membership fee in U.S. Dollars is as follows:**

Student Membership	\$ 35.00	Associate Membership	\$ 55.00
Affiliate Membership*)	\$ 80.00	Institutional Membership**)	\$185.00
Corporate Membership**)	\$1,000.00*)		

\*) For your countries fee rate, please contact our office

\*\*\*) In case of Institution, agency, corporation, etc., please indicate name, title and mailing address of the authorized representative.

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Work Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

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**For Affiliate Members only**

Only FULL TIME PRACTITIONERS in the safety/environmental/accident prevention and allied fields are eligible for the WSO Affiliate Membership. Briefly describe your present employment position, or enclose your CV. \_\_\_\_\_

Please specify your area of professional expertise. This information will be entered into the WSO "Bank of Professional Skills" which serves as a pool of information when a request for a consultant/information/expertise in a specific area of the profession is requested.

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**The Ministry for the Environment Czech Republic, Research Institute of Occupational Safety and the World Safety Organization International Office for the Czech Republic, Report**

On the overseas trip to Perth, Australia, as a part of the research project:

*“The evaluation of the strategies for major hazard control related to mining & mineral processing”*

By: Ing. Miloš Paleček; Translated into English by Dr. Milos Nedved

**Duration of the trip** 16 February to 1 March 2003. Report Submitted: 17 March 2003

**Participants** Dr. Kavel Bláha, Dr. Pavel Forint, (Environmental Risks Section of the Ministry); Dr. Miloš Paleček, Dr. Stanislav Malý (Research Institute of Occupational Safety); Dr. Michael Stibitz

(Geomedia Pty Ltd).

**Background** The project “The evaluation of the strategies for major hazard control related to mining and mineral processing” is aimed at the current processes and their environmental aspects as discussed by the European Directive 96/82/EC (Seveso II).

Particular importance for the Czech Republic is the mining and mineral processing of uranium or and subsequent rehabilitation of the mined areas. Also occupational safety in mining involves some specific features, which need to be analysed with subsequent formulation of relevant principles of safety management.

**A. General Section**

**1. Organizations visited and the list of persons involved in discussions**

Institute	Name	Position Designation
Edith Cowan University	Miloš Nedvid	Associate Professor, Occupational Safety and Health Programme, Centre for Public Health
	Janis Jansz	Occupational Safety and Health Lecturer.
The Chambers of Minerals and Energy of Western Australia	Mark Robertson	Executive Officer for Environment
	Mark Stirling	Executive Officer for Safety & Health
Kalgoorlie Consolidated Gold Mines	Jim Bawden	Safety and Environment Manager
	Danielle van Kampen	Strategic Mine Development Coordinator
	Phil Buttrose	Safety and Emergency Services Manager
Murdoch University – A.J. Parker Centre Hydrometallurgy Institute	Mark Woffenden	Chief Executive Officer, Adjunct Professor, DSE, CEO
	Bill Staunton	Gold Program Manager
	Jim Avraamides	Deputy Director
	Stephen Kamarudin	Senior Chemical Engineer – Special Inspector

**2. Organizational arrangements for the trip.**

The trip has been arranged within the framework of the major hazard control section of the Research Institute, as approved by the Ministries for Labour, after the agreement with the Minister for the Environment. The technical side of our visit has been organized by our partner organization Edith Cowan University in Australia. This University is a partner of the Czech National Research Institute for Occupational Safety for a distance education tertiary study programme “System Safety and Emergency Planing”.

**3. Evaluation of the benefits of the trip.**

The results of our trip and the new

knowledge gained there will be reflected in the drafted updated Act No. 353/1999 about Major Hazard Control.

In connection with the world-wide reduction of security following September 11, 2001, the decision was to learn from the Australian experience of anti-terrorist measures to protect large inventories of hazardous chemicals. Long term experience in major hazard control in uranium mining and processing (which is the topic of interest in the Czech Republic) results from the more advanced Australian mining industry as compared with that in the European Union. Visits to the mine sites of the largest mining companies were complemented by the discussions with university teams. Our group has also met with the anti-terrorist experts as such area is a focus of interest in Australia

following the Bali terrorist attacks.

**B. Technical Section**

*Activities during our trip*

**Edith Cowan University, Perth, Western Australia**

Information about their occupational safety courses and the areas of interest. System Safety and major hazard control, environmental impact of mining and mineral processing operations.

**The Chamber of Minerals and Energy of Western Australia, Perth**

Organization of mining safety and the environmental impact of hazardous chemicals.

**Kalgoorlie Consolidated**

Familiarizing ourselves with the processes and process equipment, regeneration and recultivation of mined land, prevention of environmental pollution. Potential for cyanide effluent



escape, mineral processing problems, storage and transport of hazardous chemicals.

#### **Edith Cowan University**

Theoretical approaches to and functional experiment with reducing the environmental impact of mining and mineral processing operations, applications of quantitative chemical analysis, the use of data bases and information systems, deterministic numerical simulations, stochastic simulations.

#### **Murdoch University**

Experience in specific multicriterial evaluations for gold mining, accessibility of relevant data. The Western Australian Governmental role in Mining Safety and their Inspection System. General discussion and areas for future co-operation.

#### **C. Proposals how to utilize the knowledge and experience acquired.**

Our Project *"The evaluation of the strategies for major hazard control related to mining and mineral processing"* is aimed at the current mining and mineral processing techniques and subsequent regeneration and recultivation of mined land, in relation to the European Directive 96/82/EC (SEVESO II). This Directive refers to major hazard control with the aim to minimize the consequences of major accidents involving hazardous chemicals in order to safeguard the highest level of safety in all European Union Member States. The Directive has to be expanded to include the latest knowledge about carcinogens.

Recent loss of containment of cyanide in Romania in January 2000, that contaminated the Danube River, has pointed at the fact that certain mineral processing or storage operations in mining can lead to very serious consequences. Therefore the European Parliament has welcomed the expansion of SEVESO II Directive.

Particular emphasis is paid to uranium mining and mineral processing, and the subsequent regeneration and recultivation of the disused mines and their surroundings.

To evaluate the level of risk of environmental contamination, safety management techniques we are

- Creating data bases and information systems.
- Conducting analysis and synthesis of the information on the sensitivity of environment using geoindicators.
- Using deterministic numerical simulations.
- Conducting an evaluation of uncertainty and stochastic simulations.

The evaluation of current load on and the vulnerability of the environment requires detailed systematic analysis of all factors affecting the soil in the area under investigation. In Europe and overseas, during the recent years, attempts have been made to standardise systematic evaluation of the above factors and of the formulation of the indicators of sustainable development of the environment. The resulting evaluation will enable a better judgement of how new human activities will impact on the environment and to quantify such impacts. Such an approach is in keeping with the European Union guidance related to town planning and land planning decisions.

#### **List of Written Documents obtained during the Study Visit.**

1. Australian Minerals Industry – Code for Environment Management
2. Minerals Council of Australia – Australian Minerals Industry Safety & Health – Safety Survey Report
3. Minerals Council of Australia – Australian Minerals Industry Safety & Health – Self Evaluation Tool
4. Minerals Council of Australia – 3<sup>rd</sup> Annual National Safety and Health Innovation Awards
5. Minerals Council of Australia – 4<sup>th</sup> Annual National Safety and Health Innovation Awards
6. The Chamber of Minerals and Energy of Western Australia – Annual Report 2001
7. The Chamber of Minerals and Energy of Western Australia – Self Audit System Health, Safety and Environment.
8. The Chamber of Minerals and Energy of Western Australia – Guidelines for

Mine Emergency Preparedness in Western Australia

9. The Chamber of Minerals and Energy of Western Australia – A guide to Contractor Occupational Health and Safety Management for Western Australia Mines
  10. The Chamber of Minerals and Energy of Western Australia – Guide to Positive Performance Indexing for Management of Occupational Safety and Health in the Mining Industry
  11. Iluka Resources Limited – Environment and Community Report 2001
  12. Iluka Resources Limited – Public Environment Report 2000
  13. Mines Occupational Safety and Health Advisory Board (MOSHAB) of Western Australia – Prevention of Mining Fatalities Taskforce – Report on the Inquiry into Fatalities in the Western Australia Mining Industry
  14. Department of Minerals and Energy of Western Australia – Management of Hazardous Substances on Mine sites – Guideline (MOSHAB approved)
  15. Department of Minerals and Energy of Western Australia – Guidelines to the Mines Safety and Inspection Act No. 62 of 1994
  16. Department of Minerals and Energy of Western Australia – Safety Performance in Western Australia – Accident and injury statistics 2000/2001
  17. Department of Consumer and Employment Protection – Fair Go – Guide to the new Labour Relations Laws
  18. The AJ Parker Cooperative Research Centre for Hydrometallurgy – Annual Report 2001/2002
  19. Centre for Economic Education – Australian Study Topic – Managing Water
- #### **The List of Electronic Documents**
1. Department of Minerals and Energy of Western Australia – Minesite Major Hazard Facilities – Stephen Kamarudin, Senior Chemical Engineer, Special Inspector of Mines Inspector of Explosives and Dangerous Goods -.ppt,
  2. Department of Minerals and Energy of Western Australia – Management

of Hazardous Substances on Minesites – Guideline (MOSHAB approved) -\*.pdf

3. Mines Occupational Safety and Health Advisory Board (MOSHAB) of Western Australia – Safety Behaviour Survey of the Western Australian Mining Industry 2002 – Safety Behaviour Working Party Report and Recommendations
4. AJ Parker Centre Gold Research Program – Bill Staunton, Project

Manager

**Photo**

(From right to left) Mr. Mark Stirling, Executive Officer Safety & Health, Chamber of Minerals & Energy; Dr. Stanislav Maly, Head, Major Hazard Prevention Centre, Czech National Research Institute for Occupational Safety; Dr. Karel Blaha, Head, Department of Environmental Hazards, Czech Ministry of the Environment; Dr.

Milos Palecek, Director, Czech National Research Institute for Occupational Safety; Dr. Janis Jansz, Edith Cowan University; Dr. Pavel Forint, Project Manager, Department of Environmental Hazards, Czech Ministry of the Environment; and Dr. Mical Stibitz, Head of Geomedia. Photo taken at the Chamber of Minerals and Energy in Perth, Western Australia.



## Book Review:

### **Lessons from Longford. The ESSO Gas Plant Explosion &**

#### **Lessons from Longford: the trial**

Author: Andrew Hopkins

The Journal of Occupational Health and Safety Australia and New Zealand 18(6) December 2002 is an interesting publication for anyone who wishes to understand the legal processes (and consequences) that occur when an occupational accident becomes a court case. The investigation conducted by the Royal Commission into the Longford explosion and fire produced very useful knowledge about the causes of this accident. Andrew Hopkins has described succinctly both the court case and the Royal Commission's investigations and findings in a way that the reader of the publication can learn about accident causes, consequences and prevention. The story of this trial and Royal Commission is also a story of how a large multinational company tried to avoid responsibility for the accident.

Andrew Hopkins was one of the expert witnesses called to testify and be cross examined in this case. In the book *Lessons from Longford. The ESSO Gas Plant Explosion* he examines this accident from a sociologist point of view and compares this accident with his investigation and publication of his findings of the Moura Coal Mining disaster in Queensland in which 11 miners died. Both accidents had many similar causes including inadequate communication, education, maintenance, management and hazard identification practices.

Andrew Hopkins shows a good understanding of people, the way that they act and why they act this way. In this publication he looks at the cultural, organisational and other causes and contributing factors to the Longford accident. The author identifies the active failures, latent conditions and root causes that made this, and other similar accidents described in the book, possible. The book is an extended and elaborated version of the information that the author presented to the Royal Commission that investigated the Longford accident. It draws on the 6,500 pages of transcript testimony of this Royal Commission.

The publication contains a very thorough accident analysis from which many valuable accident prevention strategies can be learnt. Particularly useful for this is the causal diagram and discussion that identifies the cause of the accident on five levels. Level one is the physical accident sequence. Level two are organisational factors. Level three are company factors. Level four is the government/regulatory system and Level five is the societal causes. What contributes a high reliability (safe) organisation is also described through the use of case studies.

The book is also a warning to employers about the financial costs of accidents and that they can not escape their responsibility for having a safe workplace by blaming employees for all accidents. It is also a story about the value of a union that ensured justice for its members.

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### **Environmental Technology Resources**

Author: Daniel W. Gottlieb

This book is written from an environmental management practitioner's view, but the information that is included in the publication is very relevant to occupational safety as keeping the environment safe and healthy is part of a safety professional's role. It is also a good book to read for anyone who wishes to make a business profitable.

Daniel Gottlieb provides case studies that show the financial cost of accidents and work practices that cause pollution to the environment. He also provides stories about companies that have become very profitable by using sustainable initiatives and environment improvement strategies.

Information is provided on environmental legislation and standards, identifying environmental challenges (problems), knowing where to find the relevant technical information on air, water and soil pollution control, solid and toxic waste management and prevention, site remediation, environmental monitoring, recycling and clean-process physics and business practices, and how to assess environmental management performance.

Ways to focus the search for information so that the right facts are obtained about pollution assessment, control, remediation, prevention or sustainability and how to evaluate the information obtained are outlined. How to obtain this knowledge is noted under the headings of organisation name, key words, web site, purpose, summary (or highlights) and organisational contact details. Useful research, development opportunities, projects and resources offered by government, professional and private organisations, possibilities for commercialisation and marketing of green products and processes are included.

Much of the material in this book relates to what is available in the United States of America, but it does include information about what is happening and available internationally. The 216 page book has 10 chapters. At the end of each chapter is a list of the references used in the chapter and often a brief description of what the referenced publication contains in the way of relevant information.

The book, *Environmental Technology Resources* contains a very wide range of exciting, profitable and cost effective ideas for environment and resource management. The author's main aim is to save people time in finding useful environmental management resources and ideas. All people who use the book should achieve this aim.

Reviewed by Dr. Janis Jansz, Lecturer in Occupational Safety and Health at Edith Cowan University.

These 3 books are available from Hardie Grant Publishing, 12 Claremont Street, South Yarra, Victoria, Australia, 3141, Telephone: (613) 9827 8377 Fax: (613) 9827 8766.

### ABSTRACT

Risk management is an integral part of an organization's structure that is aimed at eliminating or reducing the impact of risks to which an organization is exposed. A risk is the likelihood that an event or a sequence of events will cause damage or harm. There are a number of reasons why organizations manage risk. These can essentially be categorized into 3 areas, economic, social and legal considerations. Economic costs such as the financial costs of accidents to the workers, damage to equipment, loss of production and increased insurance premiums can affect the profits of organizations. Social and humanitarian considerations are important to the well being and good health of workers along with the support of community groups. Legal implications for breaching standards, legislation and codes of practice not only in the area of health and safety but environmental issues and product liability can be devastating for an organization. This is why it is essential that for an organization to be successful it must minimize operational losses by implementing risk management systems designed to identify and reduce risk.

### The Concept of Risk and Risk Management

Risk management is increasingly becoming an integral component of organizational structures throughout the World. Risk management aims to eliminate or reduce the impact of risks to which an organization is exposed. In explaining the concept of risk management it is important in the first instance to understand the term risk and its possible impact on an organization. A risk can be defined as the likelihood that an event or a sequence of events will cause damage or harm. The potential for unidentified risk to have a negative impact on an organization is the reason that companies are insisting their management implement risk management strategies in their daily routines. Negative costs and impacts associated with risk can be segregated into 3 categories – economic, social and legal.

### Economic Costs

The economic costs associated with the consequences of risk in an organization can impact bottom line profits. Accidents to workers and subsequent medical expenses resulting from the accident including treatment and rehabilitation of the injured worker can be long tailed and extremely costly. Loss of production due to down time and damage of machinery directly after an accident and during accident investigations can reduce capacity to fulfil obligations to customers. This down time may result in the termination of contracts and also contribute to further losses of contracts due to a poor accident records. Industrial action is always damaging to the productivity of

organizations. There can be elevated training costs involved with retraining and employment of replacement workers after an accident. Increased insurance costs associated with poor risk management record can cripple an organization. Loss and damage to assets can also lead to an increase in insurance premiums as well as the costs associated with repairing the asset (Health & Safety Executive, 1998).

### Social Costs

Social and humanitarian considerations are also vitally important for all organizations. The well-being and health of workers as well as gaining the support of community groups is paramount with good business. Social and humanitarian considerations should be made to ensure the operations of the organization do not have a negative health impact to the worker the environment and the broader community now or in the future. The safety and health of all workers in itself should be incentive enough for an organization to implement management systems designed to recognize risks and reduce the potential impact of such risks to the organization. The physical and psychological effect of accidents in the workplace can have far reaching consequences, causing disruption to normal lifestyles and affect relationships and family life.

Environmental issues such as pollution and noise can be cause of concern for local communities. Environmental evaluations need to be made prior to work commencement to assess the impact of operations by the organization on the environment and broader community. Poor morale within an organization as well as poor community perception can

affect future clients and harm the reputation of the organization (Ridley & Channing, 1999).

### Legal Costs

Legal implications for breaching standards and legislation designed to protect workers can be far reaching. The resulting prosecution can impact severely on profits and morale within the organization. Product liability can cause further costs to an organization if products are recalled or cause injury to the consumer.

Legal considerations need to be met by organizations to ensure they are complying with the relevant legislative requirements. The Western Australian Health and Safety Act 1984 protects the individual employee by requiring the employer to have a duty of care to ensure that they do not expose any workers to hazards in the workplace. This means that people who are in a position of responsibility, such as senior management should, where possible, not knowingly put any person at risk of harm or injury. Organizations who do not follow their legal obligation to the legislation can be prosecuted and fined for breaching the regulations. Common law requires that every person has a responsibility not to commit a wrong doing and failure to do this as a result of poor risk management may result an individual being prosecuted in a common law situation (Tranter, 2000).

### The Role of Risk Management

After considering the costs associated with 'risky business' the role of risk management becomes clear. Risk management is employed by organizations to determine the impact of

a risk upon the company, to evaluate alternate strategies designed to control that risk and finally to implement alternative control strategies within operations (Ridley & Channing, 1999). If risks are to be managed they will need identification and evaluation so that the best means by which the risk may be controlled is selected. Risk identification can be described as what could happen and why, the consequences of the event and how can the impacts be controlled (Tranter, 2000).

**Risk Identification and Evaluation**

Risk identification may involve the following:

- Regular inspection of the work environment by management and personnel.
- Regular safety meetings and discussions between floor staff, line managers and management.
- Independent audits conducted by outside consultants.
- Discussions between similar industries to compare safety concerns.
- Interpretation of safety studies and recommendations.
- Inspection of accident and near miss

records.

- Job safety analysis (JSA) conducted on work tasks.

Risk evaluations are used to assess the severity and the consequences of risks or their potential to cause harm and loss to the organization. Once the likelihood of risk is identified in an organization the risk is evaluated and put in order of priority or ranked based on the economic, social/humanitarian and legal impact upon the organization. The ranking of risks allows an organization to prioritize its focus on the most immediate risks first. The most severe ranked risks are acted upon in the first instance followed in turn by the less severe until all risks are addressed. A risk ranking method will be tailored by and reflect the needs of an individual organization (Ridley & Channing, 1999). As part of the control strategies there needs to be a risk assessment and ranking of the discussed hazards (Table 1). Table 1 is an example of how the Kentucky Fried Chicken (KFC) chain of companies would assess and rank risks associated with three hazards identified in a recent safety audit. This process is necessary so the worst hazards can be addressed first. All

hazards can be rated by their relative consequences. To help understand the table the following information will be required (National Safety Council, 1988).

*Hazard consequence:*

- I. Catastrophic-may cause death or loss of a facility.
- II. Critical-may cause severe injury, illness or major property damage.
- III. Marginal-may cause minor injury or occupational illness resulting in lost workdays or minor property damage.
- IV. Negligible-probably would not affect personal health and safety and may result in less than a single lost workday.

*Hazard probability:*

- A) Likely to occur immediately or within a short period of time when exposed to the hazard.
- B) Probably will occur in time.
- C) Possible to occur in time.
- D) Unlikely to occur.

*Risk Assessment Code:*

- 1) Critical                      2) Serious
- 3) Moderate                    4) Minor
- 5) Negligible

**TABLE 1. Risk assessment for 3 hazards identified in a safety audit conducted for KFC in Western Australia.**

Date	Hazard	Location	Acceptable Standard	Hazard Rating		Corrective Action	Estimated Cost of Correction	Risk Assessment Code
				Consequence	Probability			
31/05	Ice build up on floor of freezer due to poor door seal	Walk in freezer kitchen area	Sect 19 OHS act (1984) Employee must provide a safe work place	II	B	Repair door seal	\$ 100	1
31/05	Detergent dispenser located at eye level may result in splashing	Kitchen sink area	Sect 19 OHS act (1984) Employee must provide a safe workplace	III	C	Re-locate the dispenser	\$ 0	2
31/05	Location of RCD to far from cookers and not being used	Kitchen area	Reg 3.60 of OHS regs (1996) use of RCD on mobile equipment	I	C	Re-locate the current (RCD)	\$ 100	1

## **Risk Control**

Once a risk is identified and evaluated it will need to be controlled to protect an organization. An organization may choose to control a risk in a number of different ways depending on the severity and consequences of the risk. Control methods are usually decided from these 4 key areas:

1. Risk avoidance
2. Risk retention.
3. Risk transfer.
4. Risk reduction.

Risk avoidance is a decision by an organization to totally avoid a particular risk by actually discontinuing that particular task, action or event that has been identified as a risk or reducing the severity of the risk. The hierarchy of control process may be used to implement the risk avoidance strategy where by the risk may be eliminated totally by the discontinuing of that activity or work practice. Substitution of the risk with a less hazardous situation or engineering controls implemented whereby the hazard can be controlled with some type of modification to machinery or equipment. Administration policies may need to be reviewed as well as training needs assessed to determine the level of commitment required by management to control the risk. Finally the use of personal protective equipment (PPE) may be used as a last means to control any risk to the worker. These considerations are carefully assessed to ensure that the correct decision is made in regard to risk avoidance strategies (Ridley & Channing, 1999).

Risk retention in an organization is where the financial consequences of any risk and subsequent losses are financed within the company and will directly impact the bottom line profits of an organization. Risk retention is done with or without knowledge of the risk. Risk retention with knowledge is where a decision is made within an organization to meet any loss incurred as a result of risk. Risk identification and evaluation information is used in the decision making process to determine the most cost effective solution to the risk. Risk retention without knowledge is when the

organization is unaware of the risk usually as it has not been correctly identified or consequences evaluated. This is why a good risk management system can be of great benefit to an organization in the planning identification and controlling of risks (Ridley & Channing, 1999).

Risk transfer relates to the organizations ability to transfer any potential losses to another party. In most cases this refers to insurance companies where losses due to damage of assets and injury to personal can be insured against to reduce exposure to potential financial losses. The costs of premiums versus the organizations ability to manage risks are closely related. Risk identification and assessment can largely influence the overall performance of an organizations risk management system. Organizations must ensure they have sound risk management policies and good past records to maintain cost effective insurance premiums (Ridley & Channing, 1999).

Risk reduction is designed to reduce or eliminate all aspects of accidental loss that result in wastage of an organizations assets. How can the task be done in such a way that it will have no adverse effects on the organization. Risk reduction involves the collection of all accident and near miss records that have resulted in an injury or damage to machinery or the environment and coordinating the information in such a way that it is used to prevent potential risks from occurring or reoccurring. The communication of risk identification information to all areas of an organization is an important part of the risk reduction process as it brings the operations together and encourages communication between management and workers to better understand each others role in risk identification and reduction program. This is why regular meetings to discuss risk should be encouraged and are an integral part of a good risk management plan. Good communication within an organization is a great way of controlling risk (Ridley & Channing, 1999).

A risk management program is usually developed and tailored to the needs and requirements of individual organizations.

There is an Australian Standard available for guidance in the design of such programs Australian Standard 4360, 1999 Risk Management (AS, 4360). The standard gives organizations a basic structure to base more formal procedures around depending on the individual requirements of the organization (AS, 4360).

## **Conclusion**

Risk management programs are an essential part of any successful organization. How well risks are identified, assessed and controlled can be of great benefit to organizations. The process of managing risk helps to reduce costs involved with the economics of a business, injury to workers and damage to property and the environment. There are legal implications involving both legislative and common law that may be avoided if good risk management programs are implemented. The risk management program is an ongoing process that requires commitment by senior management and the efficient allocation of resources to ensure the success of the program. The risk management policy needs to be constantly communicated and reviewed so all concerns may be addressed at all levels of the organization. The safety and health of all workers in itself should be incentive enough for an organization to implement management systems designed to recognise risks and reduce the potential impact of such risks to the organization (Ridley & Channing, 1999).

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**Reducing The Occurrence Of Patient Falls In Hospital**  
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**ABSTRACT**

Often due to the medical condition and age of patients, patient falls are a common occurrence in hospitals despite the use of fall prevention strategies. This article reviews current patient fall prevention strategies. It also examines the potential use of the Petersen Multiple Causation Accident Model, to investigate the cause of patient falls and to make recommendations to prevent future accidents due to the same, or similar causes. The use of the Australian National Standard for Risk Management is considered as a model to follow to prevent patient falls.

**Introduction**

Organisations have a duty of care, not only to their employees, but also to the customers who come on their premises. Health care organisations have a duty to provide the best possible care for patients who are admitted to the hospital. Patients are not usually admitted to hospital with the expectation that they will fall or be injured while in hospital. Between January 1998 and May 2001 there were 1,295 patient falls reported in the medical wards of a Western Australian hospital. Over this period of time the hospital staff had been very proactive and introduced the following falls prevention strategies.

*Patient focused strategies*

- Used Hi Lo beds with these beds being left in the low position when the patient was not being attended by staff.
- Provided patient education, and frequent re-education as to how to use the call bell system to access staff. Kept the call bell within the patient's reach.
- On admission identified patients at risk of falling and this information was recorded on the patient care plan.
- Provided a good holistic assessment of patients' ability to mobilise. Adhered to guidelines for mobilisation with accurate, concise care planning that stipulated patients' ability to ambulate.
- Ensured that patients had, and used, suitable footwear and clothing for ambulation.
- In the aged care ward patients identified as at risk of falling had a pink name band.
- Safety jacket restraint was provided for patients who needed restraining to prevent them falling.
- Patients at risk of falling sat in lounge

chairs with T bar restraint.

- Bedside commodes provided to patients who required them.
- Patient Care Assistants (PCA) involved in active ambulation of relevant patients, particularly at peak activity times.
- Provided patients with effective continence management and a regular toileting regime.
- Assessed whether patients smoke cigarettes and documented this on the patient care plan.
- Had bed rails in situ if the patient had a risk of falling out of bed. From July 1996 to May 2001 no patient who was unconscious had a fall in the hospital medical wards.
- Used Patient Care Assistant continuous supervision for patients who required specialising to prevent them causing harm to themselves or others.

*Employee focused strategies*

- Staff education was provided on patient fall risk factors and prevention strategies with particular reference to dementia specific fall prevention strategies.
- Orientation of new staff (both Agency and Permanent) to the wards was provided to ensure that staff were fully aware of fall risk patients. Ensured compliance with functional indicator charts on hospital patient care and rehabilitation practices.
- Education provided to both patients and staff regarding patient continence management.
- Encouragement of staff awareness of the importance of the incident reporting process to ensure legal and professional accuracy in documentation.
- Encouragement of a "No Blame" Culture for incident reporting.

- Encouragement of a positive learning culture which acts proactively to enhance nursing care.
- Discussion of patient fall prevention strategies in ward meetings.

*Environment focused strategies*

- Nursing staff reported unsafe environmental issues. For example; faulty equipment or spillage.
- Nursing staff reported unsafe patient behaviour.
- Night corridor lighting provided.
- Correct storage of equipment.

Despite all of these strategies being implemented patients still continued to fall so a review of literature was conducted to identify any other patient fall prevention strategies that had been used successfully.

**Patient fall prevention strategies**

An article written by Savage & Matheis-Kroft (2001) evaluated the effects of a falls prevention program in two psychogeriatric wards (with an average occupancy of 50 patients) four months before the implementation of a falls prevention program and for four months following the program interventions. Prior to the interventions 9 patients experienced 11 falls. In the 4 months after the implementation of the intervention only one patient had one fall.

The fall prevention strategies used in this study were as follows.

- Staff education.
- Risk factor assessment for fall likelihood.
- Assessment of patient gait and balance.
- Use of SAFE Protocol that uses behaviour modification instead of restraints for patients who ambulated well but who have disruptive

behaviour.

- Non-ambulatory patients who were at risk of falling were seated in the ward in a very visible location where they could be observed easily.
- Use of a commode restraint belt.
- Individually tailored fall prevention strategies.
- A fall log for post fall analysis.

A limitation of this research was that it included only 23 patients as many of the patients in these wards died as the result of an influenza outbreak during the study period. Due to the outbreak of influenza it meant that patients who were previously likely to ambulate and fall were too sick to leave their bed. This may have been a contributing factor for the decrease in the number of patient falls recorded. A strategy described by Savage & Mathesis-Kroft (2001), that was not tried during their research trial to minimise the severity of a patient fall was protective hip padding\* that could be worn in the side pocket of pants to prevent hip fractures in patients likely to fall.

A very comprehensive review of 100 research trials and 112 publications on falls prevention strategies for patients in hospitals was carried out by Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) from the Joanna Briggs Institute for Evidence Based Nursing & Midwifery. This review produced a narrative summary of the characteristics of patients who fell, major hospital environmental factors that contributed to patients falling while in hospital and fall prevention interventions that had been used.

Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) evaluation of this research showed that the most common risk factors for falls were as follows.

- Age. Being over 65 years old.
- Mental status. Inability to understand and impaired memory.
- Previous history of falling. More than half of the patients (52%) who fell did so more than once. Some fell more than 13 times. Studies suggested that this was because the cause of the fall had not been corrected. Gaebler (1993) in a case control study had similar findings as it was identified in

this research study that 58% of multiple fallers repeated the type of fall and 64% fell in the same location.

- Needing assistance to go to the toilet, incontinence or having diarrhoea.
- Having poor mobility or impaired gait.
- Patients who had anaemia, neoplasms, congestive cardiac failure, a cerebrovascular accident or a medical disease.
- Length of stay. Most patient falls occurred in the first week of a patient's stay in hospital when the patient was in an unfamiliar environment.

There was little information available on environmental causes of falls however it was found that most of the falls occurred at the patient's bedside. Other common locations were in the bathroom, toilet and corridor. The most frequent activity that patients were doing when they fell was transferring from bed to chair. Other common activities were walking or toileting. One unpublished report by Mitchell, Heckel, Job, et al. (cited in Evans, Hodgkinson, Lambert, Wood & Kowanko, 1998) reported that of 22 falls, 17 occurred on vinyl covered floors, 3 on tiled surfaces, 17 on dry floors and 4 patient falls were on wet floors due to slipping in body fluids.

Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) used 5 measures to determine the accuracy and usefulness of screening instruments. These measures were as follows.

- Inter-rater reliability. The assessment tool could be used for a specific patient by more than one assessor and produce a similar result.
- Sensitivity. How well the tool could identify patients at high risk of falling.
- Specificity. How well the tool could correctly identify patients that had a low risk of falling.
- Positive predictive value. The proportion of patients assessed as being at risk of falling who experience a fall.
- Negative predictive value. The proportion of patients assessed as not at risk of falling who do not fall.

Evans, Hodgkinson, Lambert, Wood &

Kowanko (1998) stated that none of the risk assessment tools evaluated considered environmental factors that could impact on a patient's risk of falling. Environmental factors included staffing levels and changes in patient occupancy numbers. They further stated that their research identified that the fall risk assessment tools evaluated were very inaccurate and the usefulness of these risk assessment tools in clinical practice has yet to be demonstrated. Moore, Martin & Stonehouse (1996) conducted research to compare the effectiveness of clinical judgement and patient fall risk assessment tools. Their findings were similar as their research showed that neither clinical judgement or risk assessment tools could accurately predict the risk of a patient falling.

According to Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) no benefits in falls prevention were shown from the use of bed alarm systems or patient identification bracelets or coloured stickers on a patient's chart, bed or door. In non-hospital settings interventions that targeted multiple identified risk factors were found to be most effective. The effectiveness of multiple interventions has not been demonstrated in acute care hospital settings (Evans, Hodgkinson, Lambert, Wood & Kowanko, 1998).

Multiple fall prevention strategies used in the studies reviewed by Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) included the following.

#### 1. Assessment

This included assessing as at risk of falling, all patients with a risk of falling diagnosis, patients who had previously fallen, all confused elderly patients, post-operative patients, new admissions and all elderly patients administered analgesia or sedatives.

#### 2. Education

Education included staff training to increase awareness of patients with a high risk of falling and fall prevention interventions to be used.

Educating patients and their family about the patient's risk of falling, safety issues and activity limitations.

Orientating patients\* to their bed area,



ward facilities and how to get assistance. Demonstrating the use of the nurse call bell to patients and checking that patients knew how and were able to use the call bell.

Teaching patients to make position changes slowly.

### 3. *Creating a safe environment*

Ensuring that bed brakes are kept on.

Stabilising bedside furniture and beds.

Removing obstacles and bedside clutter.

Ensuring that patients can reach necessary items.

Ensuring that the call bell is within reach of each patient.

Using ½ length bed rails to reduce patients' need to climb over the bed rails to get out of bed.

Having night lights at the bedside and in toilets.

Having vertically fitted grab bars on the toilet wall next to the toilet.

### 4. *Providing for elimination needs*

Patients with urgency were placed near toilets.

Patients who received a laxative or diuretic were checked regularly for toileting needs.

At risk of falling patients were toileted regularly.

Male patients prone to dizziness were instructed to void while sitting.

### 5. *Safe Mobility promoted*

Non-skid footwear worn by patients.

Patients instructed to rise slowly.

Physical therapy provided.

High fall risk patients supervised when walking.

Explanation of patient activity limits provided frequently to patients and their family.

High risk patients assisted with their transfers.

Appropriate patients walked in the corridor once or twice per shift.

### 6. *Dealing with altered mental status*

Patients were orientated to the hospital environment. Confused patients were reorientated at least once a day.

Confused patients were kept close to the nurses' station for frequent observation.

Family members were asked to sit with confused patients.

Patient's family involved in patient's care.

Confused patients were nursed in a low bed.

Use of diversion therapy and occupational therapy.

Use of restraints such as safety jackets and vests, limb restraints, mittens, wristlets, anklets, wheelchair restraints and bedrails.

### 7. *Activities related to medications*

Need for patient to take each medication reviewed frequently.

Regular checking for toilet needs for patients receiving laxatives or diuretics.

Limiting combination of medications where possible. For example sedatives and analgesia.

### 8. *Preventing falls from wheelchairs*

Using a safety strap or seat belt to hold patient safely in the chair.

Using generic chairs.

Using latex mesh on the chair to prevent slipping.

Selecting suitable chairs that have arm rests and are of appropriate height for the patient to use when rising and when sitting.

Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) review of the research trials and publications concluded that assessment tools used to identify patients at risk of falling may have a role in raising staff awareness of the risk of a patient falling, but this has not yet been demonstrated.

The research by Moore, Martin & Stonehouse (1996) that compared the effectiveness of clinical judgement and patient fall risk assessment tools showed that neither clinical judgement or risk assessment tools could accurately predict the risk of a patient falling. An important factor in preventing patient falls is the way that the hospital management operates to improve patient care and safety. Mussett (2001) conducted research to identify the quality practices that produced the most successful business outcomes in Western Australian hospitals. This research identified the following successful management practices that could be used to prevent patient falls.

### *Management focused patient falls prevention strategies*

- Provide adequate human resources

and enough time to complete work tasks. Patients sometimes feel that they have to wait too long for nursing staff assistance and ambulate unassisted because they think that the nursing staff are too busy to assist them. Particularly patients who have had a stroke, or who are unsteady on their feet, fall when ambulating unassisted. Watts (2001) and Olson (2002) wrote about nurses in hospitals in Western Australia having insufficient time to provide a safe standard of patient care.

- Provide adequate material resources. This includes enough lifting equipment, walking frames and wheel chairs. Involve the people who will use the equipment in the selection of the equipment. For example, the ward nursing staff select the appropriate lifting equipment to be purchased and used to move appropriate patients in the ward. A patient, with professional guidance, selects the appropriate walking frame to use when ambulating, is provided with education on how to use this safely and is supervised until staff are satisfied that the patient can use the walking frame safely to ambulate. By involving the people who will use the equipment in the selection of the equipment the equipment is more likely to be fit for purpose, have commitment for use and the person using the equipment is more likely to have a sound knowledge of how to correctly use the equipment.
- Use team work. This provides work assistance for less experienced staff by more experienced nurses. It also provides more people to move heavy or awkward patients safely so lowering the risk of staff injury and patient falls.
- Management need to show strong leadership in promoting care, consideration, health and safety of employees, customers and potential customers. What is promoted and rewarded by management gets done. Management leadership in this area promotes a high standard of caring and safety.
- Management needs to plan, set and

implement standards and provide clear methods on how to perform tasks. This can be achieved by having documented procedures on how to assess patients, prevent falls and move patients safely. These procedures should be included in patients' bedside care plans. The work environment should also be safe. This includes having a non slip floor, the work environment free from clutter and adequate lighting so that patients can see a clear pathway.

- Provide competent supervision particularly for staff new to the work area. This can be achieved by buddying new staff with experienced nurses or by having the shift coordinator checking regularly to see

if staff need help.

- Communicate effectively. This can be done through patient care hand over at the beginning and end of each shift and during the shift if required.
- Have regular planned evaluation (for example 3 monthly), of the effectiveness of the fall prevention strategies. When evaluating the cause of a patient fall, consider patient intrinsic and extrinsic factors, employee, environment and management related causes. Provide feedback to appropriate patients and staff about the results of the evaluation. Give praise for work well done as appropriate and implement improvements as opportunities are

identified.

**Accident investigation using the Petersen Multiple Causation Accident Investigation Model**

As part of the regular evaluation of the effectiveness of the hospital patient fall prevention strategies an accident investigation should be performed after every patient fall in hospital. When performing an accident investigation as to why the patient fell a useful evaluation tool to use is the Petersen Multiple Causation Accident Investigation Model described by Taylor, Easter & Hegney (2001). This model looks at as many as possible contributing factors to the fall. Factors to be considered by the investigator include the following.

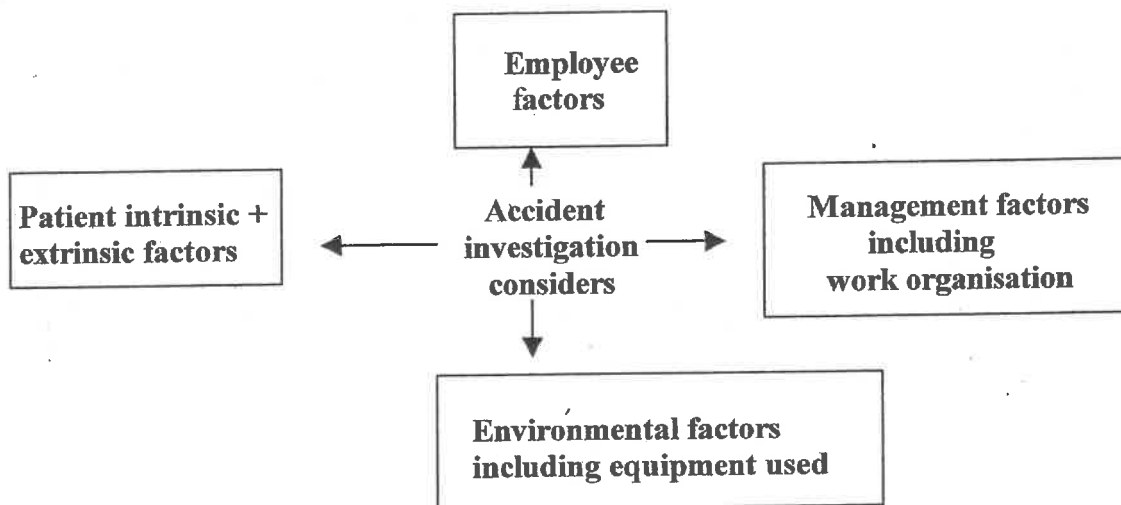


Figure 1.

For example, the following questions may be asked when investigating a patient fall.

**Patient factors**

- Why did the patient think he or she fell?
- Was this fall caused by the patient's mental state, medication taken or medical diagnosis?
- Did the patient have impaired mobility?
- Did the patient need to go to the toilet?
- Did the patient know to use the call bell to ask for assistance?
- Did the patient have a history of previous falls?
- Did the patient have a suitable restraint in use if this was needed to prevent the patient from falling?
- If the patient had a history of being dizzy, or had low blood pressure, was the

patient instructed to rise slowly and to sit when voiding?

If the patient needed assistance with toileting was the patient toileted regularly?

Was the patient wearing non-slip footwear?

Did the patient know how to use the equipment correctly, for example a walking frame?

**Employee factors**

Had a nursing assessment identified that the patient was at risk of falling?

Had appropriate fall prevention strategies been documented on the patient care plan and been implemented?

Had all the appropriate care information for this patient been communicated to the staff member caring for this patient?

Did the staff member have enough time to provide a safe level of care for this patient?

Had the staff member been trained in how to use patient fall prevention equipment correctly?

**Management factors**

Were all new staff members orientated to the ward so that they were aware of fall risk patients in their care?

Were there enough staff to provide supervision to patients who required it?

Were there enough staff to be able to attend to patient care adequately?

Had staff education been provided on patient fall risk factors and appropriate fall prevention strategies?

Had appropriate patient care standards been set?

Were these standards known and used by staff?

Was appropriate staff supervision provided as required?

#### Environmental factors

Had staff made the environment safe?

For example, cleaned up any spillage. No obstacles present in access ways.

Was the equipment that the patient used stable and supportive?

Had all faulty equipment been sent for repair?

Was the patient's bed kept at the lowest level when the patient was not being attended to?

Was there adequate light for the patient to see by to mobilise safely?

Was the floor covering made of non-slip material?

Were there grab rails for the patient to use in the shower and toilet?

Was the furniture (such as a wheel chair seat) used by the patient non-slip?

Was the chair used by the patient of an appropriate height for rising and sitting?

Was appropriate equipment used?

Was the equipment used correctly?

*Using the above multiple causation accident investigation model an accident that resulted in a patient in hospital falling may have produced the following answers.*

#### Patient factors

The patient stated that he fell when transferring from a wheel chair to the toilet because his right-foot got caught on the footplate of the wheel chair.

The patient had a stroke a week ago and had little muscle control of the right side of his body.

The patient had rung his call bell to ask nursing staff to take him to the toilet. His bell had been unanswered for 5 minutes so the patient had transferred himself from his bed to a wheel chair and wheeled himself to the toilet as all of the staff had appeared to be too busy to help him.

The patient wanted to be independent in being able to attend to his own toileting needs.

The patient had not been educated on how to safely transfer into, and out of, the wheel chair.

#### Employee factors

The nurse allocated to care for the patient who fell was at the time of the fall showering another patient (who had been incontinent) in another part of the ward so did not realise that the patient had rung his bell for assistance.

#### Management factors

The staff member allocated to care for this patient was a relieving nurse who was unfamiliar with the patient, the ward equipment and the ward layout.

No orientation was given to the nurse caring for the patient who fell as the regular ward staff had heavy patient care workloads.

There was no team work between nursing staff.

Nursing staff were allocated to care for patients scattered throughout the ward rather than in one area where there was more chance of seeing the patients that they were allocated to care for and hearing their patient's call bell ring.

The patient care required was documented on each patient's care plan. Due to patient care demands the care plan for each patient was not read by the nurse at the commencement of the shift. Taped hand over of patient care at the commencement of the shift had consisted of stating if each patient had slept well over night or not, and the care provided to each patient over night. There was no mention of patient care required for the next shift.

Nursing staff perceived that they were too busy caring for their own patients to leave their patients to care for other staff members' patients when these patients rang their call bell for assistance.

#### Environmental factors

The bathroom / toilet floor was wet from a previous patient's shower. When the patient lost his balance he slipped on this water.

The toilet had a grab rail, but the patient had not used this when transferring between wheel chair and toilet because he had not been taught to hold on to the grab rail when transferring.

The patient had not turned on the light in the toilet to see clearly what he was doing and so to be able to place his right foot in a safe place.

The wheel chair seat was of a lower height than the toilet seat and made

transferring between the two from a sitting position difficult.

*Corrective actions required would include the following:*

#### Patient corrective actions

Patient needs to be reminded to ring his bell more than once when he needs assistance if nursing staff do not answer his bell promptly.

Patient needs to be educated to realise how much he can do for himself and not to try to do unsupervised activities that he does not yet have the muscle coordination to do.

The patient needs to be educated to use the grab rail correctly when transferring between wheel chair and toilet.

Patient needs to be educated by the physiotherapist, who is his rehabilitation coordinator, how to move safely.

#### Employee corrective actions

It would have been unsafe for the nurse allocated to care for the patient who fell to have left the patient that she was showering (who was also an at risk of falls patient) to answer the call bell.

#### Management corrective actions

Nurses need to be allocated patients whose beds are located reasonably close together to be able to hear patient bells in their section when they ring.

As well as having a description of care given on the previous shift patient care required for this shift needs to be described on taped hand overs.

Team nursing should be implemented so that if one nurse is unable to answer a patient's call bell there is another nurse to help with patient care for the section.

There needs to be enough nurses to provide a safe level of care for patients' requirements. For example, so patients who require assistance can be toileted regularly.

The shift coordinator needs to ensure that new staff members are provided with a ward orientation and a description of what they are required to do during the shift. Assistance should be provided as required.

Nursing staff should be educated to answer call bells rung by patients who are not in their care and to organise assistance for these patients as required.

#### Environmental corrective actions

At the end of patient showering ward orderlies, or nurses, need to be encouraged to dry the shower floor if it is a multipurpose area that is also used as a toilet.

A sensor light could be installed in ward toilets so that the light automatically goes on when a person enters the room and the light goes off when the room is empty.

The wheel chair seat needs to be the same height as the toilet seat to make patient transferring between the two safer.

As can be seen from that above example, when performing a patient accident investigation using the multiple causation method described in Taylor, Easter & Hegney (2001) there were multiple causes for this patient's fall that needed

multiple corrective actions to prevent further falls by the patient. These corrective actions also need to be used for other patients to prevent them falling while in hospital. Using this multiple causation model should encourage comprehensive thinking by staff, particularly level two and three nurses, to consider not only patient factors in fall prevention, but also employee factors, environmental factors and management factors. The use of this accident investigation model, and the implementation of the identified hazard control measures, had not previously been described in published literature as being used to prevent further patient falls.

**Australian National Standard for Risk Preventing patient falls using the**

**Management**

A strategy to prevent patient falls that was not trialed in any of the research studies evaluated by Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) was the use of the Australian National Standard for Risk Management. The steps in the Australian National Standard for Risk Management described by Ellis (2001) can be used as a model for patient fall prevention. Ellis (2001) stops the risk management strategies at record keeping. Further strategies that need to be included to limit the frequency and severity of patient falls in hospital are regular evaluation and continuous improvement. A Patient Fall Prevention Model using the Australian National Standard for Risk Management can be summarised as follows.

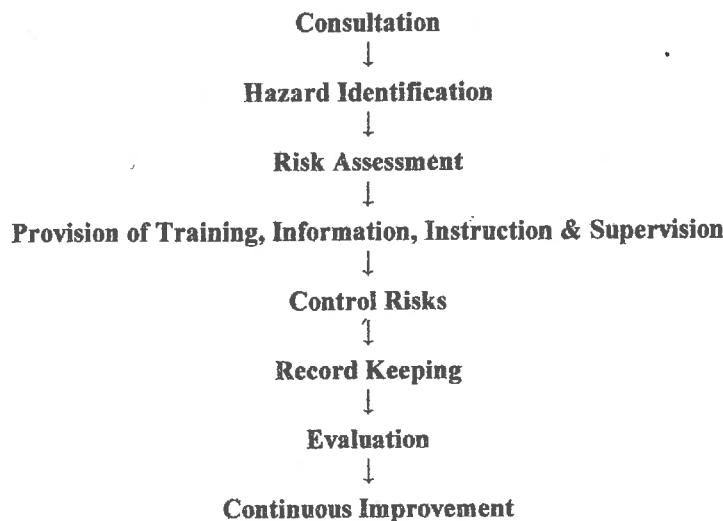


Figure 2.

An explanation of each of the headings is as follows.

*Consultation;*

Consultation is with the patient, family and staff regarding the likelihood of the patient falling and the steps that can be taken to prevent the patient falling.

*Hazard identification;*

This considers patient factors, employee factors, environmental factors (including equipment and products used) and management factors.

*Risk Assessment;*

Considers the likelihood of any of the hazards identified causing the patient to

fall.

*Provision of training, information, instruction and supervision;*

These should be provided on fall prevention strategies to staff, patients and to patients' family members as appropriate. Feedback on the effectiveness of patient fall prevention strategies used, and any identified opportunities for improvements, should be given promptly to management and relevant employees after each accident investigation and for quarterly and annual staff evaluation reports.

*Control Risks;*

Control all risks identified. The accident investigation scenario previously described includes an example of how identified patient fall hazards were proposed to be controlled. See Appendix 1 for a list of risk control strategies to prevent patient falls that have been identified in the research proposal literature review, risk control strategies that are currently used in the research hospital and other examples of risk control strategies that can be used to prevent patient falls.

*Record Keeping;*

Keep record of the risk control strategies to be used for each patient on the patient

care plan. Record in the patient's notes the effectiveness of these risk control strategies.

Record on the hospital incident form any patient falls that occur and the follow up action to be taken to prevent any further falls occurring.

#### *Evaluation;*

Conduct a thorough accident investigation of any patient falls that occur using the Multiple Causation Accident Investigation Model. Have 3 monthly ward or departmental staff evaluation of the effectiveness of the patient fall prevention strategies used for patients in the area. Have an annual Hospital Quality Improvement Team evaluation of the patient fall prevention strategies used in the hospital. Publicise the results of these evaluations as appropriate to improve patient safety.

#### *Continuous Improvement;*

Opportunities for continuous improvement may be identified through accident investigation, evaluation of the effectiveness of current patient fall prevention strategies used, reading research based published literature on patient fall prevention strategies and by networking with other hospitals to identify strategies that their staff found effective in preventing patient falls. Encourage evidence based research by hospital staff and university researchers on practical patient fall prevention strategies. Publicise and implement findings as appropriate to improve patient safety.

The Australian National Standard for Risk Management has been used successfully by many industries as a model to implement to minimise the occurrence of workplace accidents (Ellis, 2001). It is a new strategy that has not yet been trialed to minimise the occurrence or severity of patient falls in hospital. It would be valuable to trial this model as a patient in hospital fall prevention method.

#### Conclusion

Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) reviewed 112 articles and 100 researched based studies on preventing patient falls. These authors concluded "currently no interventions

have proven to be effective in fall prevention in the acute hospital setting" (p.9). These researchers stated that falls occurring in acute hospitals were the result of different factors and circumstances than falls occurring in the community or in long term care facilities, so previous research in relation to falls prevention in these settings was of limited value to use to prevent falls in an acute hospital setting. Evans, Hodgkinson, Lambert, Wood & Kowanko (1998) ended their report by saying that the major finding of their review was that there was an urgent need for quality research for interventions that were effective in preventing patients in hospital's from falling. In the following Appendix the author has summarised the best elements of the above recommendations to minimise the occurrence of patient falls in hospital.

### Appendix

#### Risk Control Strategies to prevent or minimise the potential for Patient Falls in Hospital

##### Management strategies

- Provide adequate human resources and enough time to complete work tasks.
- Provide adequate material resources.
- Use team work.
- Management needs to show strong leadership in promoting care, consideration, health and safety of employees, customers and potential customers.
- Management needs to plan, set and implement standards and provide clear methods on how to perform tasks. This can be achieved by having documented procedures on how to assess patients, prevent falls and move patients safely. These procedures should be included in patients' bedside care plans.
- Provide competent supervision particularly for relieving staff. This can be achieved by buddying new staff with experienced nurses or by having the shift coordinator checking regularly if staff needs help.
- Communicate effectively. This can be done through patient care hand over at the beginning and end of each shift and during the shift if required.

- Have regular evaluation (for example 3 monthly), of the effectiveness of the fall prevention strategies. When evaluating the cause of a patient fall consider patient intrinsic and extrinsic factors, employee, environment and management related causes. Provide feedback to appropriate patients and staff about the results of the evaluation. Give praise for work well done as appropriate and implement improvements as opportunities are identified.

##### Employee strategies

- Provide staff education on patient fall risk factors and prevention strategies with particular reference to dementia specific fall prevention strategies.
- Orientate new staff (both Agency and Permanent) to the wards to ensure that staff are fully aware of fall risk patients. Ensure compliance with functional indicator charts on hospital patient care and rehabilitation practices.
- Educate both patients and staff regarding patient continence management.
- Place patients with urgency near toilets.
- Toilet at risk of falling patients regularly.
- Check regularly for toileting needs for patients who received a laxative or diuretic.
- Frequently review the need for patients to take each medication while the patient is in hospital.
- Nursing staff to report unsafe patient behaviour and ensure that appropriate corrective action is taken to prevent this behaviour resulting in a patient fall.
- Assist high risk patients with their transfers and with mobilising.
- Walk appropriate patients in the corridor once or twice per shift.
- Encourage staff awareness of the importance of the incident reporting process to ensure legal and professional accuracy in documentation.
- Use a fall log for post fall analysis.
- Train staff to use the Multiple Causation Method of Accident Investigation to identify as many

causes of each patient's fall (documented on an incident report form), as possible and to implement appropriate risk control measures to prevent this patient, and other patients, falling as a result of the same causes.

- Encourage a "No Blame" Culture for incident reporting.
- Encourage a positive learning culture that acts proactively to enhance nursing care.
- Discuss patient fall prevention strategies in ward meetings.

#### Environmental strategies

- Nursing staff needs to report unsafe environmental issues and ensure that they are corrected. For example, faulty equipment is sent for repair. Spilt fluid is mopped up immediately.
- Correct storage of equipment.
- Ensure that bed brakes are kept on.
- Stabilise bedside furniture and beds.
- Remove obstacles and bedside clutter.
- Keep the work environment free from clutter.
- Ensure that patients can reach necessary items.
- Ensure that the call bell is within the reach of each patient.
- Use ½ length bed rails to reduce patients' need to climb over the bed rails to get out of bed.
- Have night lights at the bedside, in the corridors and in toilets. Have adequate lighting so that patients can see a clear pathway to mobilise safely.
- Have a non slip floor throughout the ward.
- Have vertically fitted grab bars on the toilet wall next to the toilet and on the walls of the shower area
- Use a safety strap or seat belt to hold an at risk of falling patient safely in a chair.
- Use latex mesh on wheel chair seats to prevent patients slipping off the seat.
- Use chairs that have arm rests and are of an appropriate height for each patient to use when rising, sitting and transferring.

#### Patient focused strategies

- On admission identify patients at risk of falling and record this information on the patient care plan. Patients at

risk of falling include patients who have previously fallen, all confused elderly patients, post operative patients, and all elderly patients administered analgesia or sedatives.

- Provide a good holistic assessment of patients' ability to mobilise. Adhere to guidelines for mobilisation with accurate, concise care planning that stipulates patients' ability to ambulate.
- Educate appropriate patients at risk of falling how to obtain assistance with mobilisation and how to mobilise safely.
- For patients identified as at risk of falling educate the patients and their carers about the patient's risk of falling, safety issues and patient activity limitations.
- For patients with altered mental state involve the patient's family in the patient's care. Ask family members to sit with confused patients.
- Explain patient activity limits frequently to patients and their family.
- Orientate patients\* to their bed area, ward facilities and how to get assistance. Reorientate confused patients at least once per day.
- Demonstrate the use of the nurse call bell to patients and check that patients know how to, and are able to, use the call bell. Provide frequent patient re-education as to how to use the call bell system to access staff. Keep the call bell within the patient's reach.
- Use Hi Lo beds with these beds being left in the low position when the patient is not being attended to by staff.
- Instruct patients to rise slowly.
- Teach patients to make position changes slowly.
- Instruct male patients prone to dizziness to void while sitting.
- Ensure that patients have, and used, suitable non-skid footwear and suitable clothing for ambulation.
- Supervise high fall risk patients when walking. Provide and use safety jacket restraint for patients who need restraining to prevent them from falling.
- Sit patients at risk of falling in lounge chairs with T bar restraint when sat out of bed.

- Keep confused patients close to the nurses' station for frequent observation.
- Provide bedside commodes to patients who require them.
- Involve Patient Care Assistants (PCA) in active ambulation of relevant patients, particularly at peak activity times.
- Provide patients with effective continence management and a regular toileting regime.
- Have bed rails in situ if the patient has a risk of falling out of bed.
- Use Patient Care Assistant continuous supervision for patients who required specialising to prevent them causing harm to themselves or others.
- Use behaviour modification strategies for patients who ambulated well but who have disruptive behaviour.
- Non-ambulatory patients who are at risk of falling should be placed in the ward in a very visible location where they can be observed easily.
- Use a commode restraint belt when a patient who is assessed as likely to fall is sat on a commode. Use hip protector pads in the side pockets of pants for patients who are ambulant and are assessed as likely to fall when ambulating.

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## Diary Of Events



### World Safety Organization

**Title:** 17<sup>th</sup> International Environmental Safety & Health Conference & Expo  
**Venue:** Holiday Inn Denver International Airport Conference Center, Denver, Colorado USA.

**Dates:** 3-5 November, 2003

**Cost:** \$600.<sup>00</sup>(US) WSO Members. \$675.<sup>00</sup> (US) Non-members

**Contact:** Debbie Burgess; telephone: (660) 747 3132 fax: (660) 747 2647 or email: [wsowmc@socket.net](mailto:wsowmc@socket.net)

**Title:** Bullying & Harassment at Work

**Venue:** Hotel Eckero, Aland, Finland

**Date:** 11-15 August, 2003

**Contact:** Gunilla Rasi; email: [gunilla.rasi@ttl.fi](mailto:gunilla.rasi@ttl.fi) or telephone: +358 9 4747 2398

**Title:** First International Seminar on Good Management Practice – Interaction of Environment, Safety & Quality

**Venue:** Hotel Levitunturi, Sirkka (Lapland) Finland

**Date:** 15-17 September, 2003

**Contact:** Gunilla Rasi; email: [gunilla.rasi@ttl.fi](mailto:gunilla.rasi@ttl.fi) or telephone: +358 9 4747 2398

**Title:** Occupational Safety & Health in the Construction: Impact of New Demands & Global Management: 27<sup>th</sup> International Symposium ISSA Construction Section Lisbon, Portugal

**Venue:** Portugal

**Date:** 22-24 October, 2003

**Contact:** telephone: +351 21 792 7059 or email: [aiss2003@idict.gov.pt](mailto:aiss2003@idict.gov.pt)

## Terrorism: Biological Weapons & Disaster Preparedness

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Disclaimer: The author does not necessarily represent the views of any military, government or non-government agency.

### ABSTRACT

This paper examines the present threat to public health posed by biological terrorism and the need for preparedness and co-operation of the various responding health and safety services. The nature and classification of biological agents that could be used in a terrorist incident is examined in light of historical references and some of the likely bioweapons is discussed. Preparedness to meet the challenge of a biological weapons release has focused on the public health response and interagency co-operation. The risk of use of biological weapons is thought to be low, however strategies must be in place to deal with such emergencies, as part of a broader disaster management plan, no matter how remote the possibility.

### Introduction

US Office of Homeland Security has indicated that public health is a "Critical element of public safety", which can be "quickly overwhelmed" in the event of a bioterrorist act. Recent funding from the US Government has allowed for the designation of National Centres of Public Health Preparedness (e.g. Harvard). These centres provide bioterrorism defence training to public health practitioners at all levels, including health care providers. In response to a national outbreak of diseases caused by bioterrorism, Americans, when surveyed, indicated that they were "more likely to trust public health officials and physicians" than "appointees" who do not have such backgrounds (Herman, 2002). The US Government is funding research into biodefence to the tune of some USD6 Billion in 2002.

The keys to defence against bioterrorism include

- Intelligence gathering
- Counter acquisition strategies
- Epidemiological surveillance systems
- Consequence mitigation (Robertson, 2000).

This paper presents some basic information of bioterrorism and its agents, discusses some of the likely scenarios, and examines in a little detail some of the public health issues associated with biological weapons and response to bioterrorism.

### Definition of a Biological Weapon

The North Atlantic Treaty Organisation defines a biological weapon as a weapon whose purpose is to injure or destroy humans, animals (e.g. foot and mouth disease), or plants (agro-terrorism) (Singley, 2002). Biological agents can

both kill and incapacitate. Biological agents can also be contagious and effect genetics and reproduction (Singley, 2002).

### History of Biological Weapons

Biological weapons have a long history of use. Some examples of plant toxins, diseased bodies, diseased animals used as biological weapons and contaminated gifts follow (after Singley, 2002):

#### Plant toxins

- In the 6th Century BC, the Assyrians poisoned the wells of their enemies with rye ergot.
- Athenians used skunk cabbage to poison the water supplies of the city of Krissa during its siege.

#### Diseased bodies

- Tartars threw plaque-ridden bodies over the city walls of Kaffa in 1346
- The same tactic was used in 1710 by Russian troops in the siege of Raval during the war between Russia and Sweden.
- Dead animals were used to poison water supplies during Queen Ann's War in the American colonies and the American Civil War

#### Contaminated gifts

- In the 15th Century, Pizarro facilitated his conquest of South America by giving gifts to local people of variola-laden clothing.
- British used similar tactics during the American French and Indian War (known as the 7 year war).
- At Fort Pitt, the commandant gave Indian blankets and handkerchiefs contaminated with smallpox

Despite these incidents, biological weapons are used relatively infrequently. There are several possible reasons for

this, including:

- Lack of sophisticated technology to deliver the pathogens
- Users may fear infecting themselves
- People may be morally against biological weapons

In 1972, 139 countries verified the Biological and Toxins Weapons Convention, which came into force in 1975. Biological weaponry was regarded as "repugnant to the conscious of mankind"

### Biological weapons as we currently know them

There is a perception that a bioweapon is a "super bug". The reality is that it is usually a naturally occurring bug, which has an insidious onset of illness. A major biological weapons arsenal could be built in with little in the way of resources. The Centres for Disease Control and Prevention (CDC, 2002) have classified the potential biological agents (see Table 1), which might be used as biological weapons. In classifying these agents, various agencies have considered the properties of biological agents, which may lead to their use as biological weapons. These include:

- The biological agent should be capable of being weaponised
- Highly lethal and easily produced in large quantities
- Given that the aerosol route is one of the most likely for a large-scale attack, stability in aerosol and capability to be dispersed are necessary
- Additional attributes that make an agent even more dangerous include being communicable from person to person and having no treatment or vaccine



## Likely Threats

The greatest potential for mass casualties and civil disruption are probably anthrax and smallpox, for several reasons:

- Both are highly lethal: the death rate for anthrax if untreated before the onset of serious symptoms exceeds 80%.
- Both are stable for transmission in aerosol and capable of large scale production
- Use of either agent would have a devastating psychological effect on the target population, potentially causing widespread panic.

## Anthrax

Probably represents the single greatest biological warfare threat. The World Health Organization (WHO) has estimated that three days after the release of 50 kg of anthrax spores along a 2 km line upwind of a city with a population of 500000, there would be 125,000 incapacitated and 95,000 deaths (about half in 24-48 hours). This number represents far more deaths than predicted in almost any other scenario of agent release, except Q fever (150,000 deaths) (Griggs and Thompson, 2002).

The early presentation of anthrax disease would resemble a fever or cough. Death follows 1-3 days later for most people. If antibiotics are not started before symptoms develop, the mortality rate is estimated to be 80-90%. Release of anthrax could exhaust supplies of drugs quickly, unless preparations are made (Gordon, 2002). Spores can persist in the environment for years (see Figure 1).

**Table 1. The CDC Categories of Biological Agents (after CDC, 2002)**

### Category A

High-priority agents include organisms that pose a risk to national security because they:

- can be easily disseminated or transmitted from person to person;
- result in high mortality rates and have the potential for major public health impact;
- might cause public panic and social disruption;
- require special action for public health preparedness

Anthrax (*Bacillus anthracis*)  
Smallpox (*variola major*)  
Plaque (*Yersinia pestis*)  
Botulism (*Clostridium botulinum* toxin)  
Viral Haemorrhagic fevers  
Tularaemia (*Francisella tularensis*)

### Category B

Second highest priority agents include those that:

- are moderately easy to disseminate;
- result in moderate morbidity rates and low mortality rates; and
- require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

Brucellosis (*Brucella* species)  
Epsilon toxin of *Clostridium perfringens*  
Food safety threats (e.g., *Salmonella* species, *Escherichia coli* O157:H7, *Shigella*)  
Glanders (*Burkholderia mallei*)  
Meliodosis (*Burkholderia pseudomallei*)  
Psittacosis (*Chlamydia psittaci*)  
Q fever (*Coxiella burnetii*)  
Ricin toxin from *Ricinus communis* (castor beans)  
Staphylococcal enterotoxin B  
Typhus fever (*Rickettsia prowazekii*)  
Viral encephalitis (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis])  
Water safety threats (e.g., *Vibrio cholerae*, *Cryptosporidium parvum*)

### Category C

Third highest priority agents include emerging pathogens that could be engineered for mass dissemination in the future because of:

- availability;
- ease of production and dissemination; and
- potential for high morbidity and mortality rates and major health impact

Emerging infectious disease threats such as Nipah virus and hantavirus.

Figure 1. Transmission electron micrographic image of *Bacillus anthracis* from an anthrax culture, showing cell division (A), and spores (B) (Source: Public Health Image Library, CDC. Available at: <http://phil.cdc.gov> last accessed 16 December 2002)



### Other threats

Protozoa are probably underestimated as biological weapons. Protozoa, such as *Cryptosporidium*, have been responsible for 1000's of illnesses and 100's of deaths when introduced into water supplies in the USA (Singley and Thompson, 2001). Smallpox release would be potentially disastrous. Interestingly, while stockpiling of smallpox vaccine takes place, 3 in 5 Americans would have voluntary immunisation. The foot and mouth disease outbreak in the United Kingdom (UK), where 4 million animals had to be destroyed, also illustrates the potential impact of a possible biological warfare attack on primary industries. The UK foot and mouth disease outbreak cost between GBP800m to GBP2400m just to the farming industry, not to speak of other associated industries and also the effect on tourism.

### What is the risk?

At least 25 countries now possess, or in the process of developing, NBC weapons (US Department of Defence, January 2001 cited by Griggs and Edwards, 2002). Biological agents have been produced in large quantities by several factories abroad. Threats have been made and attempts at release of anthrax (non-infectious) and other biological agents have also been made (Griggs and Edwards, 2002). The recent anthrax scare in the USA, which was distributed through the US Postal Service, illustrated the hazards of anthrax release, with 22 confirmed infections with 11 inhalational cases and 5 deaths associated with this outbreak (Inglesby et al., 2002).

Outside of the USA, countries like Australia have considered the risk of a major release as low; however there have been a large number of hoaxes. Again, mail and parcels have been used and suspicious "white powder" has had to be identified in each case. None have

positive for anthrax in Australia.

Fortunately, less than 1% of modern terrorist attacks have used chemical, biological or radiological (CBR) weapons (Griggs and Edwards, 2002). We must however prepare, there are special issues that need to be considered with CBR weapons that need to be considered in disaster management plans, e.g. contamination (the doors of the ER may need to be closed!).

#### Preparedness

The goal of any emergency preparedness and response planning is to keep it an emergency and to avert a disaster.

Preparedness is essentially based on:

- Risk management;
- Surveillance; and
- Detection capability

Response must be agent specific:

- A release needs to be confirmed
- Outbreak and its potential spread must be evaluated
- Depends on the mode of transmission
- Risk communication and information distribution are paramount

Hoaxes remain the greatest problem, as it can take hours to analyse an unknown powder.

#### Protection of Responders

There is also a need to protect the first responders, which may include members of the public. The priority is to protect responders and health care workers, so that they can work effectively and prevent a panic with subsequent exodus and chaos. In addition to standard principles of protection against infection, vaccination and/or prophylactic antimicrobials may be indicated. Every emergency room (ER) in major hospitals and health centers is suggested to have fact sheets on major bioweapons. Of course, health professionals and other workers in the health industry must deal with biohazards on a daily basis and therefore have considerable experience, training and expertise, however it is important that they do not become complacent (see Figure 2).

**Figure 2. International Biohazard Symbol**



#### Protection of the Population

Initial cases may need to be isolated, hence:

- Isolation facilities may need to be established
- May be necessary to restrict population movements and gatherings
- Standard principles of protection against infection, vaccination and/or prophylactic antimicrobials may be indicated

#### Public Response to Disasters

Glass (2001) has reported on an analysis of 10 events in understanding the public response to disasters. Their findings were:

- Disaster planning does not go as planned
- Victims respond with collective resourcefulness
- Panic is rare, but the public response to bioterrorism has not really been tested
- The majority of lives will be saved by the public
- Social factors to be considered in planning.

The implications for biodefence of Glass' (2001) study are:

- Victims will self-transfer and self-triage
- Plan for what people are going to do rather than what they are supposed to do
- Hospitals will not be sufficient
- Home care will be necessary in a massive event
- The public response will shape the extent of the epidemic through patterns of evacuation, help-seeking, collective action, rumouring, and volunteerism.

#### Biodefence Preparedness

Steffen (2002) has stated that a network of experts – nationally and internationally – is needed to be able to

confirm a biological agent or toxins incident, be it accidental, terrorist, or due to weapons used in warfare. Preparedness needs a significant investment of time and resources. The responsibility of national preparedness and response to biological weapons lies with nations and co-operation between nations. There are a number of specialized agencies, mainly in the USA, including:

- USAMRIID
- US Technical Escort Group
- CDC
- Weapons of Mass Destruction Center, NATO

The role of international organizations, such as the WHO, is to facilitate support for this purpose. WHO has also been funding projects for improving public health preparedness on diseases associated with biological warfare. The WHO (2001) has also released its revised guidelines for dealing with biological and chemical weapons release. In Australia, the Australian Medical Disaster Co-ordination Group has been working with Emergency Management Australia to correct deficiencies related to bioterrorism preparedness, in areas such as:

- Training
- State-based contingency planning
- Acquisition of protective equipment, and
- Detection capacity (Robertson, 2000).

Response to Bioterrorism needs to be integrated with Disaster Management Plans, and with other contingency plans for CBR releases (accidental or terrorist-related incidents) (Hills, 2002). Co-operation between government agencies at all levels, the defence force and civilian agencies are vital not only for responding to terrorist acts, but also to disasters in general (Hills, 2002).

#### Conclusion

This paper has highlighted the nature and present concerns surrounding possible biological terrorism, although there has been a long history of use of these agencies. The focus in preparedness to meet the challenge of a biological weapons release has focused on the public health response and interagency co-operation. The risk of use of biological

weapons is thought to be low, however strategies must be in place to deal with such emergencies, as part of a broader disaster management plan, no matter how remote the possibility.

#### Acknowledgments

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## Frontline Management Initiative In The Mining Industry

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### ABSTRACT

Effective frontline managers are crucial for safe production and getting the job done. This research study evaluated mine managers' opinions on the value of using Frontline Management Initiative (FMI) for the mining industry to improve managers' ability to provide a high standard of occupational safety and health and assist in eliminating industry fatalities.

The results in this study suggest that overall the experience levels of managers in the mining industry and professional qualifications are of a high standard. The knowledge and understanding of FMI was an area of concern. Results indicated that more importance should be given to the lack of understanding by mine managers on what FMI is, the benefits FMI proposes and the reasons for its compulsory introduction. The results also suggest greater emphasis should be placed on providing evidence to the workers and employers in the mining industry that FMI is the standard and/or benchmark the mining industry needs to eliminate fatalities in the industry. Recommendations for future research studies to determine effective education for mine managers to have the knowledge to improve occupational safety and health in their workplace are made.

### Introduction

In 1996 the Western Australian (WA) state government was concerned about the unacceptable number of fatalities and serious accidents and incidents within the mining industry. It called for a review of the situation. This review resulted in an Inquiry into Fatalities in the WA Mining Industry (MOSHAB, 1997). The findings validated the pivotal role supervisors and managers have to play in the success or failure of business enterprises, particularly in relation to occupational health and safety and the reduction of fatalities, serious accidents and injuries.

The competencies that supervisors require at all levels to successfully juggle productivity and duty of care demands greater management knowledge and skill. The Working Party recommended and accepted a strategy called "Applicable Training" (MOSHAB, 1997). The purpose of the Applicable Training was to ensure a competent response to any current or future crisis or significant change that may impact upon mine management and to improve supervisor competence at all levels. The Applicable Training benchmark for supervisors at all levels was deemed to be the Frontline Management Initiative (FMI) competency standards. These standards represented a sound and acceptable baseline for ensuring that supervisor competence was achieved and recognised.

The Karpin Report revealed that over 450,000 managers have technical skills

but no management or supervisory qualifications and Australian managers have the following failures:

- Over reliance on short courses
- Low levels of education and training
- Over emphasis on current rather than future skills
- Failure to handle the transition from specialist to supervisor/manager
- Failure to link management development to strategic business direction
- Failure to evaluate the effectiveness of management development (Karpin, 1995).

Frontline managers are pivotal to safe production and getting the job done. Their performance directly affects the bottom line. Through better performance managers should be able to increase productivity, without compromising health and safety, translate management and industry concepts into workplace action plans, improve team performance, improve workplace safety and processes. FMI should also help to develop leadership for change and succession planning.

### Inquiry into Mining Fatalities

In September 1997, Western Australia's Minister for Mines, Norman Moore instructed the chairman of the Mines Occupational Safety and Health Advisory Board (MOSHAB) to call a special meeting of the Board to establish an inquiry into mining fatalities. MOSHAB established the tripartite Prevention of Mining Fatalities Taskforce to carry out the Inquiry and to report its findings and

recommendations to the Minister of Mines. The inquiry found that overall, work practices, the quality of supervision, the level of training and the degree to which consultation takes place were inadequate. The report also found evidence of poor safety culture that could in part be attributed to the rapid elevation of inexperienced and inadequately trained professionals in management roles (MOSHAB, 1997).

The Mining Commission Report (Industry Commission Report, 1995) discussed line management responsibilities and accountabilities. The report commented on the huge influence line managers have in the workplace, which can significantly impede or enhance the effectiveness of occupational safety and health. This report also discussed the success Du Pont has achieved in relation to their safety performance. They attribute this to the emphasis they place on safety as a line management responsibility.

### Front Line management Initiative

The Frontline Management Initiative (FMI) Pilot Program commenced in November 1996. Frontline Management Initiative (FMI) has three qualification levels:

- Certificate III in Frontline Management
- Certificate IV in Frontline Management
- Diploma in Frontline Management

The units of competency are the same at each level, however, the context and demonstrations of the competencies

increases in depth and complexity with each level. This is defined within Frontline Management Initiative (FMI) by different range indicators and evidence guides at different levels (Welcome to Frontline Management Initiative, 2002). The literature related to FMI (FMI in the Food Management Industry, 2002, FMI in the Hospitality Industry, 2002, Implementation of Frontline Management Initiative by Australia Post, 2002, FMI in the Transport & Distribution Industry, 2002, FMI in the Utilities, 2002) indicated that it improved workplace safety in manufacturing, hospitality, transport, utility and the postal industry. The objective of this research study was to evaluate mining managers' opinion of the value of using FMI for their industry.

### Method

#### Questionnaire Design

This study was conducted via an anonymous self-administered questionnaire consisting of 21 broad questions such as, department, role title, profession, years of experience in the profession and in mining. Key questions

were asked on pre and post FMI training. These were designed to determine if the mining industry would benefit from the Frontline Management Initiative strategy.

#### Sample and Procedure

Ethics approval for the study was received from Edith Cowan University. A pilot questionnaire was distributed to a sample of 10 supervisors of the target population from any department or profession of the selected mine in Western Australia. The questionnaire was revised to improve validity and reliability from the feedback received. The final questionnaire was distributed to a convenience sample of 100 supervisors at 4 mines in Western Australia. A cover page was attached to each questionnaire explaining to the participants the intention, objectives and benefits of the study. The participants were informed that answering the questionnaire was voluntary and confidentiality was assured. The completed questionnaires were placed into a sealed envelope and posted to the researcher.

#### Data Analysis

The collected data was analysed using the descriptive statistics of number and percent for questions 1-20. This allowed the respondents' demographic details and the amount of knowledge that they had about the Front Line Management Initiative Program to be evaluated. Question 21 was an open-ended question that allowed participants to voice their opinions about how fatalities in the mining industry could be eliminated. Pattern Matching was used to analyse this data as it enabled themes in respondents' answers to be identified.

#### Results

Out of the 100 supervisors in the mining industry given the questionnaire there was a response rate of 40%. Of the 40 who did reply, only 14 respondents had undertaken training in Front Line Management (FMI). Answers provided on the questionnaire are recorded below.

#### Demographic details

Table 1 shows respondents' place of work and years of experience working in mining.

Table 1. Department and years of mining experience.

Department	Distribution		Years of Experience	
	Number	%	Total Yrs	Av. Yrs
Underground Mining	12	30%	217	18.1
Open Cut Mining	7	17.5%	135.5	19.3
Administration	5	12.5%	70.5	14.1
Exploration	5	12.5%	75	15
Process Plant	5	12.5%	76	15.2
Maintenance – Electrical & Mech.	3	7.5%	49	16.3
Safety & Health	2	5%	31	15.5
Environment	1	2.5%	1.5	1.5
			655.5	16.4

Respondents had over 650yrs of mining experience averaging 16.4 years per supervisor. Of these respondents 9 (22.5%) were employed as managers, 10 (25%) as supervisors and 21 (52.5%) as first line supervisors.

Table 2. Professional Qualifications and years of experience in that qualification.

Professional Qualification	Qualified		Years Qualified	
	Number	%	Total	Average
Engineering Mining & Mechanical	9	22.5%	130	14.4
Geology	9	22.5%	144	16
Trades	5	12.5%	105	21
Health & Safety Science	2	5%	27	13.5
Environmental Science	1	2.5%	2.5	
Industrial Chemist	1	2.5%	25	
No Professional Qualification	13	32.5%		

Thirteen (32.5%) of supervisors did not have recognised professional qualifications. These supervisors were predominantly from the underground and open cut mining areas, and were at the line supervisor level. Between them they

total over 234 years of experience in mining, averaging 18 years of experience each.

**Level of knowledge of, and opinions about Front Line Management**

**Initiative**

Table three shows respondents' opinions about the Front Line Management Initiative prior to attending the course.

Table 3. Pre-course attendance knowledge and opinions

Question	Yes		No	
Have you heard of FMI?	33	82.5%	7	17.5%
Do you know what FMI is?	28	70%	12	30%
Do you know FMI may be compulsory?	28	70%	12	30%
Have the reasons & benefits for introducing FMI been explained?	25	62.5%	15	37.5%
Is technical experience enough to be a competent supervisor?	14	35%	26	65%
Is sufficient training provided to fulfil your role competently?	14	35%	26	65%
Does the mining industry need FMI as a standard or benchmark?	27	67.5%	13	32.5%
Should the mining industry provide evidence before FMI is made legislation?	32	80%	8	20%

The results show that most mine managers had heard of the Front Line Management Initiative. Two thirds of the supervisors in this study believed that there was insufficient training provided to enable them to fill their role as a supervisors competently, that technical prowess and experience were not enough

to be a competent supervisor and that the mining industry needs a standard or benchmark such as FMI. Managers indicated that they thought relevant education was required to manage effectively although most (3/4) were not in favour of Front Line Management Initiative being a legally required

training.

Fourteen of the 40 participants had undertaken FMI Training. These 14 completed a post-course attendance questionnaire. Their answers to the post-course questionnaire were as follows.

Table 4. Post-course attendance knowledge and opinions

Question	Yes		No	
Is technical experience is enough to be a competent supervisor?	2	14.3%	12	85.7%
Does FMI provide the skills to manage OHS competently?	7	50%	7	50%
Will FMI have a positive effect on eliminating fatalities in the mining industry?	8	57.2%	6	42.8%
Should FMI be a pre-requisite before a person is appointed as a supervisor?	6	42.8%	8	57.2%
People who conducted FMI training were competent?	12	85.7%	2	14.3%
Is there trainee involved in the assessment process?	14	100%	0	0%

More of the respondents who attended the FMI course believed that technical experience was not enough to be a competent supervisor. Only half of these respondents considered that FMI provided the skills to manage occupational safety and health

competently. Three quarters of the respondents thought that the people who conducted the training were competent and all agreed that they were involved in the assessment process.

Question 21 of the questionnaire stated; "Fatalities in the mining industry

continue to occur. In your opinion, what do you think is the answer to help eliminate fatalities in the mining industry?" The responses of participants are recorded as written but have been grouped into themes.

Table 5. Ways to eliminate fatalities.

Education (9)	<ul style="list-style-type: none"> <li>Continually make workers aware of safety. Provide continual reminders to put safety to the forefront of people's minds.</li> <li>Create a more practical awareness of safety instead of "bogging" supervisors / employees down with paperwork concerning legislation / procedures / policies / practices / regulations / requirements etc, which will only breed resentment.</li> <li>Study causes of fatalities to understand how it happened. Study safety toolbox meetings in each department as things usually get reported in these meetings.</li> <li>Greater supervision and higher standards of training.</li> <li>Better training.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Too many companies have or are introducing FMI to the wrong levels within their company. Line managers, shift supervisors, foreman, leading hands are not having this training even though they are the in house people managers. Many do not have the skills as they have come up through the ranks. The supervisors and managers do not actually know how safely people work.</li> <li>• Acceptance and awareness of dangers and increased training.</li> <li>• More hands on training and less classroom training.</li> <li>• Education of persons to ensure complete understanding of what incorrect actions can cause and the damage, injury and suffering that may result.</li> </ul>
Risk Management (9)	<ul style="list-style-type: none"> <li>• There is no answer as there will always be a risk of having a fatality, as there is always a risk in any other industry and life. All we can do is minimise the exposure to risks/hazards.</li> <li>• Remove the human element. As long as there is a human factor in the equation you will never eliminate fatalities.</li> <li>• If families were more involved in their partners occupation this would lead to less stress when working away from home, especially where children are involved.</li> <li>• Replace manager bonuses as these push the envelope to achieve targets and goals.</li> <li>• More emphasis on better working conditions ie. working hours, fly in – fly out.</li> <li>• Less use of contractors.</li> <li>• Pay rates not linked to production.</li> <li>• Shorter than 12 hour shift rosters.</li> <li>• Slow down the progression of production.</li> </ul>
Impose penalties (1)	<ul style="list-style-type: none"> <li>• Stiffer penalties should be imposed, especially when an act of negligence can be proven.</li> </ul>

### Discussion

This research study was designed to evaluate if mining industry managers considered that FMI would improve their ability to manage occupational safety and health and assist in eliminating industry fatalities. The data obtained from the participants has allowed the investigator to make the following interpretations;

#### Experience in the Mining Profession

For the 40 supervisors who participated in the study there was an average of 16.4 years mining experience per participant. This result was contrary to the findings of the Karpin Report (Karpin, 1995) that supervisors and managers in the mining industry are promoted at a young age with very little experience. The survey undertaken by the Mines Occupational Safety and Health Advisory Board (MOSHAB, 1998) found that 79% of the supervisors surveyed had more than 10 years experience as a supervisor and most supervisors had obtained their experience at a variety of mine sites. This study had similar findings. The results of this study showed that of the 67.5% of respondents had professional qualifications and all had significant experience in their respective professions. It can therefore be concluded that companies do employ people in supervisory roles who are qualified both academically and by years of experience in that profession.

A third of supervisors surveyed did not have recognised professional qualifications. It could be argued that that people in supervisory positions should have some form of recognised qualifications. FMI would provide supervisors with a competency based, nationally recognised qualification (Chamber of Minerals & Energy, 1999). One of the Priority, 1 recommendations from the Inquiry into Fatalities in the Western Australian Mining Industry states that MOSHAB should co-ordinate the development of an accredited, competency-based training program for underground mining employees (MOSHAB, 1997).

Queensland Rail conducted a pilot study on FMI with one of the major benefits recognised by the participants being that FMI led to the recognition of a real qualification and had relevance in the wider market place (FMI in the Transport & Distribution Industry, 2002). The supervisors who participated in this study without professional qualifications averaged over 18 years of experience each.

Petit (1999) reported that increasing external pressures upon mining enterprises to perform in the market place demanded even greater management knowledge and skill. The

competence to be able to successfully juggle productivity and duty of care demands and all that both entail is the base of modern management. This research had similar findings with 65% of supervisors recording that insufficient training is provided to fulfil their role competently.

#### Technical Prowess and Experience

This question was asked twice, pre and post FMI. Post FMI yielded over a 20% increase in the opinion that technical prowess and experience is not all that is required to be a competent supervisor. Past beliefs were that technical prowess and experience was all that was required to be a supervisor (Chamber of Minerals & Energy, 1999). It can be assumed from this result that supervisors believe that something more is required such as FMI Training.

#### The Need for FMI as a Standard or Benchmark

Two thirds of respondents believed the mining industry needs a standard or benchmark such as FMI to ensure supervisor and manager competence. These findings supported the findings of the survey undertaken by the MOSHAB (1998) titled "Risk Taking Behaviour in the Western Australian Underground Mining Sector."

#### Evidence before Legislation.

To the research question "Do you feel that the mining industry should provide evidence to substantiate the FMI strategy, before it is made a legislative requirement?" the results of this study showed 100% in the Pilot Study and 80% of the respondents in the main study believed the mining industry should provide evidence to substantiate this strategy before it is made a legislative requirement. There have been no studies conducted by the mining industry directly on FMI to date where evidence can be produced to say that FMI is the strategy that should be adopted to help eliminate fatalities in the industry. Even without this evidence 57.2% of post FMI participants believe FMI would have a positive effect on helping to eliminate fatalities in the mining industry. Some studies on FMI have been conducted by companies from other industries (Welcome to Frontline Management Initiative, 2002, FMI in the Food Management Industry, 2002, FMI in the Hospitality Industry, 2002, Implementation of Frontline Management Initiative by Australia Post, 2002, FMI in the Transport & Distribution Industry, 2002, FMI in the Utilities, 2002), that show that FMI is effective in improving safety management.

#### **Training in FMI**

The success of FMI relies on two important factors. Firstly, the competence of the trainer and the organisation, and secondly the involvement of the trainee in the assessment process. The results of this study showed that 85.7% of post FMI participants believed that the trainers who delivered this training were competent in its delivery. Further more, 100% of the post FMI participants were of the opinion that as FMI students they were required to demonstrate and produced evidence of knowledge and experience and were completely involved in the process of assessment to attain competency.

Recently MOSHAB (2003) conducted the "Safety Behaviour Survey of the Western Australian Mining Industry 2002". Using the results of this survey it was recommended that training for managers and supervisors should include:

- Strategies that improve the ability of supervisors and managers to positively influence employee behaviour.
- Effective communication skills, including how to give positive feedback to employees for working safely and how to discipline unsafe behaviour.
- Understanding hazard identification, risk assessment and risk control.
- Understanding statutory responsibilities of managers and supervisors (p. 3).

FMI training would achieve all of these educational requirements.

#### **Education, risk management and penalties**

From question 21 written recommendations on ways to minimise fatalities in the mining industry, there were three main themes. There were 9 recommendations for more education, 9 for improved risk management and one recommendation to impose stiffer penalties when negligence was proven. The reports on Risk Taking Behaviour in the Western Australian Underground Mining Sector (MOSHAB, 1998) and the Report on the Inquiry into Fatalities in the Western Australian Mining Industry (MOSHAB, 1997), both discuss extensively in their recommendations the requirements for more training and the need for better risk management. None of the recommendations made were that FMI alone was the answer to reducing fatalities in the mining industry.

#### **Implications of the findings**

The results in this study suggest that overall the experience levels of managers in the mining industry and professional qualifications are of a high standard. The knowledge and understanding of FMI was an area of concern. More importance should be given to the lack of understanding on what FMI is, the benefits FMI proposes and the reasons for its compulsory introduction. The results also suggest that it may be more prudent for the mining industry to place greater emphasis on providing evidence to the workers and employers in the mining industry that FMI is the standard and/or benchmark the mining industry needs to eliminate fatalities in the industry. It would most likely be more acceptable to industry as a whole if there was evidence

to back up this proposed strategy. It could be argued that the number of fatalities is evidence enough. The results do suggest that the Registered Training Organisations and the trainers are conducting the FMI training in a competent manner with the trainee playing a pivotal role.

#### **Recommendations**

In view of the high percentage of respondents who believed the mining industry needs a standard or benchmark such as FMI, the Department of Minerals and Energy (DME) and the Chamber of Minerals and Energy (CME) should provide evidence that Frontline Management Initiative (FMI) is the strategy which should be adopted and made legislation. To achieve this it is recommended that further studies should be conducted directly related to Frontline Management to establish if FMI is the most applicable strategy that should be adopted by the mining industry to help eliminate fatalities. The studies should be on a scale that will categorically determine whether the mining industry will benefit from the FMI strategy and if its compulsory participation will have the desired outcome of eliminating fatalities in the industry. A suggested method would be for the DME and the CME to sponsor the managers in a number of mines in Western Australia to attend FMI training and then conduct a case control study using the mines sponsored in the study. The study should take into account the particular mines' safety performance pre and post FMI noting the impact FMI may have had both positively and negatively.

#### **Study Limitations**

A limitation of the study was that only 40% of managers approached answered the questionnaire. This response rate may have been due to the managers not understanding the questionnaire's purpose, being too busy to answer the questionnaire or for other personal reasons. A larger sample with a greater response rate may have produced a more representative result of mine managers' knowledge and opinions of FMI.

#### **Conclusions**

This study set out to evaluate if the introduction of Frontline Management



Initiative (FMI) into the mining industry would make a difference to workplace managers / supervisors successfully managing Occupational Health and Safety in this industry. What the study did reveal was that a considerable number of mining people had no real understanding of what FMI is and that the mining industry needs to provide good evidence to substantiate the compulsory introduction of FMI. Recommendations were made based on the major findings of this study which may lead to people working in the industry having a greater understanding of the FMI strategy and its proposed benefits. A suggestion for further research would be to establish where people who are working in the mining industry should be trained in FMI. If this training should be undertaken out in the field or through University / TAFE studies or through a mixture of both practical and tertiary education.

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# Safe Working Practices For The Western Australian Ferry & Charter Boat Industry

By: Mr. Gavin Waugh

Mr. Gavin began his working career as an apprentice shipwright. Gavin's long career applying marine safety has been complemented through continued studies at TAFE and University by Trade, Engineering and Master of Health Science Qualifications. Focusing on the effect of ideological means and methods of legislative enforcement to safety outcomes, he is currently researching for a Ph.D. in Marine Safety through Edith Cowan University. Using 15 years experience as an Engineer and Ship Safety Surveyor Gavin initiated and developed a post graduate course in Applied Risk Management - Marine Safety Surveying, for Edith Cowan University. In further recognition of his qualification and extensive experience, Edith Cowan University engaged Gavin to lecture in Occupational Safety and Health. For the encouragement of higher professionalism in maritime safety, Gavin was awarded Fellow of the Safety Institute of Australia and has recently been elected to serve as Safety Institute of Australia, Western Australian Division, President.

## ABSTRACT

The historic development of the Western Australian Marine Act, 1982 is examined in this article. The deficiencies of this Act are noted. The development by the ferry and charter boat industry of a Code of Practice to improve occupational safety and health in the marine industry is described.

### Introduction

Standards improvements occur continuously though often slowly. During the past year representatives from the Western Australian (WA) Ferry and Charter Boat Industry have been developing a Code for Safe Working Practice. The intended outcome is a policy document providing industry members with a guiding resource through which they may authoritatively develop their own company specific or vessel specific "Safe-Work Procedures and Practices" manuals. It is anticipated the development and use of these manuals would provide comprehensive and practical preventative strategies to improve safety and health in the Ferry and Charter Boat working environment. This paper briefly describes the political history and path to this development and outlines the development of the code itself.

### Marine Safety Legislation History in Western Australia

The WA Marine Industry has until recently been a very isolated area of our community. Particularly through the lack of easily accessible communication aids and accompanied by the extended time required to reach and return from operating areas. Of further significance, particularly to the ferry and charter boat industry, was the very limited custom available from which to draw an operating profit. Without profit there is no incentive to develop higher standards of quality.

During 1964 a Royal Commission was held into safety aspects of the WA marine industry (Wallwork 1964). Two of the terms of reference were the adequacy of legislation and the ability of the government agency of the day to effectively administer that legislation. Having been advised of identified deficiencies, the authority and government hastily set about remedying the situation. Working at the task for 18 years their efforts culminated in the Western Australian Marine Act (1982). During this time Lord Robens reviewed the British Occupational Safety and Health Legislation. The resulting Robens' Report, (Robens 1972) was an in-depth review of the British industrial safety culture. It was completed during the early 1970s and sent shock waves around the world, turning upside down the concept of traditional prescriptive legislation and tick list enforcement by 'skilled' government inspectors. The Robens' Report was not considered in the development of the WA Marine Act and Regulations. This legislation remained prescriptive and unwieldy.

In 1984 the Occupational Safety and Health (OSH) Act was proclaimed in Western Australia (WA). The OSH Act was modelled around Robens' 'Common Law' principles. Under this Act all WA workplaces, including those in the maritime fields were now be required to apply sound risk management principles through System-Safety Management processes.

In spite of the Marine Act's prescription major technological changes occurred to vessel; design, materials and modes of construction, during the 1980s continuing into the 1990s. Cracks started to appear in the validity of approvals given under the Act. How could so many different types of boats comply with the prescription? Every technological improvement required a change to the prescription list, changes which would invariably occur after the vessel had commenced operation. Although these approvals were given in good faith, they focused on structural engineering without operational safety consideration.

Under such a regime, failures were inevitable and they did occur. Loss of vessels and loss of life continued to result with notable cases such as the loss of 5 crew on the sinking of fishing vessel Saint Maddalena in 1992 and the loss of 7 seafarers during cyclone Bobby in 1995. Although these and numerous other cases did not involve ferry or charter boats, the lessons to be learnt were equally applicable. Directly resulting from the failure of the administration of the WA Marine Act, 1982, to deliver safety improvement the administrators of the Western Australian Occupational Safety and Health Act, 1984, stepped in to investigate. In both examples the responsible marine authority was strongly criticised for its failure to develop and apply appropriate regulatory requirements. (Elkington 1992 & 1995)

The subsuming of responsibility for safety at sea away from the State Marine Authority by WorkSafe WA had begun. Through examination of Hilmer's (1993) National Competition Policy, the preceding is a classic demonstration of where the conflict of interests of a regulatory development body in enforcing that same regulation had lost sight of the original intended objective. This created an opportunity for the secondary intervention provided through WorkSafe WA. It is an unfortunate outcome that Ferry and Charter Vessels then became subjected to inspections from two legislative enforcement agencies with the later overriding approvals given by the former.

By the end of the 1990s individual safety procedure and practice manuals and operational safety management plans were appearing more systematically across the marine industry. The fishing sector had developed generic manuals for use within their subgroups. The recreational dive fraternity then followed with the development of a Code of Safe Practice to address the needs of this rapidly expanding activity. More and more areas were finding their responsibilities could not be met through reliance on the existing statutory enforcement regime.

An explosion of high-speed ferry and charter passenger operations occurred in WA during this same decade. In recognising the greater need for awareness of safety and environmental responsibilities and hence appropriate management strategies the Charter Passenger Vessel Advisory Committee (CPVAC), a Ministerial Advisory Committee for the industry formed a Subcommittee to pursue the development of a Code of Safe Working Practice for the industry. The Committee consisted of four industry representatives, Tony Baker, Richard Reid, Bill Edgar and Don Brown. Technical advice was provided by Stuart Hawthorn of WorkSafe WA with Eddie Watling giving representation on behalf of the tourism industry. Gavin Waugh provided drafting and administrative support through the Department for Planning and Infrastructure.

### Reasons to seek a Code of Practice rather than changes to legislation

Codes of Practice are the modern approach to safety. They provide flexibility to find new or improved ways of doing things. They allow people to use their own judgement relative to their own needs and situation. Codes of Practice are more suited to, and encourage, a safety culture within the workplace or industry. Timely recognition of technical advances and organisational efficiency improvements are easily accommodated within a Code of Practice as opposed to prescriptive legislation.

Ownership and management of each and every vessel comes with its own special needs and responsibilities. Only those persons actively managing or working a vessel will know or understand the intricacies of their own vessel. Codes of Practice recognise, and allow, this understanding to be a significant part of safety management. Government or other independent inspectors cannot provide this benefit.

#### **The objectives sought were;**

- To guide and encourage members of the Ferry and Charter Boat industry to 'self regulate' safety and health management with respect to their Duty of Care obligations.
- To encourage consistent application to safety in both occupational and customer areas.
- To assist with the addressing of safety issues/areas not specifically or efficiently covered by other legislated standards.
- To provide a basis upon which an industry professional accreditation program may be encouraged.

#### **The limitations were that;**

- The Code would refer to related legislation but could not show how to comply with legislation. Legislative compliance remains the interpretation of the enforcing agency.
- The Code would not in itself provide proof that legislative compliance requirements have been met;
- The Code would not remove or reduce any lawful duty to comply with requirements of legislation.

#### **The benefits were;**

The adoption of the recommendations of the Code;

- would assist the vessel operator/manager in attaining legislative compliance in a manner that most benefited their own operation;
- may provide support against common law claims;
- would recognise the diversity of user application;

#### **Legal status of Codes of Practice**

Codes of practice show there is a practicable means of reducing the risk of work-related injury or disease. They may not provide exact solutions to occupational safety and health problems in all workplaces in an industry, but following the practical guidance in a code of practice should help to reduce the legal uncertainties associated with the way that safe working environments are established and maintained. Where it is alleged that a person has contravened a provision of the Act or Regulations, the information in a code of practice may be used as evidence if the Minister has approved that code. The point of reference for approval of codes of practice is section 57 of the Occupational Safety and Health Act.

#### **The Ferry and Charter Boat Code of Practice**

For practical simplicity the Ferry and Charter Boat Code of Practice is separated into seven parts.

**Part 1 – Overview.** An overview and status of Codes of Practice.

**Part 2 – General.** Advice general to all persons and all vessels.

**Part 3 – Ferry Operations.** Advice specific to Ferry Operations.

**Part 4 – Function Cruises.** Advice specific to Function Boat Operations.

**Part 5 – Fishing Charter.** Advice specific to Fishing Charter Operations.

**Part 6 – Ecotourism / Diving.** Advice specific to Ecotourism or Diving Operations.

**Part 7 – Sailing Vessels.** Advice specific to Sailing Vessel Operations.

#### **Duty of Care, Responsibility & Due Diligence that the Code addresses**

Through "general duty of care" provisions discussed in the Western Australian Occupational Safety and

Health Act, all parties involved with work have responsibilities for safety and health at work. This includes employers, employees, self-employed persons and others, such as people who control workplaces, design, construct, manufacture or supply plant.

The duties under the Act are expressed in non-prescriptive terms, for example:

- an employer must, as far as practicable, provide a work environment in which employees are not exposed to hazards;
- employees must take reasonable care for their own safety and health, and that of others, at work; and
- self-employed persons must, as far as practicable, ensure the work does not adversely affect the safety and health of others.

Such wide ranging duties are called a "general duty of care" - reflecting that a "duty of care" is owed in law by one person to another (WorkSafe WA, 1998). Although the Western Australian Occupational Safety and Health Act deals with workplace and employment responsibility issues it is worth noting that the same Common Law responsibilities exist in relation to any person on or near the vessel.

#### **Operator and Crew Responsibilities**

The operator has primary responsibility to ensure that systems of work are in place which will provide a safe working environment. With respect to the safe and efficient management of a vessel, it's compliment of crew and passengers, preparations for departure or following arrival and the voyage being undertaken, each and all persons associated with that vessel have both a legal and moral obligation to promote the health and safety of themselves and all others. A person observing or noting a matter beyond their own authority has an

obligation to report that observation to a person in an appropriate higher position of authority, for action to be taken.

All crew members should be aware of the impact of activities such as second jobs, driving, recreational pursuits, insufficient sleep, consumption of alcohol or other drugs, prescribed or otherwise, and stressful situations on their well being and capacity to work effectively and safely. These activities may affect task competency. Further information related to the Duty of Care and the responsibilities of each person is included in Sections 19, 20, 21, and 22 of the Occupational Safety and Health Act of Western Australia, 1984. It is also included in specific regulations in Part 3 Divisions 1 to 6 and 8 of the Occupational Safety and Health Regulations of Western Australia, 1986.

#### **Conclusion**

This historical perspective has outlined the path through which the WA Ferry and Charter Boat industry came to develop a code of safe working practice. The administration of the WA Marine Act 1982 had demonstrably failed to provide the industry safety management outcomes originally intended. Eventually sufficient pressure was brought to bear to overcome that failure and turn the system back toward the path to successes. This occurred with pursuit of the Western Australian OSH Act, 1984 and with compliance to this legislation among participants in the marine industry during the 1990's. Through the Code of Practice for the Ferry and Charter Boat Industry described in this article it is easy to see that an approved, industry developed Code of Safe Working Practice is statements by a maturing industry that is looking to its members for a way to improve occupational safety and health.

#### **References**

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Robens, Lord. A. (Chairman). (1972). *Safety at Work: Report of the Committee 1970-72*. London, UK: HMSO.

Wallwork W.J. (1964). *Report of Royal Commission in relation to the safety of ships to which the Western Australian Marine Act, 1948-1962, applies and which proceed outside inland waters and those aboard them while at sea*. Perth, WA: WAGP

WorkSafe (1998). *Guidelines For The Development Of Industry Codes Of Practice For Approval Under The Occupational Safety And Health Act 1984*. Retrieved March, 2003 from. [www.safetyline.wa.gov.au/pagebin/pg004247.htm](http://www.safetyline.wa.gov.au/pagebin/pg004247.htm)

#### **Legislation**

*Western Australian Marine Act 1982*. (1982, 5 November) Perth, WA: WAGP

*Western Australian Marine Act 1982 Regulations*. (1983, 1 July) Perth, WA: WAGP

*Occupational Safety and Health Act 1984*. (WA, 1995, 16 November) Perth, WA: WAGP

*Occupational Safety and Health Regulations*

## Job Search:

**David L. Russell, CRSP, WSO-CSSD/CSE/CSM/CSS**  
31 Schreyer Crescent, Mt. Pearl, NF, Canada, A1N 3W2. Phone: (709) 745-4854  
Fax: (709) 745-4854. E-Mail: [drussell@roadrunner.nf.net](mailto:drussell@roadrunner.nf.net) Nationality: Canadian

David Russell is looking for work in occupational safety and health. David has been a Member of World Safety Organisation since 1985. He is at present the Safety, Health and Environment Manager for Pride International in Chad Africa. Previous to this he was the Senior Safety Health, Environment & Security Manager for Nabors Drilling International in Dhahran, Saudi Arabia.

### EMPLOYMENT HISTORY

#### **HSE Manager, for Pride Forasol in Chad, Africa**

**2002- Present**

The HSE Manager reports directly to the General or Base Manager. He is responsible for the coordination of all HSE-type activities of the group, including environment, and the implementation of the EMP Management Plan as agreed upon by the client. He is also responsible for the proper reporting, investigation and rectification of all HSE incidents. All HSE Group personnel report directly to him and each member of the group are appraised on an annual basis. The HSE Manager also ensures that the sub-contractors are aware of and adhere to company and client safety policies and procedures.

#### **Safety Advisor for Pride Forasol in Chad, Africa**

**Mar. 2002**

This is an advisory position to senior rig / company management as well as operator personnel. Responsibilities include ensuring both operator and contractor safety policies are adhered to with special emphasis on the permit-to-work system, job safety analysis and step back 5 x 5's. Incumbent supervises / participates in on site training for both expats and nationals as well as conducts safety meetings with all rig personnel and is a member of the accident investigation team.

#### **Senior Safety, Security & Environmental Manager Nabors Drilling International Ltd., Dhahran, KSA**

**Aug. 2000 – Mar. 2002**

The supervision and auditing of onshore rigs & offshore installations as well as directing training personnel is a primary responsibility of this position. Up grading safety policies & procedures as well as providing consulting services to senior management also absorbs a significant amount of time. Responsible for fourteen land based rigs as well as three offshore jack-ups. Supervises a staff of five eastern expatriate trainers, inspectors and field personnel.

#### **Rig Safety & Training Co-ordinator (RSTC) R&B Falcon Ltd. St. John's, NF**

**June 1998 – Aug. 2000**

Maintain the safety and training objectives of the company at rig level. This is accomplished through various means. For example, the performance of all on board safety orientation for arriving personnel; perform hazard identification during rig operations; and maintain training / OJT records for all personal on board. Safety consulting services to senior rig / company management, accident investigations, regulatory liaison, offshore survival training and orientations for new workers were additional responsibilities.

#### **Safety Specialist / Manager**

**Jan. 1996 – Apr. 1998**

#### **Saline Water Conversion Corporation Al-Jubail, KSA**

Responsible for the supervision and the direct work of the Safety Inspectors, Fire Captains, and the Safety and Fire Technicians. Also responsible for developing and implementing the necessary training programs for supervisors and workers. Responsible for accident investigations, maintaining employee files, crisis management and company representation at meetings / conferences.

#### **Industrial Occupational Health & Safety Officer**

**1987-1996**

#### **Offshore Occupational Health & Safety Officer**

**1983-1987**

#### **Department of Environment & Labour, St. John's, NF**

Responsible for performing technical inspections/audits and promoting awareness of health and safety issues in workplaces in Newfoundland and Labrador. These inspections and assessments were also conducted to ensure compliance with the Occupational Health & Safety Act and Regulations. As offshore O.H. & S. Officer, responsibilities also include inspections/audits of all onshore service companies.

#### **President**

**1983-1988**

#### **National Safety Consultants Co. Inc., Mt. Pearl, NF**

Work included working with the Occupational Health & Safety committees and union/company representatives to develop accident prevention programs and train safety professionals. Also held the role of a safety auditor. This position would monitor health and Safety committees, program components and emergency procedures for compliance to regulatory statutes. Responsibilities also include being a Safety Consultant to offshore service companies.

**NOTE: Detailed job descriptions are available for all positions upon request**

### **PROFESSIONAL AFFILIATIONS**

- World Safety Organization - Affiliate Member
- Safety Engineering Technology Advisory Council - Newfoundland and Labrador Marine Institute
- Toastmasters International
- Amateur Athletic Union of Canada - Canadian Member

### **SAFETY CERTIFICATIONS**

**Occupational Health and Safety Training:** Transportation of Dangerous Goods, Blasters Safety, Confined Space Entry, Occupational Health & Safety Committee Workshop, Total Loss Control

**Newfoundland Safety Council:** Crane Slings Seminar British Columbia Safety Council Supervisor's Safety Training National Safety Council, Supervising for Safety and Protecting Workers Lives

**Oilwell Drilling Courses:** International Association of Oilwell Drilling Contractors, Work-Over & Completion, Offshore Technology, The Rig and Its Management, Non routine Operations, Normal Drilling Operations, and Rotary Rig and Its Maintenance

**Canadian Association of Oilwell Drilling Contractors:** Work-Over and Completion, Offshore Technology, Non-Routine Operations, Normal Drilling Operations, and Rotary Rig and Its Maintenance

**Other Safety Courses:** Petro-Canada Resources, Management Safety and Total Loss Prevention Program; Ontario Industrial Accident Prevention Association, Management Guide to Loss Control; Maritime Blasting Services Limited, Blasting Inspectors Course; Aquarius Safety Training, Health and Safety Training and Systems Safety Training; Onsite Training Services, Access Tower Appreciation, Train the Trainer; TransOcean Sedco Forex, Slings and Banksman Course; TransOcean Sedco Forex, Forklift Operators Course; TransOcean Sedco Forex, Trainer Scaffold Erection; R & B Falcon, STOP program for Supervisors; R & B Falcon, Task Based Risk Assessment; R & B Falcon, Accident Investigation Training; Atlantic Safety Centre, Transportation of Dangerous Goods - Road; Atlantic Safety Centre, Transportation of Dangerous Goods - Marine; ISO 9001 - Quality Management System; Tap Root Accident / Incident Investigation Course; S.T.O.P. Safety Program

**Memorial University Of Newfoundland:** Asbestos Control in Buildings and Industry, Indoor Air Quality, Welding Health & Safety, Asbestos Abatement; Pinchin & Associates, Diving Technology for the Production Platform, and Sea-Ice Management Certificate

**College of the North Atlantic:** Flashback Arrester Welding Safety; First Step 2001 Safety Training

**College of Fisheries and Marine Navigation:** Basic Survival Training (BST), Petroleum Industry Training Service, Ballast control, Basic Offshore Survival Training (BOST), Marine Emergency Duties Certificate (MED) - HUET Trainin

**Westviking College:** Heavy Equipment inspection

**International Loss Control Institute:** Accredited Safety Auditor (A.S.A.) and Modern Safety Management

**Operating Engineers Institute of Ontario:** Crane Hazard Awareness Inspectors Course

**Total Loss Control Training Institute:** Total Loss Control

**Petroleum Institute Training Service:** First Line Supervisors Offshore Blow-Out Prevention and H<sub>2</sub>S Alert

**Petrel Training:** H<sub>2</sub>S Alert, Workplace Hazardous Materials Information Systems (WHMIS)

**Law Enforcement:** Royal Canadian Mounted Police, Advanced Law Enforcement Investigators Course; Royal Canadian Mounted Police & Royal Newfoundland Constabulary, Accident Investigation Techniques; Royal Newfoundland Constabulary, Advanced Statement Taking & Investigation Techniques; Department of Justice, Commissioner of Oaths in and for Newfoundland & Labrador, Fire Prevention & Investigation

**First Aid:** St. John Ambulance, Emergency First Aid; The Canadian Red Cross Society, Basic CPR; St. John Ambulance, Advanced Mariners First Aid Course

**Public Service Commission:** Business Skills, Interview Preparation, Report Writing, Effective Letters & Memos

**Karol Sapkaroski.**

7 Empen Way, Hillarys, Western Australia 6025  
 Work Telephone: (08) 9442-5276 [karols@ozemail.com.au](mailto:karols@ozemail.com.au)  
 Nationality: Australian.

Languages Spoken: Greek, Macedonian, Basic Croatian and Serbian, and English

**Career Objective:** To secure a position in the Human Resources industry, which offers new challenges and opportunities and utilises the experience, skills and knowledge of several years of increasing responsibility in the Risk Management and Occupational Health and Safety arena.

**Qualifications/Education:**

**2002:** Currently studying towards the Bachelor of Health Science Degree at E.C.U. (due to be completed November 2003)

<u>Subjects Completed</u>	<u>Results</u>		
Injury Prevention	Distinction	Risk Management	Pass
OSH Policy Development	Distinction	Management of Hazardous Substances	Pass
Epidemiology	Credit	Industrial Placement 2	Pass
Food Safety & water quality	Pass	Workplace Health & Safety Programs	Pass
Communicable disease control	Results available July	Ergonomics 2	Pass
Health and the Environment	Results available July	Resolution of OSH Issues	Pass
Applied Safety Science 2	Results available July	Negotiation Skills	Pass
Health Communication	Results Available July	Presenting reports	Pass
		Action Research Project	Pass
		Computer operations	Pass
		Computer operations-data retrieval	Pass

**2002: Diploma of Occupational Health and Safety**  
 (Balga Tafe, W.A.)

<u>Subjects Completed</u>	<u>Results</u>
Rehabilitation and Workers Compensation	Pass
Occupational Hygiene 3	Pass
OSH Management Systems	Pass

**2000: Workplace Safety Certificate 1V.**  
 (36 Week Part-Time Course - TAFE. N.S.W.)

**COURSES/TRAINING**

**Australian Institute of Management** 1999 - Instruction for Training of Small Groups  
**Paramedical Services** 1992 - Senior First Aid  
**T.A.F.E.** 1982 - Retail Management Course (Liverpool N.S.W.)

**Woolworth's**

2000 – Tools For Food Safety Program (N.S.W.)

1999 – Armed Hold-up Safety Training

1998 – Store Mgmt Traineeship (12 Month Intensive In-House Training – N.S.W.)

1996 – Rehabilitation Coordinator's Seminar (WorkCover – N.S.W.)

1996 – Interview Recruitment Selection & Induction

1995 – Counseling and Appraisal Workshop

1994 – O.H.S. Committee Workshop

**Work Experience:**

2003 **Swan Brewery, W.A.:** Develop Dangerous Goods Manifest. Review current emergency site plan. Update emergency site plan. Review all placarding on site. Update placarding according to Regulations 3.20 of the Explosives and dangerous goods (Dangerous Goods Handling and Storage) 1992.

2003 **West Australian Bible College, W.A.:** Develop and implement Safety Management plan according to ASNZ 4801. Develop all associated policies and procedures in conjunction with Bible College Staff. Identification of Hazards and set up of Hazard Identification and reporting procedures. Develop site OSH Manual Identify training needs, develop and deliver training to site staff. Develop training video for the Bible Colleges future training needs.

2002 **B & D Roller Doors, W.A.:** Develop Emergency Evacuation Procedures. Communicate to all Staff the procedures in place. Organise and supervise Emergency Evacuation drill. Assess effectiveness of procedures.

**Employment History:**

Current: **Occupational Safety and Health Officer,** Bakewell Foods Pty Ltd, Situated in Malaga, Bakewell Foods is self-insured.

3 Month Contract. **Job Function:** Liaise with department managers in regards to the provision of restricted duties for injured employees. Initiate and coordinate health promotion activities. Provide OSH advice to staff and management as required. Assist OSH Manager with managing all workers compensation claims. Assist in coordination and management of OSH data and reporting systems. Assist in the coordination of monthly safety audits and hazard identification in conjunction with safety representatives and managers on all OSH issues. Conduct safety inductions and design, prepare and deliver training programs as required and report on outcomes. Maintain and control all paperwork pertaining to OSH committee meetings. To follow up all directions and outcomes of the OSH committee where appropriate. To assist in investigations of accidents/ incidents as they occur and produce recommendations and action plans upon completion and monitoring of corrective actions.

1999-2001: **Occupational Health and Safety Adviser,** Woolworths Head Office N.S.W.

**Job Function:** Responsibility and Management of staff across 72 stores. Conducting Accident Investigations. Auditing Sourcing/Designing new equipment. Communicating with N.S.W. Work Cover Authority. Communicating with State Branch Services Division. (Re - requirements of stores/design of new equipment). Extensive Document Control. Organising Trauma Counselling. Reviewing Injury Statistics (monthly). Implementing new strategies – improve work methods

1996-1999: **Assistant Store Manager/Relief Store Manager,** Woolworths Supermarkets N.S.W.

**Job Function:** Responsibility and Management of approximately 300 staff. Liaise with Administration, Department and Store Managers. Monitor Expense Budgets, Worker's Compensation Claims and Public Liability Claims. Assist Dept Managers with weekly sales plans and budgets. Monitor training of staff regarding safe work practices. Monitor and enforce company policies and procedures. Oversee all ordering, displays and merchandising. Allocate and manage resources to fulfil target commitments. Assist all departments in achieving bottom line results.

1992 - 1996: **Administration Manager,** Woolworths Supermarkets N.S.W.

**Job Function:** Responsible for staff recruitment and induction. Manage all controllable expenses (including wage control). Manage all Workers' Compensation/Public Liability Claims. Implement return to work plans in conjunction with doctor's recommendations. Identify and use suitable tasks for injured employees on RTW plans. Oversee staff training to include O.H.S. training. Liaise with various authorities regarding employee claims. Interview staff at Centerlink (Re Apprenticeships). Interview staff for store openings. Hazard identification and elimination within the workplace. Ensure all company policies and procedures were followed.

## WSO Code of Ethics

Members of the WSO, by virtue of their acceptance of membership into the WSO, are bound to the following Code of Ethics regarding their activities associated with the WSO:

1. Members must be responsible for ethical and professional conduct in relationships with clients, employers, associates and public.
2. Members must be responsible for professional competence in performance of all their professional activities.
3. Members must be responsible for the protection of professional interest, reputation and good name of any deserving WSO member or member of other professional organization involved in safety or associated disciplines.
4. Members must be dedicated to professional development of new members in the safety profession and associated disciplines.
5. Members must be responsible for their complete sincerity in professional services in the world.
6. Members must be responsible for continuing improvement and development of professional competencies in safety and associated disciplines.
7. Members must be responsible for their professional efforts to support the WSO motto "Making Safety A Way Of Life...Worldwide".

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