WORLD SAFETY JOURNAL

ESP - Enhanced Safety Principles

ISSN 1015-5589
Vol. XI, No.1, 2003

- Occupational Health and Safety Policies
- Significance & Causes of Motor Vehicle Accidents
- Risk Control for Emergency Management Services
- Movement Safety: A strategic Approach for Breaking Through the Strains & Sprains Plateau
- A Retrospective Cohort Study of Workers' Compensation Indicators
- Globalization, Multiculturism, Culture & Professionalism
- Biochemical Terrorism

World Safety Organization in Malaysia
Seminar on Increasing the Level of Professionalism

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 issues upon completion of each course.
- Members receive special hotel rates when attending safety programs, conferences etc., sponsored by the WSO.

Issue Dates

March
June
September
December

CONTENTS

EDITORIAL

Successful safety publications as well as organizations do not just happen. Outstanding safety publications or organizations are made up of individually successful people who do the right things at the right time in the right circumstances. The managers of these safety publications or organizations are leaders who work with the members to create clear direction and vision, build effective teams, focus on member needs, and practice sound business management.

An organization's strategic vision defines what the publication wants to project and where it wants to go. An effective strategy guides the decisions that affect the direction of the publication. An organization's operating philosophy is on the opposite end of the same continuum; it defines how the organization is run. The organizers of the WSO safety publication have developed a plan. They understand the WSO's strategic vision and have incorporated that vision into their plans.

The ability to generate creative solutions is essential in business today, when an organization's survival and success may depend on how quickly it can respond to a changing world. Creativity involves not only coming up with original and innovative solutions, but also being resourceful by taking what is and making it better.

Creativity is a process that requires commitment and effort. By developing the ability to come up with 'new and improved' ideas, a safety publication can dramatically increase the value of the organization, helping to move it to a greater competitive position. By increasing the innovation within the publication, we will be able to improve the quality of the ideas/articles being published thus making our publication a step above the rest.

The first step was coming up with the new name of the safety publication. This was accomplished at our last conference in Las Vegas, Nevada USA. The new name of the publication is ESP - Enhanced Safety Principles. Our next step will be to find sponsors for the publication so we can get the safety publication printed professionally. The publication team is now working this issue. Do you know of any business that would like to have an advertisement within the document to help us in this endeavor? If you do please contact Debbie at the World Management Center at PO Box 518, Warrensburg Missouri 64093, (660) 747-3132 or wsowmc@socket.net.

Have a Safe Day,

Lon S. McDaniel
Chief Executive Officer
World Safety Organization

Editorial

By Dr. Janis Jansz
Journal Editor

Science is a systematic method of continuing investigation, based on observation, hypothesis testing, measurement, experimentation, and theory building, which leads to more adequate explanations of natural phenomena. Through research occupational safety and health is becoming a more scientific based profession, and maybe accidents are a natural phenomena as none of us are perfect.

The European Agency for Safety & Health at Work's Research Centre in May 2002 collected specific information about the latest trends in accident prevention that need to be implemented to deal with current work practices. This information was collected through literature searches (this is one reason why it is important to publish the results of your research), questionnaire results, politicians, participants and accident prevention expert presenters at conferences, seminars and workshops. A reason for improving accident prevention was that in the European Union "5,500 people per year loose their lives, and more than 75,000 people loose their working ability" through accidents at work (European Agency for Safety & Health at Work, 2002, p.9). Many of the fatalities were caused by falls. Surveys conducted by the European Union in 1991-2000 showed that the occurrence of manual handling injuries was increasing. Small businesses represent more than 80% of companies world wide (ISSA, 2002). Organisations with less than 50 employees had twice the rate of fatal accidents of larger organisations (Eurostat, 2000).

The main work related changes were identified by this European research as the uncertainty of employees having continuing employment. Companies downsizing or restructuring which increased the occurrence of bullying and occupational violence. Increasing mobility of employees which produced an increase in the risk of traffic accidents. Globalization of work. Privatisation of previously large public sector enterprises. Transformation of the economy to a service economy. Increased subcontracting which can create uncertainty about the responsibilities for safety. Changes in technology that can reduce old risks, but may increase new risks. Growth in the use of teleworking and home working. Changes in working hours, work pace and workload. More self employment, part-time jobs, employment of women and an increasingly aging workforce.

Successful accident prevention strategies recommended to improve occupational safety and health were legislation, labeling and certification of products and services to testify to their quality, safety and reliability. Management commitment to safety promotion. Continuous quality improvement. Risk management with everyone in the company encouraged to be involved in accident prevention activities. Integrating safety into the overall management strategy and networking to share good ideas within and between companies. To prevent accidents it was suggested that each company has good communication practices, focuses on discovering technological alternatives that are the safest options for work, markets safety, promotes a good safety culture with high safety ethics and has a safety policy starting with a mission statement that is realized through concrete initiatives, programs and actions. Safety education at schools and community awareness campaigns for better safety and health behavior at home, for leisure and sporting activities was deemed important to change the mentality of the entire population to acting safely and realizing that all accidents are preventable. Life long learning and a holistic approach that integrates safety, health, environment and quality into all aspects of work was considered important.

The changing world of work gives us many opportunities to improve occupational safety and health.

References.

European Agency for Safety & Health at Work. (2002). *New trends in accident prevention due to the changing world of work.* Luxembourg: Office for Official Publications of the European Communities.

Eurostat. (2000). *'Accidents at work in the EU in 1996', Statistics in focus,* Themes 3-4/2000. [on-line]. Available http://europa.eu.int [2003,January 15].

ISSA. (2002, Autumn). Every day life of small businesses. *ISSA Newsletter.2*, p.8.

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
Articles are referenced as follows:
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:// and the rest of the internet path address, [Access date]

Submissions should be sent to:

Editor: World Safety Journal
Dr. Janis Jansz
Edith Cowan University, 100 Joondalup Drive
Joondalup, 6027, Western Australia
Or Email to **j.mussett@ecu.edu.au**

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

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

ISSUE DEADLINES:

for the **March** issue we need your submissions by **31 January**

for the **June** issue we need your submissions by **30 April**

for the **September** issue we need your submissions by **31 July**

for the **December** we need your submissions by **31 October**

WSO Office's (International) and Directors

Australia:
Dr. Janis Jansz
Edith Cowan University, 100 Joondalup Drive,
Joondalup, 6027, Western Australia.
Phone: (618) 9400 5590. Fax: (618) 9400 5449
email: j.mussett@ecu.edu.au

Czech Republic:
Dr. Milos Palecek
c/o Occupational Safety Research Institute,
Jenuzalemska 9, 11652 Prague 1, Czech Republic
email: palecek@vubp-praha.cz

Ghana:
Mr. Kofi M. Amponsah
c/o Amponsah Architects, PO Box 93883
Accra, Ghana
email: amponsah@africaexpress.com

Lebanon:
Dr. Elias M. Choueiri
c/o Ministry of Transportation, PO Box 401
Hazmieh, Beirut Lebanon
email: e_choueiri@hotmail.com

Macedonia:
Mr. Milan Petkovski
c/o Macedonian Occupational Safety Association
11 Oktomvri 19 1/9, Skopje, 91000 Makedonija Europe
email: milanpet@hotmail.com

Malaysia:
Dr. James C. Fernando
c/o OSHALOG Fire Safety Consultant Services SDN
BHD, Lot 2331, Ground floor, Jalan Dato Muip, Piasau
Bulatan Commercial Center, 98000
Miri, Sarawak, East Malaysia
email: asafe@pd.jaring.my

Marianas Islands:
Mr. Marvin C. "Ike" Iseke
c/o Networld CNMI, Inc., Middle Road, H.K.
Pangelianan Bldg., Chalan Laulan, PO Box 7724 SVRB
Saipan MP 96950
email: Iseke2000@yahoo.com

Philippines:
Mr. Alfredo A. De La Rosa, Jr.
20/F, Trafalgar Plaza, H.V. De La Costa Street
Salcedo Village, Makati City, Metro Manila Philippines
email: info@wso.org.ph

Poland:
Prof. Danuta Koradecka, MD
c/o Central Institute for Labour Protection
Czerniakovska 16, 00-701 Warsaw, Poland
email: dakor@ciop.pl

Russia:
Prof. Dr. Edouard Petrossiants
c/o Research Center for Socio-Economic Studies of
OS&H, Obolenskiy per., 10 Moscow, Russia 119829 CIS
email: ohrantr@fednews.ru

Singapore:
Dr. M. Jeyaraj
c/o Dynamic security Pte Ltd, 151 Chin Swee Road
06-15 Manhattan House, Singapore 03116
email: dynamicz@singnet.com.sg

Slovakia:
Ing. Teodor Hatina
c/o Occupational Safety Research & Educational
Institute, Trnavska Cesta 57, 814 35 Bratislava,
Slovakia

Taiwan, Provence of the Peoples Republic of China:
Dr. Shuh Woei Yu
c/o Center for Industrial Safety & Health Technology
Industrial Technology Research Institute, 11F, Bldg 51
Sec 4 Chung Hsing Road, Chutnug,
Hsinchu, Taiwan 310
email: swyu@itri.org.tw

Ukraine:
Dr. Konstantin N. Tkachuk
Labour Safety State Committee of Ukraine, Sheveehenko
Blvd 8/26 252005, Kiev - 4 Ukraine

WSO 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, researchers, 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 Organizations 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.

Application For Membership

[ ]	Associate Membership	U.S. $ 55.00
[ ]	Affiliate Membership *)	U.S. $ 80.00
[ ]	Student membership	U.S. $ 35.00
[ ]	Institutional Membership**)	U.S. $185.00
[ ]	Corporate Membership**)	U.S. $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.

(Please print or type)

Name (Last, First, Middle): -Mr. - Ms. - Mrs.- Dr.
Position/Title:
Company Name and Address:
Mailing Address (Street, City, Zip, County, Postal Codes): Work or Home
Business Phone: Fax:
Home Phone: e-mail:
Professional Memberships, Designations, Licenses:
Education (Degree(s) held):

Please enclose your check, payable to the WSO, for your membership fee. Annual dues hereafter will be billed and payable on the anniversary date of your membership. (U.S. Funds only: International postal money orders or bank drafts with a U.S. Bank routing number on the bottom of the check are acceptable for outside U.S.A. members)

Form of payment (you may use a Master of Visa card):

VISA ( ) Master Card ( ) Check enclosed ( )

Card number: _____

Expiration Date: _____ Today's Date: _____

Signature: _____

Referred for membership by (List Name);

WSO Member: _____

WSO Chapter: _____

WSO Division/Committee: _____

Other: _____

---

*) For Affiliate Members Only:
Only FULL TIME PRACTITIONERS in the safety environmenta;/accident prevention and allied fields are eligible for the WSO Affiliate Membership. Describe briefly your present employment or enclose your CV / current resume.

_____

_____

_____

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.

( ) Occupational Safety & Health
( ) Environmental Health & Safety
( ) Safety/Loss Control Science
( ) Construction Safety
( ) Industrial Hygiene
( ) Product Safety
( ) Nuclear Safety
( ) Aviation Safety
( ) Product Safety
( ) Hazardous (Toxic) Materials Management
( ) Other _____
( ) Fire Safety/Science
( ) Security/Safety
( ) Public Health/Safety
( ) Transportation Safety
( ) Safety Research
( ) Risk Management
( ) Petroleum
( ) Ergonomics

Please forward Application and check to:
World Safety Organization, World Management Center
106 West Young Avenue Suite G, PO Box 518
Warrensburg, MO, 64093, United States of America
wsowmc@socket.net
www.worldsafety.org

Welcome Address Of The 16th International Environmental Health & Safety Conference

Presented by: Dr. Vlado Senkovich. President/Director General of World Safety Organization

Welcome WSO members, guests, ladies and gentlemen, to our 27th annual WSO conference! Whether or not any conference is successful depends, to a large extent, on two factors:

- The basic concept behind the conference, and
- The conference's appeal to an audience

This year's conference attracted wide interest; as a matter of fact, so much so that we could not accommodate all prospective participants. I am confident that the program will be well received by all who participate. The fact that the international aspect of this conference will be stressed throughout the lecture series should set an important perspective for safety and health in our working environment.

Most employers throughout the developed world do everything possible to prevent injury and occupational illness in the workplace. Safety slogans and procedures are not pushed just because - but it is more and more important from the perspective of morals, ethics and (big yes) financial profitability. Occupational and health safety is, in my eyes and, indeed, in the view of most of my colleagues here in this audience and around the world, not only a social/political necessity, but also an integral part of a sensible economic strategy. Health and safety at work, as a worldwide dimension, have indeed a firm place in all segments of world societies - regardless of governmental structures. Unfortunately, we cannot discuss the impact of all regulatory requirements here and abroad. We, in the U.S., do not have basic logistics problems like the safety professionals in the European Community.

As much as I know today, in the near future the European Union will be less concerned with harmonization and more concerned with establishing minimum safety and health requirements through the community. Firm establishment of these requirements is, in my opinion, an absolute necessity to prevent competition between the 15 European Union states, the rest of Europe, and the rest of the world to prevent distortion and out of control friction among the EU countries.

I think our biggest problem in the U.S. is our accelerating "victim mentality." Nobody in our society is responsible for themselves or anybody else. I believe persons in the U.S. should step back and start to accept responsibility for our own lives, safety, environment and actions. There is a lot of truth in the old proverb: "When you are pointing a finger at someone else, three fingers are pointing back at you." Let's leave us, the U.S., for a second.

Whatever the Europeans are doing (or not doing!), we must have our fingers on their pulse. We have to know exactly what is necessary in order to sell our products to European markets. If you have ever tried to unravel all the treaties, proposals, regulations, directives, recommendations, opinions - do you want more? - you know how difficult this can be. Let me give you a quick run down on these terms:

Regulation -	Comparable to a law and binding
Directives -	Binding and link between different states and guidance for the national policies
Decisions -	Binding for government, and employer or a private individual
Recommendations -	Suggestions to adopt a behavior and binding
Opinions -	Expressions of one of the institutions and not binding

The EU system is cumbersome and, surely, heaven for the legal people. For example, little Slovenia is not yet a member state of the EU, but already it has more than 65 legal people in different committees, subcommittees, etc. Basically, for a normal person it is almost impossible to unravel who actually decides what, when, why and how anything is decided in Brussels. Once the other would-be members, like Slovenia, Poland, Czech Republic, etc., join the club, the situation will be even more confusing.

Do we have to be concerned with the European situation or with a developing China and India? You better believe it! Globalization is not only marching into all parts of our society and economy, but it is already in the running stage.

Unfortunately, we in the U.S. (I am speaking now not as the President of the WSO, but as a Corporate Director of a large international company) are also running into more and more over-regulation. What we need in the U.S. is fewer regulations bringing everything into line with each other and more regulations laying down the minimum standards to be observed. Standards which can be interpreted on an equal level between a regulating inspector and an average safety manager. That should be the only sensible way to achieve great safety and also greater security at work. Safety means freedom from harm. It is achieved by doing things right the first time and every time.

We have:

- Industrial hygienists
- Certified safety professionals
- Ergonomic experts
- Industrial psychologists
- Drug/alcohol abuse programs
- Safety programs

AND YET, PEOPLE GET HURT!

I think this happens because people believe injuries are a way of life. If we are of the school, "accidents will happen," accidents will and *do* happen.

Now is the time to add a new dimension to our safety program - the vision of a work place in which not one single person gets hurt. Impossible? Not really! But this takes a heck of a lot of passion, dedication, belief and support that we are capable of generating. Lots of people will tell you that it can't be done, that it is an impossible goal. But goals are very often reached. The goal that you set, you should work toward. So what is your vision for safety in your facility? Safety for yourself, safety for people who work with you and for you?

<u>Your vision has the power to influence others more than you might imagine.</u>

Remember the Wright Brothers, or Otto Lilienthal and their small fledgling planes? Their vision brought and sparked the imagination of others, like a building block, new ideas of travel, rockets, and space exploration. From the visions of Montegolfier, the Wright Brothers, Otto Lilienthal, Warner von Braun and countless other visionaries, an entirely new world was discovered.

I have a friend in the Navy who says, "Safety is not for sissies!" It takes guts and courage to go

against the grain, to share your vision, to risk ridicule and have others try to convince you that your vision is impossible. You will have to defend you position. You will work with, or for, people who don't care about safety, who are angry about safety regulations. Make plans, enlist support, call in the experts, change things ergonomically, set new standards, do audits, job safety analysis and engineer out hazards.

The most important aim of this conference is to bring you professionals for occupational safety and health from all over together for lectures, discussions and an informal exchange of ideas and practices at a very high professional - or if it works - simple level. The amount of preparation required in the year leading up to this conference and, indeed during the meeting, is quite immense. I would like to thank you, all the members of WSO, whose dedication we can thank for this conference.

As the technology of the 21st century is developing and is working on goods and services, at the same time it is also changing the nature of industry and manufacturing. Online communications are developing and there are tremendous innovations in robotics and automation: not only equipment and machines, but also people. In my company you don't see any white collars working with computers on the production floor - just blue collars. This should tell you that a new industrial revolution is not new any more.

Classical production injuries (I am excluding farming, fishing and the construction industry) - mechanical injuries like amputations, cuts, bruises, etc., are slowly but surely being replaced by psychological and sensory problems and stress situations. Just look at what is happening in your companies. Managers with some degree of psychological knowledge are taking over the reins of companies. Our sacred duty as safety, health and environmental professionals must be in the forefront of these technological changes. We are not only forced to follow, but it is our duty to follow all the latest technologies in the world of not only health and safety, but also ways to manage people.

Your duty and your goal must be to sit in on and have a big voice at all top management meetings. You must be an active member of the top management team. Times when we could be just safety managers, safety coordinators, etc., are disappearing very rapidly. World manufacturing globalization, free trade, rapid movement of the workforce and capitals are forcing us into a permanent state of education, (for example through OSHA, CAL-OSHA, EPA, ZAVOD ZA VARSTVO, DEUTCHE VERSICHERUNG BAND, etc.). We need to learn about new/changed rules, and what is new in the world of computers, management, history, politics and work psychology. Actually, the list is endless.

Without permanent and constant education and reading across national boundaries, we, as professionals, will not only stagnate, but we will have a more and more difficult time doing our job. Talk to people, go back to school, attend classes and educational seminars, be in touch every hour and every day, but above all, you must have vision. Have the best, most idealistic, daring vision for safety, health and environment that you can possibly imagine. Don't forget, where there is no vision, people suffer the consequences.

Book Review: FIRE HAZARDS IN INDUSTRY

By Norman Thomson

Chapters in this book start with one or more case studies relevant to the fire safety matters discussed in the chapter. In a practical way this brings home to the reader the importance of the information described.

The first chapter discusses the Fire Precautions Act 1971 and other fire safety legislation that is relevant to people that live in the United Kingdom. Best practice information from the British Health and Safety Executive is used as a basis for much of the information provided in this book.

The author describes how to conduct a fire risk assessment for high-risk, medium-risk and low-risk premises using a ten-stage fire prevention plan. A comprehensive fire risk assessment checklist that can be used in any industry to assess the presence of fire risks follows this. The author, to show how to use this checklist effectively, uses a practical case example. The book also contains scientific information about combustion, flammability, explosions and control measures to use to prevent flammable or explosive materials from causing fires. Common causes of workplace fires and how to control or eliminate these are explained.

If a fire does occur the author discusses how to manage the outbreak of fire so that it causes minimal damage and is extinguished quickly. Also described are the consequences of not doing this. The importance of human factors and how to successfully management people so that they are able to escape a fire if one does occur is outlined.

Conducting a risk assessment is not the only way described in this book to prevent fires. The author states that "50% of fires in industrial, commercial and public premises are due to arson attacks." The book provides information on how to identify if a fire was caused by arson, how to prevent arson occurring in home, business and leisure facilities and how to survive an arson attack so that the business does not go bankrupt following arson.

This succinct well written book is an easy to read practical hand book for Safety Professionals to use to improve fire prevention and hazard control strategies used for community, home and industrial premises.

The reviewer, Dr. Janis Jansz, is a Lecturer in Occupational Safety and Health at Edith Cowan University.

Proceedings Of WSO Global Safety Roundtable 2002

Edited by Dr. Peter A. Leggat, FAFPHM, FACTM, FFTM, FACRRM, FSIA, FAICD, MRACMA, MACE, WSO-CSE/CSM/CSS/CSSD, Associate Professor, School of Public Health and Tropical Medicine, James Cook University, Townsville, Queensland, Australia

Abstract: Since the Inaugural Roundtable in 1995, the World Safety Organization (WSO) Global Safety Roundtable has become an annual event and an international safety "Think Tank", drawing on international representation from the WSO's annual educational meetings. The WSO Global Safety Roundtable 2002 was convened on the 16th of September 2002 to assist the WSO in the formulation of specific proposals and resolutions for the United Nations (UN) and its agencies. It was convened during the WSO 16th International Environmental Health and Safety Conference and Expo, Riviera Hotel and Casino, Las Vegas, Nevada, United States of America. It builds on the resolutions presented at the previous Global Safety Roundtables. The major issues arising from the "Think Tank" discussion included: promotion of safety professionals in different countries, including encouragement to write up their programs and activities in the *World Safety Journal*, UN and other sources of funding, the Child Labor Initiative, International Standards Organisations/International Labor Organisations collaboration, WSO Safety Resources Library in Australia, the appointment of WSO UN Liaison Officers needs review and follow-up; and the upgrading of WSO's Consultative Status with the UN.

(Photo courtesy of JCU Outlook 1999)

Introduction:

The World Safety Organization (WSO) Global Safety Roundtable 2002 was convened on the 16th of September 2002 to assist the WSO in the formulation of specific proposals and resolutions for the United Nations (UN) and its agencies. It was convened during the WSO 16th International Environmental Health and Safety Conference and Expo, Riviera Hotel and Casino, Las Vegas, Nevada, United States of America. It builds on the resolutions presented at the previous WSO Global Safety Roundtables for which proceedings have been published for Roundtables I-IV (Leggat, 1995; 1996, 1997; 1998; WSO, 1998). Present (per sign-in Registers): Mr. Lon McDaniel (Chair and CEO, WSO), Dr. Janis Jansz, Dr. Elias Choueiri, Mr. J. Peter Cunliffe, Mr. Timothy Wells, Mr. Tim L. Wulf, Mr. Ed. Hogue, Dr. Vlado Senkovich (President/Director-General, WSO), Mr. Ken Davis, Mr. Safety Herb Everett, Mr. Gordon E. Cordes. Dr. Peter A. Leggat (Editor). There were also a number of additional observers, who did not complete the "sign in" sheet.

Background

On the 26th of September 1995, Dr Rashmi Mayur, Director of the International Institute for Sustainable Future, based in Bombay, addressed the delegates of the WSO 6th World Safety and Accident Prevention Congress in Memphis, Tennessee, USA, at the first WSO Global Safety Roundtable. The proceedings of this Roundtable have been published elsewhere (Leggat, 1995). The challenge was laid down for safety professionals to address the major issues in safety throughout the World. In addition to developing specific proposals and resolutions for the United Nations, it was proposed that a "Think Tank" forum be formed to brainstorm and develop 21st Century plans for the major United Nations agencies addressing all safety problems, whether in the factory, the home or the environment. Dr. Mayur promoted a book entitled, *The Earth First Reader: Ten Years of Radical Environmentalism* (Davis, 1995), and presented a copy of this to the WSO. Dr. Mayur has written a preface to this new Indian Edition/reprint.

The WSO Global Safety Roundtable became an annual event drawing on international representation from the WSO's annual educational meetings to provide the basis for this "Think Tank". In 1996, the participants of WSO Global Safety Roundtable II presented several proposed resolutions targeting five (5) key areas. These areas were:

- road safety,
- international project funding,
- child safety,
- global emergency response, and
- continuance of the global "Think Tank", as part of the work of this WSO Global Safety Roundtable (Leggat, 1996).

Subsequent WSO Global Safety Roundtables presented proposed resolutions focusing on areas such as environmental compliance and development of international safety standards (Mussett, 1998). It further proceeded to look at avenues to help the WSO interface with the UN and its agencies in order to develop an international awareness of these issues (Mussett, 1999).

Context of the WSO Global Safety Roundtable 2002

WSO Global Safety Roundtable 2002, or Global Safety Roundtable VIII, was scheduled on the afternoon of the 16th of September 2002 during the opening days of the WSO 16th International Environmental Health and Safety Conference and Expo, Riviera Hotel and Casino, Las Vegas, Nevada, USA. This ensured a high profile for the Roundtable without interfering with the educational programs conducted during the Conference. It has become an integral part of the annual meeting of the WSO. During the Roundtable 2002, 11 registered participants and many more observers, coming from a number of countries around the world, met for approximately half an hour (16:30-17:00 hours). The documented registered attendance has been given above. A variety of disciplines were represented including environmental safety, occupational safety, healthcare safety, ergonomics, workers' compensation, medical science, transportation safety, and safety engineering.

Discussion

The WSO Global Safety Roundtable 2002 commenced with an overview of the previous Roundtables and articulating the general purpose of these Roundtables. Clarification was sought on the functions of the Roundtable from the WSO President/Director General, Dr. Vlado Senkovich, which were proposed from WSO Global Safety Roundtable I. One of the issues identified in WSO Global Safety Roundtable III was how the WSO could implement the programs and resolutions of the Roundtable, as approved by the Board of Directors, particularly through the UN and its agencies (Leggat, 1997). It was noted that there were several proposed programs proposed which needed follow-up by the Board, including:

- UN and other Funding (UN Representative),
- Child Labor Initiative (Mr. Peterson),
- International Standards Organisations/ International Labor Organisations collaboration (Dr. Yu),
- WSO Safety Resources Library in Australia (Dr. Jansz),
- The appointment of WSO Liaison Officers to the UN needs review and follow-up (WSO Board of Directors); and
- Upgrading of WSO's Consultative Status with the UN (Dr. Seiden and Mr. McDaniel).

The participation of various WSO members in the recent Mexico earthquake, Chernobyl, the New York World Trade Centre terrorist attacks

(on 11 September 2001), and other global disasters was also briefly reviewed. It was suggested that the participants in these and other projects and activities in their countries might consider writing up their experiences for publication in the *World Safety Journal*.

At WSO Global Safety Roundtable IV (Leggat, 1998), Dr. Matt Seiden was invited to present an overview of how the WSO can interact with the UN through its Consultative Status to the UN Economic and Social Council (ECOSOC) and through other agencies. Dr. Seiden explained that the WSO had applied for upgrading of its Consultative Status from Category II to I. UN ECOSOC functions through various structures, including regional offices, with which the WSO has appointed a number of WSO Liaison Officers, and also a yearly calender of meetings in different parts of the World. Other tools such as the use of the internet were also briefly discussed. The major issues arising from the "Think Tank" discussion included international safety standards, child safety, and global ethics. The question of funding of any projects was also raised, which would obviously impact on the scale of any worldwide safety program or initiative.

Also, during WSO Global Safety Roundtable IV (Leggat, 1998), other basic themes, which emerged, included both long-range programs involving the building of solidarity amongst and focusing world resources on specific safety needs for G-77 emerging nations and intermediate range programs. Intermediate range programs included working on some relatively short-term projects defined and approved by the WSO. Suggested projects focused on children's safety, e.g. water quality and education programs for schools, as well as educational programs for workplaces. Several Committees were suggested to help accomplish such tasks. Other topics discussed were wide-ranging but covered areas such as publicity, advocacy and education. The development of WSO International Offices and the WSO World Institute for Safety Education and Research were also suggested as possible vehicles for implementation of programs.

One of the issues raised at WSO Global Safety Roundtable 2002 by Dr. Senkovich was the need to promote safety professionals in different countries. There was a need for WSO promotion also at upcoming conferences and there was an indication from several Roundtable 2002 participants that they would be attending upcoming meeting in Europe (Germany) and Lebanon and would be promoting the activities of the WSO. Also discussed, it was suggested that the WSO should particularly focus on environmental and occupational safety and health in the future. In the past, the WSO has been concerned with the spectrum of safety activities, including areas such as transportation safety, child safety and other distinct safety areas. Longer range planning (4 to 5 years) was suggested as a means for developing strategic plans and materials for presentation to the UN.

Assisting the WSO Global Safety Roundtable

The WSO Global Safety Roundtable has become a regular feature of WSO regional and international conferences. It is hoped that all interested WSO members can continue to support the work of the WSO Global Safety Roundtable throughout the year, including the development of proposals for consideration at subsequent Roundtable discussions. WSO Members and other interested professionals should consider participating at WSO Global Safety Roundtable 2003. WSO Members and other interested professionals who may be able to assist with the development and implementation of these proposals or resolutions or who wish to assist with the work of the WSO Global Safety Roundtable or its work with the UN should contact the WSO World Management Center:

WSO World Management Center
106 W Young Avenue Suite G, PO Box 518
Warrensburg Missouri 64093 USA
Tel. (660) 747 3132 Fax. (660) 747 2647
Visit: http://www.worldsafety.org
email: wsowmc@socket.net

Acknowledgments

The attendance and contributions of all the registered participants and observers at the WSO Global Safety Roundtable 2002 were greatly appreciated.

References

Davis, J. (1995) *The Earth First Reader: Ten Years of Radical Environmentalism*. Indian Edition Reprint. Salt Lake City: Peregrine Smith Books and published in India by the International Institute for Sustainable Future. 272.

Leggat, P.. (Ed) (1995) Proceedings of a Global Safety Roundtable. *WSO Tech-Letter*. October: 1-4.

Leggat, P. (Ed) (1996) Proceedings of a Global Safety Roundtable. *WSO News-Letter*. September-October: 3.

Leggat, P. (Ed) (1997) Proceedings of the WSO Global Safety Roundtable III. *WSO News-Letter*. November/December: 2-3.

Leggat, P. (Ed) (1998). Proceedings of WSO Global Safety Roundtable IV. *WSO Tech-Letter*. November: 1-3.

Mussett, J. (1998). The 12th World Safety & Accident Prevention Educational Conference. *Australian National Safety Journal*. *6*(2), 16-18.

Mussett, J. (1999). The 13th World Safety Accident Prevention Educational Conference. *Australian National Safety Journal*. *7*(2), 14-16.

World Safety Organization. (1998) *Proceedings of Global Safety Roundtable I, Global Safety Roundtable II, and Global Safety Roundtable III*. Warrensburg: WSO World Management Center.

Occupational Health & Safety Policies

Ms. Karol Sapkaroski.

ABSTRACT: The development and implementation of a health and safety policy is a fundamental step towards the development of a Safety Management Plan. It forms the basis for an occupational safety and health program. The policy is a statement of the principles that an organisation upholds. This article covers what an occupational safety and health policy is, the purpose of the policy and the benefits of having a policy.

Introduction

An occupational safety and health policy is a statement of management's commitment to achieving high standards of safety. This commitment can be represented in different ways. It could include such things as commitments to comply with work related safety legislation, consultation with employees regarding the management of safety within the organisation, the provision of adequate resources for implementation of the policy and a vision to continuously improve safety and health performance.

The commitment to work towards continuous improvement of safety and health performance could be achieved by acting upon feedback from performance measurements and audits. Consultation with employees regarding safety management is imperative and can be achieved by establishing a Safety and Health Committee and electing Safety and Health Representatives.

Regardless of the specific content, the policy should accurately reflect the intentions of the most senior people in an organisation, should identify a genuine attempt to communicate the safety outcomes expected by management and outline some of the broad strategies that will be used to achieve those outcomes. Importantly, a policy is a means of communication between management, employees and customers of the organisation. It should therefore be presented in a format that is easily read and understood by these people.

What is an occupational health and safety policy?

> A health and safety policy forms the basis for an OHS program and is a statement of a principle that an organisation upholds. In order to be effective, it would need to demonstrate a clear direction from management and include the entire organisation. It will be the basis for any occupational health and safety decisions and action. It is also important to note that the policy needs to be reviewed and updated regularly. (Six steps to Occupational Health and Safety. 2002, p.1)

The safety policy is the foundation upon which successful safety plans are built. By stating the objectives and providing a framework for achieving the objectives, everyone in the organisation can feel assured that there is a commitment to health and safety. This is also supported by the fact that the policy will outline the roles and responsibilities of managers, supervisors and employees in the implementation of the policy. It is important to note that the policy needs to be supported by plans and procedures relating to more specific safety issues such as manual handling, chemical safety, etc. The procedures provide more specific detailed information that allows the requirements of the policy to be actioned. (DOHSWA, 1994.).

The essentials to the formation of an effective occupational safety and health policy are:

- A commitment from Senior Management to use all practicable means to minimise ill-health and injury in the workplace
- An outline of the means to achieve the occupational safety and health objectives
- A commitment to consult with employees on occupational safety and health
- The policy itself should be arrived at by consultation
- A commitment to keep occupational safety and health under constant review as part of continuous improvement.

In order to achieve this:

- The policy must be clear
- Written in easy to understand language
- Have an aim
- Define key terms
- Define key principles
- Allocate responsibilities
- Be regularly revised
- Staff must know the policy and understand it
- There must be regular review to ensure that the policy is working. (Jansz, 2002).

An example of the structure of a health and safety policy is as follows:

Health and Safety Policy

- A statement of commitment from Senior Management to use all practicable means to minimise ill-health and injury in the workplace
- A statement that the employer understands and accepts responsibilities set out in occupational safety and health laws
- The occupational safety and health objectives for the organisations
- Defined responsibilities
- An outline of how the occupational safety and health objectives will be achieved
- Defined key principles
- A statement of commitment to consult with employees on occupational safety and health
- What consultative process was used to develop the policy
- A statement of the commitment to keep occupational safety and health under constant review as part of continuous improvement
- Be clear and written in easy to understand language.

The policy may also contain short statements on smoking, training, rehabilitation, chemical safety, health surveillance, noise, manual handling, eye safety, PPE etc. It should include the employer's signature, the date of issue and the date for review.

The purpose of a safety and health policy

There are three main purposes to a safety and health policy. Firstly, for moral reasons, an organisation may have a mission to provide as safe a workplace as possible for their employees in order to reduce the rate of injuries and death.

Secondly, by demonstrating a commitment to safety, an organisation can improve morale amongst their workforce and therefore improve production. By implementing effective health and safety policies an organisations can set a clear direction to follow. Health and safety policies can contribute to all aspects of business performance by demonstrating a commitment to continuous improvement, by having an effective management structure and by having effective arrangements in place for delivering the policy. Staff should then be motivated and empowered to work safely in order to protect their long term health and not simply to avoid accidents. The arrangements should be underpinned by staff participation and involvement and sustained by effective communication. The policy should be implemented by a planned and systematic approach through the health and safety management system. (H.S.E; 2000)

Thirdly, an organisation can comply with legislative requirements. "An employer shall, so far as practicable, provide and maintain a

working environment in which his employees are not exposed to hazards" (OSH Act of WA 1984, s 19).

Indicator 1.5. Of the Worksafe Plan of Western Australia (1999) states:

> To achieve a satisfactory rating for this indicator, there should be an occupational safety and health policy that is finalized and endorsed by the "employer". In situations where the "employer" is more than one person, such as with a body corporate, one person would sign as a representative of the group. "Up-to-date" means that it has been reviewed in the last 12 months and re-endorsed. As a minimum, the policy should contain:

- a statement regarding the organisations's commitment to high standards of occupational safety and health;
- a statement that the employer understands and accepts responsibilities set out in occupational safety and health laws
- the occupational safety and health objectives for the organisations;
- the employer's signature; and
- the date of issue or re-endorsement.

Australian Standards can also be referred to in order to define what should be included in an occupational safety and health policy. AS1470-1986 (1986) states that a policy should be developed ensuring that all levels of management and supervisors are aware of and understand their responsibilities in regards to safety in the workplace.

This Australian Standard covers all the points above with the inclusion of the following.
Each policy shall be developed in consultation with employees and their representatives and shall-

a) be publicly displayed and promulgated to all concerned
b) direct management in its involvement in occupational health and safety programs and identify those managers with prime responsibility for safety and health
c) seek the cooperation of all employees to achieve the aims of the policy. (Standards Australia, 1986)

Benefits of an occupational safety and health policy

The development and implementation of an OHS policy should not be perceived as an added cost. If effectively integrated into an organisations processes the policy will not become an extra cost, but rather will become another everyday process that will play a part in assisting in continued progress for the organisations. Although the policy alone will not prevent accidents it will assist in prevention through specific plans and procedures. To this effect, the plans and procedures need to be realistic, flexible and continually reviewed and improved. (DOHSWA; 1994)

Therefore, it can be concluded that by implementing an effective policy, plans and procedures, an organisations can benefit in the following areas:

- Reduction in injuries
- Reduced workers compensation premiums and associated costs
- Reduction in days lost
- Improved morale and safety culture
- Improved company image
- Improvements and increase in production/ output
- Compliance with legislative requirements.

The benefits to employees would be:

- Less injuries
- Reduction in time lost from work due to injury
- Improved morale and safety culture
- Safer work environment
- Less staff turnover as employees would prefer to work for a safe organisations.

The development and implementation of successful health and safety policies, combined with the government provision of guidelines, laws, regulations and codes of practice have resulted in successful safety management across whole industries. David Grantham, (1992, p.2) states that policies and procedures should be implemented in an effort to prevent illness within a workplace. In some cases this "may involve a complete overhaul of attitudes towards work with hazardous materials or hazardous environments. This must involve education of both the worker and the employer." He also states that there " have been some spectacular successes (eg. in the coal mining industry)" (Grantham, 1992, p2).

Responsibilities

In order for a safety policy to be successful, responsibilities need to be clearly outlined. This can be done through the policy itself, safety meetings and job descriptions. Responsibilities can be also used as performance indicators.

The Company General Manager is also required to actively pursue the goals set out in the Health and Safety Policy through the following approaches:

- devising and administering a comprehensive safety and health program
- providing enough resources (human and material) for successful safety and health management
- holding regular senior staff and supervisors meetings to discuss health and safety performances
- taking effective action to provide and maintain safe and healthy working conditions for all employees and to
- ensure regular audits and inspections are conducted in all areas and improvements made where practicable.

Conclusion

The development and implementation of an occupational health and safety policy, if effectively integrated into all organisations processes, will become another everyday activity that will play a part in assisting in continued progress forward for the organisations. The policy alone will not prevent accidents but it will assist in prevention through providing specific guidelines. Therefore, it can be concluded that by implementing an effective policy, plans and procedures in an organisations can benefit by providing a safer work environment, reducing injuries, reducing workers compensation premiums and associated costs, reducing work days lost, improving morale and safety culture, improving company image, providing improvements and increases in production/ output and compliance with legislative requirements.

References

David Grantham, (1992). *Occupational health & hygiene. Guidebook for the WHSO,* Moorooka, Queensland: Merino Lithographics.

DOHSWA, (1994). *Jobsafe Plan Manual*, Perth, W.A. Australian Government Printers.
Health and Safety Executive, (2000). *Successful Health and Safety Management.* Norwich, England: Author.

Jansz, J. (2002). *Safety Policy* [handout] (Available from Edith Cowan University, Joondalup Drive, Joondalup, Western Australia).

Six steps to Occupational Health and Safety. (2001, April 26). [online]. Available www.rmmanagement.com.au/Occ Health Safety.htm <http://www.rmmanagement. com.au/Occ Health Safety.htm>. [2002, April 26].

Standards Australia. (1986) *Health and safety at work: Principles and practices. (2nd ed).* Sydney N.S.W: Author.

Worksafe Western Australia. (1999).*The Workplace Plan of Western Australia,* Perth, Western Australia: Author.

Significance & Causes Of Motor Vehicle Crashes

Ms. Fiona Hanrahan. *Fiona Hanrahan is an Environmental Engineer currently completing a Masters in Occupational Health and Safety at Edith Cowan University. For the past eight years, Fiona has worked in Health, Safety and Environmental Departments of major oil & gas companies and is currently working in California, USA. This paper is the first in a series of three papers researched to assist her company in implementing a motor vehicle safety program throughout its worldwide operations.*

ABSTRACT: Long term analysis of motor vehicle crashes (MVCs) has identified common causes. The severity and rate of MVCs have decreased across the developed world through road and vehicle improvements, law enforcement and education initiatives. However, MVCs continue to be a significant cause of death and serious injury with increasing prevalence in developing countries. MVCs are estimated to result in 1.17 million deaths and over 10 million crippled or seriously injured every year (World Bank, 1999). The main MVC causes are recognized as speed, drink driving, driving while fatigued, and distractions. Trends also indicate higher accident rates of greater severity for country two lane undivided roads and for individuals with a prior accident driving history. Control of speed, distractions, fatigue and drunk driving are the most significant MVC prevention techniques. Similarly the use of seat belts is the single most significant technique to minimize MVC injuries.

Introduction

Motor vehicle crashes are a significant cause of death and serious injury throughout the world. The recognized major MVC causal factors include speed, drunk driving, driving while fatigued, and distractions. This report validates and summarizes the main MVC causes and trends as well as their relative significance. Results referenced in this report were predominantly compiled from research data from the US, UK, Australia and Europe. The writer acknowledges that different countries may have variant motor vehicle risks than those detailed from this report. As illustrated in Appendix A, the death rates and respective injury rates for motor vehicles vary internationally.

Significance of Motor Vehicle Crashes (MVCs)

The World Bank (1999) estimates that MVCs resulted in 1.17 million deaths and 10 million people being seriously injured each year. They are a particularly significant hazard in the workplace around the world. In the US in 2000, MVCs accounted for 43.5% of all workplace deaths (US Department of Labor, 2002) and in Australia, between 1999 and 2000, MVCs accounted for 23% of occupational fatalities (National Occupational Health & Safety Commission, 2002). These rates exclude fatalities incurred by workers driving to and from work.

Not only are MVCs a significance cause of death, MVCs account for an even larger number of injuries. In the US in 2000, almost 42,000 people were killed and 3.2 million people injured in over 6.39 million accidents (NHTSA, 2000a). This amounts to a fatality rate of 1.6 and injury rate of 116 per 100 million vehicle miles. Of those killed 87% were vehicle occupants, the remaining were non occupants including pedestrians and cyclists (NHTSA, 2000a).

Continual vehicle and road safety improvements, have reduced the US MVC death rate per hundred million miles traveled from 5.6 in 1970 to 1.6 in 2000 (US Transport Research Board, 2001a). Similarly, in Australia the MVC fatality rate has declined from 8 fatalities per 10,000 vehicles in 1970 to 1.4 per 10,000 vehicles in 1999 (Australian Bureau of Statistics, 2001). These reductions, also reflected in other developed countries have been achieved through road and vehicle improvements, law enforcement and education initiatives.

Despite such improvements, MVC related fatalities are an increasingly significant cause of premature death, largely from an increase of MVCs in developing countries. The World Health Organization, Harvard School of Public Heath and the World Bank (1996) detailed that MVCs caused 2.5 % of all disability adjusted life years in 1990, with a projected rise cause to 5.1% in 2020, the third most significant cause of cause major injury and death.

Common MVC causal factors

The main MVC causes are recognized as speed, drink driving, driving while fatigued, and distractions (NHTSA, 2000a/b/c; Motor Accidents Authority 1999). Research results discussed in the following paragraphs identify trends relevant to these accident causal factors. It is important to note that many MVCs result from more than one causal or contributing factor.

Speed

In the US, speed was a contributing factor in 29% of all fatal crashes, and a contributing factor in 38% of motorcyclist fatalities (NHTSA, 2000b). In Australia, statistics indicate speed was a causal factor in at least 38% of fatal crashes and 16% of all accidents in New South Wales, Australia in 1999 (Motor Accidents Authority, 1999). This is consistent with substantial research which links speed to both crash causality and to injury severity (Fildes & Lee, 1993; Zaal, 1994; Garber & Gadiraju 1989; all cited in Harrison, Fitzgerald, Pronk & Fildes 1998).

Alcohol

Drinking alcohol before driving, or being in the proximity to roads after consumption, increases the risk of causing motor vehicle crashes. The relative risk of accidents increases with alcohol consumption and the related increase in blood alcohol concentration (BAC). Alcohol was involved in 40% of fatal crashes and 8% of all crashes in the US in 2000 (NHTSA, 2000d). The risk of injury and fatality is not limited to drivers, as one third of all pedestrians 16 years or older killed in traffic crashes in 2000 were themselves intoxicated with a BAC >0.1% (NHTSA, 2000d).

Combined, alcohol and speed create an even higher risk of a MVC. In the US, in 2000, where speeding was a contributing factor in fatal crashes, alcohol was also involved with (NHTSA, 2000b):

- 30% of drivers with a BAC of 0.01-0.09%
- 40% of drivers were intoxicated (BAC>+0.10%)

Seat Belts

While not a MVC causal factor, when worn seat belts significantly reduce the fatality and severity rates for those involved in MVCs. It is estimated that 59% of passenger vehicle occupants killed in the US in 2000 were unrestrained (NHTSA, 2000a). Further, in 2000 of the 31,910 killed in passenger vehicles, 9,238 lives could have been saved if all passengers were wearing seat belts (NHTSA, 2000c). That accounts for 66% of vehicle occupant fatalities and 50% of all fatalities. Seat belts not only save lives, but reduce the severity of injuries for non fatal crashes. This fact is supported by statistics indicating that average inpatient costs for crash victims not wearing seat belts were 55% higher than those restrained (NHTSA, 2000c).

Location

Trends indicate that the highest risk areas for severe accidents are country/rural, two-lane undivided roads, with an increasing risk if roads are windy. This MVC trend is consistent for both single and multi vehicle crashes.

In the US, fatal crashes predominantly occurred on two lane roads, with 57% on undivided

roads, and another 18% on divided roads. Rural locations accounted for 58% of fatal crashes, while 72% of fatal crashes occurred in a general roadway and not in vicinity of a junction or traffic control device (National Center for Statistics and Analysis, 2002). The majority of fatal crashes on rural roads involved local rural residents (Blatt & Furman, 1998) indicating that familiarity with conditions is limited in preventing MVCs. Similar trends were seen in New South Wales, Australia during 1999, where country roads accounted for 32% of all accidents, but 62% of fatal accidents and 35% of injuries (Motor Accidents Authority, 1999). Research in the UK indicates that single vehicle accidents increased by 13% and 34% respectively for bends and sharp bends per kilometer (Taylor, Baruya & Kennedy, 2002).

Distraction & Fatigue

The significance of the role of distraction and fatigue varies, but it is a common and statistically significant factor in MVCs. Within the US, research indicates that the significance of fatigue and distraction varies from 25% (NHTSA; 1997) to an estimated 35-50% of MVCs (Sussman, Bishop & Walter, 1995; cited in Stutts, Reinfurt, Staplin & Rodgman, 2001). Irrespective of the accurate percentage, distraction and fatigue are significant primary causal and contributing factors to MVCs.

Distraction

It is estimated that driver inattention was a factor in 13.2% of MVCs (Wang *et al*, 1996; as cited in Stutts, Reinfurt, Staplin & Rodgman, 2001). This estimate is acknowledged to be low, as official statistics are prone to be underestimated, due to drivers' unwillingness to admit the cause of their fault. According to Stutts *et al* (2001), of the distraction related MVCs, an estimated 75% of distractions are due to the following:

- Outside person, object or event
- Adjusting radio/cassette/CD
- Other occupant
- Other-medical problems, looking inside vehicle (map, pen etc) or outside (street sign, parking), sneezing and sun glare

Of the distractions listed, phone use constituted just 1.5% of the total distraction causes. As this is taken from official crash data reports, like other distractions it is likely to underestimate their significance. The risk of phone use while driving is discussed in more detail in the next section.

Mobile/Cell Phones

An activity attracting increasing concern amongst motor vehicle safety groups and regulators is the risk of cell/mobile phone use whilst driving.

At present, there is currently a lack of definitive data on the prevalence of MVCs attributed to phone use and uncertainty as to the exact amount to which the risk of MVC involvement is increased (Shah, Thomas & Wilson, 2001). However, there is sufficient research and supporting results that conclude the use of phones while driving does increase the risk of MVC involvement (Shah, Thomas & Wilson, 2001; Redelmeier & Tibshirani, 2000; Burns, Parkes, Burton, Smith & Burch, 2002; McKnight & McKnight, 1991; and Goodman, 1997). In fact some of these research studies have calculated the MVC risk to be comparable to driving under the influence of alcohol (Redelmeier & Tibshirani, 2000; and Burns, Parkes, Burton, Smith & Burch, 2002).

Pertinent to both hand held and hands free phones, research has concluded that the use of phones while driving increases crash risk due to the following aspects:

- Phone use whilst driving results in driver inattention; inhibited perception, response time and accuracy of response (Shah *et al*, 2001).
- Answering or dialing the phone (even for hands free models) invariably involves the driver taking their eyes from the road (Shah *et al*, 2001).
- Complex conversations lead to increased reaction times (McKnight & McKnight, 1991; Burns, Parkes, Burton, Smith & Burch, 2002).
- When caught in a conversation, a driver's situational awareness and judgment are impeded (Goodman, 1997) for example leading to missing warning signals (Burns *et al*, 2002).

In addition, it is also recognised that using a hand held phone results in a reduction of a driver's physical control over the vehicle. Stein, Parseghain & Allen (1987) identified a significant deterioration in maintaining course and manoeuvring curves while using a phone-regardless of where the phone is placed.

In an attempt to avert an increase in MVCs associated with the proliferation and use of mobile/cell phones, governments across the world have enacted regulations restricting or banning phone use whilst the vehicle. Such measures have been enacted in the state of New York in the US, Australia, Malaysia, Spain, Israel, Portugal, Italy, Brazil, Switzerland and Great Britain.

Fatigue

Fatigue (sleepiness or drowsiness) is a major causal factor in MVCs and is especially critical in the context of workplace MVCs. Fatigue is the primal casual factor in 1-3% of police reported crashes and 4% of fatalities in the US (Stutts, Wilkens, & Vaughn, 1999). In the UK, fatigue accounts for an estimated 16-20% of crashes (Horne & Reyner, 1995 as cited in Stutts *et al* 1999). In New South Wales, Australia, it is estimated that fatigue was involved in 18% of fatal accidents (Motor Accidents Authority; 1999).

Why fatigue causes MVCs

Fatigue is a causal factor for MVCs as it impairs elements of human performance critical to safe driving including slower reaction time, slower information processing and reduced vigilance (Dinges & Kribbs, 1991 as cited in NHTSA, 2000b). Research has shown that 17 hours of wakefulness is equivalent to a blood alcohol limit (BAC) of 0.05% and for 24 hours equivalent to a BAC of 0.10% (Dawson & Reid, 1997; cited in Stutts, Wilkens, & Vaughn, 1999). Despite these findings, fatigue is generally (though inaccurately) not perceived as dangerous as driving under the influence.

Synergistic effect of Fatigue & Alcohol

Research has found that sleep restriction exacerbates the sedating effects of alcohol, with the combination adversely affecting psychomotor skills to an extent greater than that of sleepiness or alcohol alone (Roehs *et al*, 1994; Wilkinson, 1968; Huntley & Centybear, 1974; Peeke *et al* 1980; cited in NHTSA, 2000b).

Characteristics of Fatigue related MVCs

According to the NHTSA (2000e) a typical crash caused by fatigue has the following characteristics:

- is likely to result in serious injury or fatality
- a single vehicle leaves the roadway
- The crash occurs on a high speed road, under monotonous driving conditions (Nguyen, Jauregui & Dinges, 1998).
- the driver does not attempt to avoid a crash and is alone
- those at highest risk are young males aged 16-20 and shift workers

High risk times

A primary peak in the number of automobile accidents occurs in the early morning hours and a secondary peak during the mid afternoon around 3pm (Pack *et al* cited in Nguyen, Jauregui & Dinges; 1998). These peaks are consistent with circadian sleepiness patterns (Wylie *et al;* 1996, cited in NHTSA, 2000e).

High risk individuals

Sleep deprivation is known to be a factor in occupational accidents; with research indicating that individuals who had sleeping difficulties in the prior two weeks are involved in almost twice the number of fatal occupational accidents (Åkerstedt, Fredlund, Gillberg & Jansson, 2002). Shift workers are the most obvious work group at risk of chronic sleep deprivation or disruption. The circadian

phase disruptions caused by rotating shift work are associated with lapses of attention, increased reaction time and decreased performance (Dinges *et al* 1987; Hamilton *et al*, 1972; cited in NHTSA 2000b). Obviously, shift workers and sleep deprived are a high risk group for MVCs within the workforce with research indicating shift workers are almost six times more likely to be involved in a sleep related MVC (Stutts *et al*, 1999). However, MVCs due to fatigue can be prevented or minimized by proactive steps, and when fatigue does occur, journey management practices should prevent or control exposures.

Individual Susceptibility: History, Gender & Age

Research has identified consistent accident trends aligned with driving history, gender and age. Such factors may be relevant for consideration in driver selection within a journey management system or for the actual employment of dedicated or professional drivers.

Specific Trends

The concept of accident proneness has a number of problems and has failed to provide a means by which to predict individual accident involvement (Australian Federal Office of Road Safety, 1989). However, it is acknowledged that drivers at high risk of crash involvement are reported to exhibit a broad range of personal and social characteristics including:

- Aged less than 25, predominantly male
- Education less than 12 years
- Semi skilled or unskilled worker
- Single marital status and low socio-economic status.

Driving History

Previous driving history can act as an indicator of future crash involvement (National Center for Statistics and Analysis, 2002), for example:

- 14.1% of drivers with previously recorded crashes were involved in fatal accidents; and
- 12.6% of drivers in fatal crashes had previous license suspensions or revocations.

Gender & Age

Young males are considered the highest single group at risk in MVCs. In the US, young males aged 15-20 are most likely to be speeding and males aged 21-24 are most likely to be involved in an alcohol related MVC fatality (NHTSA, 2000a). Further, novice drivers (recently licensed) represent approximately 7% of the driving population, 14% of the MVCs and 20% of MVC fatalities (US Transport Research Board, 2001).

Of speeding drivers involved in fatal accidents in New South Wales, Australia, 34% were men aged between 17 and 25. In contrast, only 4 per cent were women in this age group (Motor Accidents Authority, 1999). This accident rate is consistent with research supporting safe driving behavior, whereby women have higher observation rates of belt use, speed limits, and abstaining from drinking and driving (Shinar, Schechtman, & Compton, 2001).

Research also indicates that with an increase in age there is an increase in the use of seat belts and reported observation of speed limits (Shinar *et al*, 2001) and a decrease in the involvement in speed related MVCs (NHTSA, 2000a).

Skill and Behavior

Driver competency or skill issues are associated with up to one third of all fatal crashes (US Transport Research Board, 2001). It is therefore estimated that even modest gains in improving driver competency, can reduce the frequency of MVCs. It is also estimated that 85% of the factors that contribute to MVCs are related to unsafe driving behaviors (US Transport Research Board, 2001). The factors that underlie these high risk driving behaviors (speeding, drunk driving and failure to use restraints) are complex and not well understood (US Transport Research Board, 2001). Of relevance to behavioral influences are discipline motivations, including the probability of detection and apprehension. Detection and the associated penalty significantly influence a driver's willingness to comply with traffic regulations (US Transport Research Board, 2001).

Conclusion

The major MVC causation factors have long been recognized and as such, significant improvements have been made in motor vehicle safety across the developed world. To achieve a reduction in the frequency and severity of accidents is logically supported by targeting MVC causation and injury severity factors through:

- Persistent reduction of vehicle speed
- Prohibit driving when under the influence of alcohol
- Mandate and enforce the use of seat belts
- Avoid driving on high risk routes and times
- Prevent and manage fatigue
- Minimize distraction related accidents through education or stronger policy/regulation enforcement to target for example mobile/cell phone use.

Unfortunately, an MVC is likely or has lead to the premature death of someone we know personally. Despite this personal connection and substantial evidence on effective MVC preventative measures, it remains a substantial challenge to change entrained and even habitual unsafe behaviors of drivers and sustain such behavior changes through time. The prevention of MVCs is one of the most difficult and persistent safety challenges for contemporary society.

References

Åkerstedt, T., Fredlund, P., Gillberg, M., & Jansson, B., (2002). A prospective study of fatal occupational accidents-relationship to sleeping difficulties and occupational factors. *Journal of Sleep Research, 11*(1), 69.

Australian Bureau of Statistics (2001). AusStats: special article-a history of road fatalities in Australia. *Year Book Australia 2001.* <http://www.abs.gov.au/ausstats/abs@nsf/0/9AFD4E13D7A281FCA2569DE0028B40C?Open&Highlight=0,fatalities> [2002, August 1]

Blatt, J., & Furman, S.M., (1998). Residence location of drivers involved in fatal crashes. *Accident Analysis and Prevention. 30*(6), 705-711.

Burns, P., Parkes. A., Burton, S., Smith, R.. & Burch D. (2002). *How dangerous is driving with a mobile phone? Benchmarking the impairment to alcohol. TRL Project Report 547.* Crowthorne: UK Transport Research Laboratory.

Goodman, M., et al (1997). *An Investigation of the Safety Implications of Wireless Communications in Vehicles.* National Highway Traffic Safety Administration (NHTSA). http://www.nhtsa.dot.gov/eople/injury/research/wireless/ [2002, November 26].

Grey, E; Triggs; T.; Haworth, N. (Eds). (1989). *Driver Aggression; the Role of Personality, Social characteristics, Risk and Motivation.* Canberra, ACT: Australian Federal Office of Road Safety.

Harrison, W., Fitzgerald, E.., Pronk, N.. & Fildes, B. (1998). *An investigation of characteristics associated with driving speed. Report No. 140.* Monash, Victoria: Monash University Accident Research Centre.

International Road Federation (2002). *World Road Statistics 2002.* Geneva: International Road Federation.

McKnight, A.J., & McKnight, A.S., (1991). *The effect of cellular phone use upon driver attention.* Washington DC: National Public Services Research Institute. Funded by AAA Foundation for Traffic safety. <http://www.aaafoundation.org/resources/index.cfm?button=cellphone> [2002, November 26].

Motor Accidents Authority (1999). *"What is causing crashes, 1999"* New South Wales, Australia. <http://www.maa.nsw.gov.au/road_safety/cause> [2002, Feb 19].

NHTSA (1997). *An investigation of the safety implications of wireless communications Report.* Washington, DC.: National Highway Traffic Safety Administration DOT HS. 808-635.

NHTSA (2000a). *Traffic Safety Facts 2000 Overview,* US Department of Transportation-National Highway Traffic Safety Administration, DOT HS. 809 329.

NHTSA (2000b). *Traffic Safety Facts 2000 Speeding.* US Department of Transportation-National Highway Traffic Safety Administration, DOT HS 809 333.

NHTSA (2000c). *Traffic Safety Facts 2000 Occupation Protection,* US Department of Transportation-National Highway Traffic Safety Administration, DOT HS. 809 327.

NHTSA (2000d). *Traffic Safety Facts 2000 Alcohol.*

US Department of Transportation-National Highway Traffic Safety Administration, DOT HS. 809 323.

NHTSA (2000e). *Drowsy Driving & Automobile Crashes*. US Department of Transportation-National Highway Traffic Safety Administration & National Center on Sleep Disorders Research Expert Panel on Driver Fatigue and sleepiness. www.nhtsa.dot.gov/people/perform/human/drowsy.html <http://www.nhtsa.dot.gov/people/perform/human/drowsy.html> [2002, Aug 8].

National Center for Statistics and Analysis (2002) fatality Analysis Reporting System (FARS). <http://www-fars.nhtsa.dot.gov/finalreport.cfm?title=Crashes&stateid=0&year=2000&title2=Location> [2002, July 30].

National Occupational Health & Safety Commission (2002). Australian National Workers Compensation Statistics database. <http://nohsc.info.au.com> [2002, July 30].

Nguyen, L., Jauregui. B, & Dinges. D., (1998). *Changing Behaviors to Prevent Drowsy Driving and Promote Traffic Safety: Review of Proven, Promising and unproven Techniques*. Supported by the American Automobile Association Foundation for Traffic Safety. www.chp.ca.gov <http://www.chp.ca.gov> [2002, July 30].

Redelmeier D, Tibshirani R. (2000). Association between Cellular-Telephone Calls and Motor Vehicle Collisions. *The New England Journal of Medicine, 336*(7), 453-458. <http://www.nejm.org/content/1997/0336/0007/0453.asp.[November> [November, 25 2002]

Shah, R., Thomas, A., & Wilson, L., (2001). Cellular Distractions: "An Investigation of the Safety Implications of Cellular Telephones in Moving Vehicles". Maryland Department of Transportation.

Shinar, D., Schechtman, E., & Compton, R., (2001). Self-reports of safe driving behaviors in relationship to sex, age, education and income in the US adult driving population. In *Accident Analysis and Prevention; 33*(1) 111-116.

Stein, A., Parseghain, Z., & Allen, R. (1989). A simulator study of the safety implications of cellular mobile phone use. In *American Association for Automotive Medicine*, Proceedings of the 31st Annual Conference (AAAM, Desplaines).

Stutts, J., Wilkens, J., & Vaughn. B. (1999). *Why do people have drowsy driving crashes? Input from drivers who just did*. Prepared for the AAA Foundation for Traffic Safety. <http://www.aaafoundation.org/pdf/sleep.pdf> [2002, Aug 1].

Stutts, J.C., Reinfurt. D.W., Staplin. L., & Rodgman, E.A., (2001). *The role of Driver Distraction in Traffic Crashes*. Prepared for AAA Foundation for Traffic Safety. www.aaafoundation.org/projects/index.cfm?buttons=distraction <http://www.aaafoundation.org/projects/index.cfm?buttons=distraction>[2002, Feb 19].

Taylor, M., Baruya, M. , & Kennedy, J., (2002). *The relationship between speed and accidents on rural single-carriageway roads*. (TRL report 511). Crowthorne; Transport Research Laboratory.

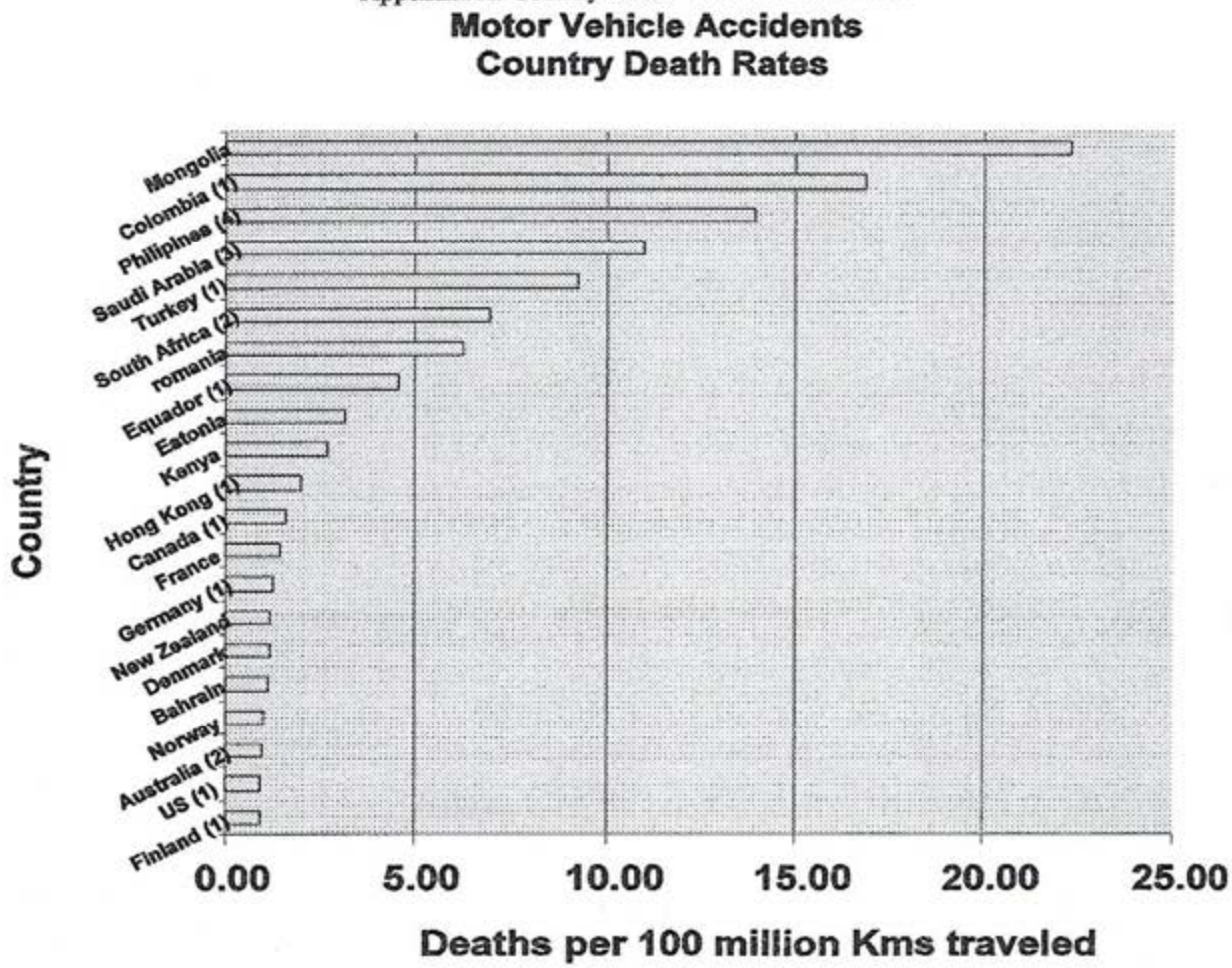
US Department of Labor (2002). Bureau of Labor Statistics. "*2000 Census of Fatal Occupational Injuries data*". <http://www.bls.gov/iif/oshwc/cfoi/cflb132.pdf> [2002, August 1].

US Transport Research Board (2001). *Highway Safety Research: A National Agenda*. www.trb.org/trb/publications/rtforum/safety_agenda_july_2001.pdf <http://www.trb.org/trb/ publications/rtforum/safety_agenda_july_2001.pdf> [2002, August 1].

World Bank (1999). *Road Accidents: A Global Problem requiring Urgent Action*. Roads and Highways Topic Note RH-2. www.worldbank.org/transport/topnotes/rh-2.htm <http://www.worldbank.org/transport/topnotes/rh-2.htm> [2002, November 14].

Murray, C., Lopez, A. (Eds.) (1996). *Global Burden of Disease-A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020*. World Health Organisations, Harvard School of Public Health & World Bank.

Appendix A: Country Motor Vehicle Death Rates



International Road Federation (2002)

All figures from yr 2000 unless noted: 1996 (4); 1997 (3); 1998 (2); & 1999 (1)

Risk Control For Emergency Management Services

Dr. Janis Jansz, FSIA. Edith Cowan University, Director of World Safety Organization International Office for Australia.

ABSTRACT: This article describes the reasons for Emergency Management Services having a Risk Control Program. It documents how to control risk inputs in the design stage for physical resources, human resources and information, risk control for the physical work environment, equipment, products used and safety management systems for work activities and risk control for the outputs of emergency management services. It concludes with information about the benefits of having a risk control program.

Introduction

Why is it important for Emergency Management Services to have a Risk Control Program? How do you organise a Risk Control Program for your organisation? What are the benefits in having a Risk Control Program for Emergency Management Services? This paper answers all of these questions.

Reasons for having a Risk Control Program

Most countries have a legal requirement for work related risks to be controlled. In Western Australia the legal requirement is the Occupational Safety and Health Act 1984. Section 19 records that "An employer shall, so far as is practicable, provide and maintain a working environment in which his employees are not exposed to hazards." The fine for not doing this is $100,000 to $200,000. Section 20 of this Act documents that

(1) An employee shall take reasonable care -
[a] to ensure his own safety and health at work; and
[b] to avoid adversely affecting the safety or health of any other person through any act or omission at work.

The fine for not doing this is $10,000 to $20,000. The Occupational Safety and Health Act 1984 promotes the responsibility of a general duty of care for occupational health and safety. The Occupational Safety and Health Regulations 1996 Section 3.1 require the identification of work related hazards, the assessment of the risk of injury or harm to a person that can result from each hazard, and consider the means by which the risk may be reduced. If this is not done the employer, or who ever is in charge such as the main contractor, is liable to a fine of $25,000. Other countries have similar legislation.

The potential for human error to occur is another reason for controlling risks. Every human makes a mistake at some time in their life. In emergency situations the cause may be attention lapse due to being tired, being in an unfamiliar situation, lack of training or knowledge about how to deal with a situation or being in an unfamiliar area so not aware of the danger. If an accident happens and damage to people or property results there is a financial cost, both direct and indirect to the organisation. Costs include money, time, labour, disruption, loss of good will, political and intangible losses. Risk Control is needed to prevent catastrophes from occurring. A catastrophe may result in the death of many people, the financial ruin or destruction of an organisation, or large-scale environmental destruction. A Risk Control program is needed to ensure business continuity.

To develop a Safety Culture where the employer and all employees look after personal safety, the safety of coworkers, customers, bystanders and the public it is very important to have a Risk Control Program. Cox and Tait (1998) document the purpose of having a Risk Control Program as "to control and reduce risks to acceptable levels; to reduce uncertainty in risk decision making; to increase public credibility of risk management decisions". Emergency management Services constantly deal with the public.

Risk Control Definitions

AS/NZS 4360:1999 p.3 defines risk control as "that part of risk management which involves the implementation of policies, standards, procedures and physical changes to eliminate or minimise adverse risks."

Cox and Tait (1998) describe risk control as six interlinked phases, which include hazard identification, hazard analysis, risk estimation, risk evaluation, development of implementation strategies, monitoring and auditing the strategies effectiveness and making improvements where possible in controlling risks. This definition encompasses a wider range of activities than the Australian and New Zealand Standard 4360:1999.

Rogers (1999) p.4 defines a hazard as "anything that may result in death or injury to a person, or harm to the health of a person, or damage to property, equipment, process, or loss to the organisations/individual." There are eight major groups of work related hazards. These are as follows.

- Physical. For example, air quality, noise, electrical, heat, cold, radiation.
- Chemical. Solids, liquids, gasses.
- Ergonomic. For example, manual handling, work station design, task design.
- Mechanical. Machinery.
- Psychological. For example, shift work, workload, bullying.
- Biological. For example, viral or bacterial infection.
- Environmental. For example, storms, earthquakes, terrorist attacks.
- General. For example, slips trips and falls.

Risk is defined as the likelihood of harmful human or property contact with the hazard. Risk assessment analyses the consequences of contact with the hazard and the probability of this contact being made. The combination of consequences and probability of occurrence determine the degree of risk present. Hazards that occur frequently with the risk of causing a catastrophe have a high degree of risk. Hazards that occur rarely and which will cause minimal damage have a lower level of risk.

The Health and Safety Executive (1998) summarise risk control as the activities used to minimise hazards entering an organisations, the elimination or minimisation of risks within the business processes and minimising the risks outside the organisations arising from business processes, products and services. All of the above definitions describe what needs to be included in an Emergency Management Risk Control Program. The Risk Control Program for Emergency Management Services described in this paper is based on the Health and Safety Executive (1998) definition and their recommended business risk control program.

Risk Control Program

Risk Control includes thinking of everything in an Emergency Management Service that could go wrong, from the design of the service, through the working life of the people, premises, equipment, products used, all work processes, the effects that the service may have on the community and the effects that the government and members of the community may have on the Emergency Service, through to the decommissioning of the organisations. Once all of these risks have been identified the risk of any hazard causing harm to the service or its employees, or its property need to be assessed and prioritized in order of importance for risk control strategies to be implemented.

If there is the opportunity to be involved in the design stage of an organisations the MORT chart is an excellent risk control tool. It has over 1,500 risks that are considered and covers most work-related situations that Emergency Management personnel will find themselves in (Stephenson, 1991). MORT is also a good tool to use to evaluate an organisations's risk

control program to identify how effective the program is and if there are opportunities for improvement (System Safety Development Center, 1995).

Risk control is part of good business quality management practices. It is as much about identifying opportunities for improvement for cost-effective management to improve company profits and ensure business continuity as it is about avoiding or preventing losses.

Emergency service organisations are different to many other organisations in that their employees do not just work on one premises, but also go out to many dangerous situations in the community. For example, in September 2001 a train traveling from Bloomfield to Little Rock at 12.20am ran into the back of a stopped train going from Houston to Little Rock. One of the empty cars that derailed punctured a tanker containing about 25,000 gallons of acetone, triggering a blast and a fire. The acetone, a mild irritant, continued to burn for several days with fire crews trying to extinguish it. One person was badly injured in the blast and was treated at the scene by paramedics and taken to the hospital for further care. Police had to evacuate from their homes about 300 people who lived within a radius of one and a half miles of the fire.

The Emergency Service employees involved in this situation were the Fire and Rescue Service the Ambulance Service and the Police. The place that these employees were sent to work was not safe. In fact the primary reason that the Fire and Rescue Service was sent to the accident was to help make the area safe so that the residents who were removed from their homes by the Police could return home. The Police faced danger from the fire and also from people who may have become aggressive at having to leave their home. The Paramedics who treated the injured person also faced danger from the fire. As part of their work the Emergency Personnel frequently face danger that their employer can only minimise through the implementation of effective loss control.

Stage one - Risk Control for inputs

The first stage of the Risk Control Program should be to eliminate or minimise any hazards and risks entering the organisations. This should be considered under three main headings. Physical resources; Human resources; and Information.

The **physical resources** that need to be considered are the design, selection and construction of the workplace. The employees of the Fire and Rescue Service, the Police and the Paramedics described in the case study all had a home workplace that they spent some of their working hours at. This work premises needs to be located in a safe area, purpose built to meet service requirements and constructed safely. Business continuity needs to be thought about for the future, such as the future need for expansion and the area use zoning.

Risk control strategies must be considered in the design, selection, purchase and installation of all equipment and products used by the organisations. Equipment and products selected should be the safest and most efficient for purpose available that can be afforded. The equipment purchased needs to be designed to minimise the potential for human error. There needs to be enough equipment and products to perform the required work tasks safely. Products should be available locally and should be able to be purchased from more than one supplier to ensure product availability. There should be at least three (3) days' supply in the organisations of all consumables so that if there is a heavy demand, or if supplies are interrupted, the organisations's work is still able to continue.

Equipment purchased should have easily available parts from local suppliers and be able to be maintained by local people. Having products or parts that have to be sent from overseas or interstate can often result in expensive delays. Suppliers need to be made partners in risk control activities and to have ongoing contracts with the organisations to promote commitment to providing a high standard of service and products. Contractors' equipment and substances used also needs to be considered for risk control because many core business activities, such as cleaning and catering, are contracted out.

Human resources need to be considered in the recruitment and selection of all employees. For example, Grant, Murray, Bergeron, O'Keef and Limmer (1995) recommend that the physical traits of a person selected to work in emergency care should be as follows. The person should be:

- able to lift 125 pounds. [For risk control this should be changed to *"able to move 125 pounds without lifting if possible"*]
- have muscle coordination, dexterity and the strength to be able to perform basic rescue procedures.
- have good long and short distance vision as both types are needed for client assessment, controlling emergency scenes, driving and other work activities. [For risk control appropriate eye glasses may need to be worn]
- Have good hearing and speech to be able to give and receive instructions and to communicate with clients, other emergency management personnel and bystanders.

These authors also list the personality traits that are required for emergency care employees as follows. To be pleasant, Sincere, Cooperative, Resourceful, A self starter who uses initiative, and Emotionally stable. Able to lead in controlling a scene, organising bystanders, delivering care and in taking complete charge of an emergency. Neat and clean to reduce the possibility of contamination. Of good moral character. In control of personal habits such as not smoking at work and not consuming alcohol within 8 hours of coming to work. Able to communicate well and to listen to others.

It is also very important for Emergency Personnel to have appropriate tertiary or other qualifications and competencies to be licensed to be able to perform their work. Employees selected for Emergency Management Service need to have a positive attitude to safety and the motivation to work safely because they may be required to work in situations that they, or others, would die if they do not work safely. This is particularly important for the position of Chief Executive Officer, because safety is lead and enforced from the top as well as communicated, acted upon and reviewed for effectiveness throughout the organisations. Coffman (2001, p.11) stated that "Safety starts at the top but is implemented by the bottom."

In risk control for human resource inputs the other consideration needs to be the selection of contract organisations. All organisations that tender for contracts need to submit their organisation's safety management plan, task hazard analysis plan that states all activities that will be performed by their employees, all identified hazards for these tasks and the preventative action that will be taken to eliminate or minimise these hazards as well as a record of the organisation's past negative performance indicators and their current positive performance indicators to be considered before a contract is awarded.

When organizing a Risk Control Program another input that needs to be considered and used is **information** that relates to occupational safety and health legislation, standards, codes of practice, organisational best practice information and any other technical and management information that relates to risk control and the development of a positive safety and health culture.

Stage two - Risk Control for work activities

The objective of this part of the Risk Control Program is to eliminate or minimise risks within the business processes. Risk Control activities in this stage need to cover the areas concerned with work activities and risk creation. These include the work premises and physical work environment, equipment and substances used, work procedures, people and the management systems.

Factors that need to be considered for Risk

Control in the **physical work environment** include the work premises, buildings, grounds, entrances and exits and community areas that employees may reasonably be called to go to. When considering **equipment** and products used include risk control of any hazards that can occur when the equipment or products are used, handled, transported or stored. All equipment must have regular planned maintenance and evaluation to ensure that it functions correctly. There should always be backup for equipment so that if one piece of equipment fails another part of the equipment, or another piece of equipment takes over. There needs to be a replacement policy for equipment so that equipment is replaced before it wears out.

Risk Control must be included in the design stage of all **work procedures**. This includes the system of work and a job safety analysis that considers, the location of the work, how each job will be done, the steps to be included in the job, any hazards that may occur when performing these steps, preventative action to be taken to eliminate or minimises the risks of any identified hazards causing harm, the standard of work required and any certificates of competency required to do the work. When including risk control in the plan of work consider who will do the work, how many people will do the work, the skills required to do the work, the training and instruction required to be given, the level of supervision required to be given and how long each task should take.

While implementing risk control into work procedures consider ways to eliminate particular hazards. For example immunise employees against communicable diseases if they may be exposed to them. Also consider ways to minimise the effects of hazards that cannot be controlled. For example stress due to having to deal with multiple casualty events, death of a coworker, calls involving infant or child abuse or neglect or having to deal with violent situations. As well as having an effective debriefing and support system the organisation needs to be able to commence rehabilitation of any sick or injured employee as soon as possible after any adverse health effect occurs.

With all procedures it is important to plan to be safe, for safe behavior to be the expected behavior and for safe behavior to be rewarded by management. For example, employees need to wear safe clothing, such as reflective clothing if they will be in traffic areas where it is important that they be visible, have equipment prepared so that it is not cumbersome if fast movement is necessary and carry a method of communication, such as a mobile telephone to allow to call for help if it is needed. It costs less time and money to promote and use safe behaviour than it does to deal with the consequences of accidents.

The Risk Control Program must include a **safety management system** for each type of work. For example, for ***first aid practice*** there should be a workplace policy that describes the purpose, scope and limitations of the activity. "Actions speak louder than words. The best written safety policies, the most detailed set of safety rules and procedures, etc, are totally meaningless unless they are fully resourced, rigorously implemented and kept under regular review" (Turner, 2001, p.33). The policy must be followed by decisions and documentation for the organisation of relevant activities. Organisation includes the following.

Control with management providing strong leadership in promoting care, consideration, health and safety for employees, contractors, customers and potential customers. Management must decide who will be responsible for operating and running the first aid. Duty statements need to be written, known and used. All statutory requirements for first aid need to be considered and met. The person with overall responsibility will, in consultation with other employees, plan, set, document and provide clear methods on how to perform the first aid tasks. Safe work procedures will then be implemented after appropriate education has been provided to employees. Management then is required to monitor and review performance and effectiveness.

Consultation and cooperation:. For this part of the safety management system for Risk Control management need to be team orientated and work with employees to decide how system users will be involved in the development and updating of first aid practice and ensure these safe practices' acceptance and effective working. Management and other employees are required to work together to decide how any deficiencies, weaknesses or failing in the system will be reported and ensure that any deficits identified are rectified. It is important for management to be involved in these activities because management has control of the resources and directions given for work processes. It is important for the people who will use the procedures to be involved because they are the people most likely to identify any hazard risks or inefficiencies in procedures which, when reported to management enable risk control and quality improvement procedures to be implemented.

Communication: It needs to be decided what communication is necessary to ensure the effective operation of first aid practices, what documentation should be involved and how it can be designed to be clear, effective and easy to use. Employees need to be trained to document carefully and accurately as this documentation may be called for at any legal proceedings resulting from the incident that required the first aid. Important documentation should be stored in more than one form (for example, hard copy and electronic), so that if one type of record is lost another exists to be used. If using electronic records these need to be stored in more than one form too. For example on a main frame computer that is backed up every night as well as the computer hard drive, or a computer CD or disc. This helps to prevent information being lost due to a computer worm or virus. An effective risk reporting system needs to be implemented so that follow up action can be taken to control any identified risks.

Competence: Management must ensure that the training, qualifications, skills and level of competence required for the employees who will perform first aid, and for those who will monitor and review performance, is adequate to perform these tasks to the required standard.

Implementing the work procedures: A critical person for this stage, in any loss control program, is the first line supervisor. The organisations needs to ensure that it has adequate systems in place to enable the line management to provide competent supervision and to manage the work safely. Management must provide adequate human and material resources for the work to be able to be performed to the required standard. It is particularly important that employees are provided with enough time to work safely and that there are enough employees to do the work to the required standard. This is an important part of risk control according to WorkSafe Western Australia (1999), as many accidents happen when not enough employee time is allocated for the work required to be done.

The last part of the risk control management system is **measuring, reviewing** and **auditing performance**, and then making changes as required to prevent risks and to improve risk control measures. This can be achieved by having periodic inspections of the work activities, documentation, staff discussions, and by having outside consultants or accreditors evaluate the work performance. It is also important for management to check that the work of contractors, as well as employees, meets organisations performance requirements.

People: When eliminating and minimising risks within the business process one of the most important elements to consider within the business processes are the people doing the work. Included in this area of risk control is the effective placement of employees, their competence for the job and any health

surveillance needed. Employees must be encouraged to have a culture of caring, to work together as a team, be educated and trained to perform work related tasks to the required standard, empowered, be consulted and participate in the planning, implementation and evaluation of services and change, have security of continuing employment and communicate effectively (Mussett, 2000).

As part of the risk control program employees need to be trained to recognize hazards, assess the risk, manage the risk and safeguard themselves and others from hazards. For example, because a considerable part of emergency workers activities take place in the general community, rather than always at a set workplace, emergency workers need to be trained to deal effectively with climate and scene safety. For example, if a Police Officer has, on a hot day, to deal with a car crash in which people are injured, there is a large amount of glass over the road, petrol leaking from the wreckage and there is the danger of an explosion and fire, the Officer would need to establish a danger zone that people and traffic need to be kept out of and a safe shaded zone that the injured people will be moved to if possible. The Police Officer would need to call for Paramedics with an ambulance to treat the injured people and take them to the hospital, the Fire Brigade to deal with the petrol leakage and fire if it occurred, tow trucks to remove the crashed cars, more Police to deal with people and traffic control and road workers to remove the broken glass.

This identifies another important part of risk control for emergency management service employees, and that is the need for them to be trained to know when an incident is beyond the person's ability to deal with effectively and call for the help of coworkers or other emergency services as appropriate. In situations where more than one emergency person is involved a chain of command needs to be established to ensure that work is undertaken safely and effectively. By encouraging all employees to care for each other, their clients and to identify hazards, assess the risks, and where possible eliminate or minimise the risk of the hazard causing harm a safety culture can be developed.

According to Hall (2001) subgroups of employees who are most at risk of being involved in an accident are trainees, new employees, transferred employees, temporary employees, recently promoted employees and contractors. These people particularly need to be the focus of safe work education and appropriate supervision until they are familiar with how to work safely in their employment roles. Continuing employees still need regular training to ensure that they continue to be reminded of how to work safely and to keep them up to date with new advances in technology and knowledge. Any employee accident, incident or ill health that occurs as a result of work activities needs to be carefully investigated and effective strategies put in place to prevent or minimise recurrence.

For all key organisational roles more than one person must be trained to effectively carry out the role. This ensures that there are replacement employees who know how to do each job should a key employee be on sick leave, resign or be away from the organisations. This allows effective business continuity.

In stage two, when devising risk control for the work activities of emergency management services it is important to consider each of the following and implement appropriate risk control measures:

1. The operation of business duties during routine and non-routine activities.
2. Maintenance tasks. Who will do the regular maintenance - onsite employees or contractors? The business duties that will occur during maintenance.
3. Planned changes in the organisational structure, premises, equipment, processes, products used, procedures, people or information.
4. Foreseeable emergencies giving rise to serious and imminent danger, such as lightening strikes, fire, injury, bomb threats or ill health. As well as planning and putting in place strategies to prevent disasters, such as having an earthquake proof building, there must be known and used procedures for what to do when an emergency happens, and disaster recovery procedures to be implemented immediately when the emergency is over.
5. Decommissioning, dismantling and removal of the buildings or other facilities, equipment and substances.

Third stage - Risk Control of outputs

Risk control of outputs is necessary to minimise risks outside the organisation arising from the emergency management organisation's work activities, services provided or information given. Any complaints from members of the public, government organisations or businesses must be carefully investigated. Appropriate risk control measures must then be implemented.

Benefits of having a Risk Control Program for Emergency Management Services

A good risk control program results in the following benefits:

- Less human, material and system losses as a risk control program enables business losses to be prevented or minimised due to better decisions being made.
- It allows for business continuity because of the existence of contingency plans, people, equipment, products, etc.
- Provides smarter allocation of resources.
- As risk control is driven by all levels of the organisation, from the Chief Executive Officer to the employees doing the hands on work, a culture of controlling risks and promoting work related safety exists because people are trained to think safety in the design stage and implementation of all work.
- An effective risk control program increases management's ability to make better strategic planning and implementation decisions because business risks are able to be evaluated in light of current risk control activities.
- Good risk control practices promote team work that encourages the sharing of ideas, information and resources across work groups to promote occupational safety and health as many of the solutions for risk control are within employees' expertise to identify and implement in a cost effective way.
- Effective risk control programs reduce the occurrence of lost time through injury or disease, reduce workers' compensation premiums, maintain a fit, healthy workforce, good morale, market support and reduce liability (Turner, 2001).
- Risk control is a powerful asset that delivers a competitive advantage by allowing cost-effective service to be delivered.
- Increased credibility of service by customers because client needs are more likely to be met.
- Positive publicity and enhanced organisational reputation because of the provision of a high standard of service.
- The organisations is more likely to be accredited by relevant authorities.
- The organisations is more likely to win awards for excellence. For example, the Texas Municipal Power agency has an Emergency Response Team that assists in emergency situations as requested. This organisations has documented over 7,340,680 safe work hours without a lost time injury. The company has had only one recordable accident during its operation. The Texas Municipal Power agency has received over seventy (70) Worldwide, National and State Safety Awards since 1986.

Conclusion

Having a known and used risk control program is essential for Emergency Management Services to be able to control and reduce risks to an acceptable level, provide public credibility for risk management decisions,

provide cost effective service to the community, meet legal occupational safety and health requirements, continuously improve business activities and to enable business continuity.

References

Associated press (2001, September 8). Cleanup of derailment underway. *Waco Tribune Herald.* p.10A.

Coffman, J. (2001, September 10-12). Safety by design. *15th International Environmental Health & Safety Conference & Expo 2001,* Waco, Texas.

Cox, S. & Tait, R. (1998). *Safety, Reliability & Risk Management (2nd ed.).* Oxford, UK: Butterworth Heinemann.

Grant, H., Murray, R., Bergeron, D., O'Keefe, M & Limmer, D. (1995). *Emergency Care (7th ed.).* Upper Saddle River, New Jersey: Prentice Hall.

Hall, D. (2001, September 10-12). Critical Issues for the 21st century. *15th International Environmental Health & Safety Conference & Expo 2001,* Waco, Texas.

Health & Safety Executive (1998). *Successful health & safety management.* Sudbury, Suffolk: HSE Books.

Mussett, J. (2000). *An analysis of quality practices and business outcomes in Western Australian hospitals.* Unpublished doctoral dissertation, Edith Cowan University, Perth, Western Australia.

Occupational Safety & Health Act 1984 (1996). Perth, WA: Western Australian Government Printer.

Occupational Safety & Health Regulations 1996. (1996). Perth, WA: Western Australian Government Printer.

Rogers, D. (1999) *Principles of Hazard Management.* Claremont, WA: Statewide Safety Pty Ltd.

Standards Australia (1999). *Risk Management AS/NZS 4360:1999.* Strathfield, NSW: Standards Association of Australia.

Stephenson, J. (1991). *System Safety 2000.* New York, NY: Van Nostrand Reinhold.

System Safety Development Centre (1995). *MORT Users' Mannual.* Idaho: Department of Energy.

Turner, E. (2001). *Crisis Risk Management & Organisation Guide.* Churchlands, WA: Edith Cowan University.

WorkSafe Western Australia (1999). *WorkSafe Plan.* West Perth, WA: Author.

World Safety Organization (2001). *WSO Awards 2001,* Warrensburg, MO: Author.

A Note From The Conference Coordinating Committee

Preparations for the 17th Annual World Safety Organization's International Safety & Health Conference & Exposition continue. There will again be a variety of timely technical presentations, and the WSO Colorado Chapter in cooperation with the OSHA Training Institute at the Rocky Mountains Education Center, is planning to make available the following courses: ❖ OSHA #302 - Electrical Standards, ❖ OSHA #204A - Machine Guarding, ❖ OSHA #501 - General Industry Train the Trainer, ❖ OSHA #225 - Principles of Ergonomics, ❖ OSHA #845 - OSHA Recordkeeping, ❖ OSHA #314 - Hazwoper 8 Hour Refresher, ❖ OSHA - Compliance Update, ❖ RMEC #370 - Accident Investigation, ❖ RMEC #319 - Mastering Safety Communications Conflicts, ❖ RMEC #910 - Industrial Terrorism Awareness, ❖ and CETE #155 - Introduction to Environmental Law ; are a few of the course that will be available at this conference.

The Holiday Inn Denver International Airport Conference Center has been selected as the site of the 2003 WSO Conference and Exposition. The size, location and amenities of the facility will be an excellent venue for the conference and exposition. The conference will be the week of November 3rd, 2003. Sunday evening November 2nd, we will have our WSO President's Reception, where we will have a chance to visit with old friends and meet new ones. Concurrent with the conference program, there will be an "Exposition" where Environmental, Safety & Health Vendors will have booths established. Presently we have over 200 vendors requesting information and foresee a minimum of 150 vendors participating. Mr. Tony Ploughe, Director/Coordinator of Vendor Recruitment continues to interface with and provide information to all interested organizations, he is currently developing packages for many more. On Wednesday evening the 5th of November we will have our annual WSO Awards Banquet and Program, where we will also recognize outstanding individuals and companies in the safety and environmental fields. We have arranged two "professional" field trips to be conducted on Thursday, the 6th of November, and a few evening "recreational" activities (Casino's, sight seeing, etc.) during the week. We believe that by moving the 2003 WSO conference into November and announcing activities and enhancement course now, it will enable many of those planning to attend to better make early arrangements. We look forward to seeing you in Denver.

Movement Safety: A Strategic Approach For Breaking Through The Strains & Sprains Plateau

Mr. Robert Pater. M.A., Managing Director, Strategic Safety Associates, rpater@movesmart.com http://www.movesmart.com

ABSTRACT: This article describes what will not reduce work-related strain and sprain injuries as well as discussing 14 successful strategies that can be used by the employer and employees to prevent these injuries occurring.

Introduction

There's a good reason why some organizations will try "anything" to reduce strains and sprains - they're expensive, pervasive, frustrating and hurt safety record and performance. And it's likely that for this complex/multi-factored problem there is no one solution. Some search for the holy grail of soft tissue damage prevention; others have given up, focusing instead on other safety problems. There's nothing like feeling frustrated, that you've tried "everything humanly possible" (in the words of a safety professional in one of my seminars) to lead to either giving up on attempting a creative approach, becoming jaded or blaming others for not listening to acting wisely.

The answer to preventing work-related strain & sprain injuries.

As many organizations have found to their disappointment, there are no easy answers to "solving" these persistent problems. Sure, different interventions - ergonomic design, back schools, simplistic body motion approaches and others have reduced injury rate in different companies. But these interventions have too-often picked the low-hanging fruit, only reducing injuries to a certain point or for a short time, after which the organization settles into a plateau of still-too-high injuries.

Consultants, professors or "experts" notwithstanding, what sustaining and "breakthrough" solutions to strains and sprains, slips and falls are NOT is **not just**:

- physical body motion,
- re-design or putting into place ergonomic 101 fixes,
- lifting a box off the floor,
- training,
- auditing behavior,
- administrative controls.

Sure, each of the above can help. But, many safety professionals, understandably seeking a simple resource-efficient answer in times of limitations, have found that each of the above, at best, picks off the low-hanging fruit, gets some results and then, returns diminish into the Performance Plateau.

Now some reading this may know that our consulting firm offers some of the above services. So why should you listen to me as opposed to all those purporting to have the true answer (for a fee, of course)? Let common and strategic sense rule as well as experience in seeking quick fixes to complicated lasting issues (do you remember the "let's just give everyone a back belt, that'll fix it" quick fix?)

Movement related injuries - soft tissue strains and sprains, slips/trips/falls, hand injuries - are often subjective in nature. It's difficult, if not impossible, to objectively quantify:

- why two people of similar age, size and experience may have completely different injury histories,
- why one person and not another turns in a workers compensation claim,
- which specific off-work factors contribute to cumulative trauma injuries,
- personal differences in pain thresholds. Why is one person able to work with or "override" a level of pain that might disable her peer?

Even in some areas that would seem to be "obvious", there is controversy. Does anyone, for example, doubt that repetitive work can lead to hand injuries? Hand surgeon Dr. Peter Nathan does. He contends that carpal tunnel syndrome has little, if anything, to do with workplace repetitions; rather, he believes, this wrist-hand problem positively correlates only with a person's level of obesity ("body mass index").

In dealing with these subjective injuries that, inarguably, have some personal contributing factors, psycho-social and organizational factors are critical to understand and shape if you wish to make considerable and lasting penetration into these problems. I suggest something intrinsic to creating significant and lasting safety improvements. This is that the role of the safety professional is to help re-focus senior management away from reducing workers comp claims and towards improvement of health and performance. Because a worker hasn't filed a claim, to a certain point, it's not a sign of success. He or she may be working hurt, but may be biding their time to turn in a claim, or may not be aware of a low level injury until it blossoms to a undeniable level or something else.

Ergonomics?

We define ergonomics as improving the fit between people and their tasks. There are two ways this fit may be improved:

1. Bring the tasks closer to the worker, and
2. Help people better adapt to their jobs.

Organizational controls underpin this meshing process.

By default, ergonomics is commonly equated with re-designing tools, equipment and work stations to eliminate causes of cumulative trauma problems (Carpal Tunnel Syndrome, low back pain, etc). Unfortunately, a narrow focus on environmental design can lead managers and staff in search of the ergonomic holy grail - the perfect chair or the tool with the ideal grip. All too soon, they discover that environmental improvements by themselves can't overcome the many causes of CTDs. For example, workers may be operating in environments that are difficult or costly to control: maintenance personnel often work in other departments' turf, some function with equipment that might be prohibitively expensive to redesign, still others work in the field. And it's important to remember that employees may also accumulate trauma exposures off the job - these are difficult to engineer out.

It should be realized that ergonomics gains an ally through an artful mix of environmental, human and organizational factors. This means systematically improving the working environment (adjustable work stations, suspending weight of heavy tools), developing employee capabilities (attention control, judgment, skills, work methods, motivation), and refining organizational procedures (job design, supervision, reinforcement) as part of every ergonomic intervention.

Certainly, controlling environmental stresses is vital; working with poorly designed work stations or tools can endanger workers even over a relatively short time. But this is not enough. In the real and "messy" world of work, ignoring human or organizational factors can unplug an otherwise worthy ergonomics effort. In our experience, human and organizational factors are most overlooked - perhaps because they seem less tangible and thereby less easily controlled.

We have heard supervisors wryly suggest that carpal tunnel syndrome is a "contagious disease." Managers complain that no one is actually using those expensive scissors lifts recommended by the ergonomics consultant. And bargaining units declare that injuries are solely management's responsibility - due to poor design and inadequate tooling and

insufficient cash infusions. What is going on?

Many mangers have experienced this first hand. It's not enough to purchase expensive "ergonomic chairs" if employees are not shown how to adjust them to improve position and alignment, employees sitting in them may still slump or work out of position. Employees need to be trained how to use any new equipment and how to use better body mechanics with this equipment.

We suggest the field of bio-engineering be expanded to study and incorporate the full range of natural human forces - biophysical, emotional and psychological. Treating people as little more than biological robots is strategically doomed. Usually, employees rebel and assert their independence - often by resisting "logical" ergonomic interventions. Just as our muscular-skeletal structure needs variation of forces, so does our mind seek diversification of tasks. Low-interest work often results in problems driven by inattention.

The Medical Director of one large company noted, "Adjustable work stations are fine, but we've got to create a climate where people aren't looking to bail out with a carpal tunnel syndrome." We've too often seen the number of claims for wrist or back pain surge just after downsizing is announced. Your company doesn't have to accept being stuck between the rock of unworkable ergonomic interventions and the hard place of spiraling cumulative trauma problems (CTDs). A strategic and practical approach can reduce the incidence of CTDs and boost morale, involvement, communication, and safety culture - all critical elements if ergonomic improvements are to take root and thrive in hard organizational ground.

How to make significant change - a strategic organizational approach:

The answer begins and ends with the organization. Experience has shown a wide range of companies can cut their incidence of strains and sprains, slips and falls and hand injuries. Personal control and responsibility is a major key to successfully preventing these injuries. While *personal responsibility* may end with the worker - it *begins with the organization*.

- Move away from a program-approach to an organizational change mentality. Be sure that your planning takes into account overall organizational goals and goes beyond "cutting injuries."

- Think strategically - and help others do the same. Remember that everything you do and don't do sets precedent and sends signals. Starting and stopping programs goes counter to a progressing, cumulative thinking mind set. During these times of do-it-faster-cheaper-and-now, it's common for senior management to expect immediate results. How is it that we just put an initiative into place for reducing hand injuries and we've just had more carpal tunnel syndromes? It's critical to alert executives in advance that an initiative started today to prevent soft tissue, hand or any other cumulative type of injury will show results in 3-6 months.

- Move away from a "quick-fix" mentality - this only results in preventing the easy-to-deal-with injuries and rarely lasts. Don't bring in programs or experts who don't understand organizational realities, can't persuade senior managers, are unable to get credibility with employee leadership or who purport to solve complex injuries with a magic wand effectively canned approach.

- Set organizational expectations to look for more than a simplistic, one-short answer to complex problems. Educate professionals that ergonomics is more than just equipment design or monkey see-monkey do body motion.

- Don't be "disabled by "OK-disabled" dualistic thinking. In our experience working with hundreds of companies worldwide, most adult workers over the age of 30 have some weak areas or pain that affects them. We all learn to deal with twinges and weak spots while continuing to work. So, even with a moderate reported incidence rate, there may still be problems close to the surface that will turn into claims

- Go beyond - way beyond - incidence rate as a prime measure of success. I often ask executives: Which would you prefer? Five minor back strains that cost the company $500 each or one laminectomy that costs two hundred thousand dollars? Focusing on incident rate often sends messages to hide injuries. Where this is the case, the injuries that are most likely to be hidden are lower-level problems that, unreported, don't allow an Early Warning System of more severe and expensive problems to be missed.

- Measure organization-specific leading indicators to create buy-in and show success. Then publicize them. Think of leading indicators as road-markers denoting progress to your goals. Leading indicators of soft-tissue injury "success" might include:
  - heightened retention rate
  - improvements in scheduling metrics
  - reduced absenteeism
  - reports and observations of usage of safety methods
  - greater executive and supervisory safety activity
  - and more.

- Think of making systematic and continuous improvement - not just quarterly improvements. Conceive of a safety system, akin to a Quality process, as one of continuous improvement. Move away from a Program-of-the Month mentality.

- Be sure your interventions are practical. For example, many managers would agree that the ability to direct attention is critical to change in performance. But, for too many, the answer to this is to exhort people to "Pay Attention!" It seems an easy edict to follow, but people can be easily distracted by noise, surrounding activities and personal issues. And, when attention wanes, safety and productivity can decline. Poorly controlled attention can hamper doing common activities such as walking, climbing, lifting, driving or using tools. Mentally repetitive work can lull people into a loss of attention. Work overload from lean staffing may create demands to shift attention ever more quickly between tasks, reducing the practice of maintaining concentration and focus. And the fast pace of work leaves inadequate time for workers to learn a new task or to be effectively reinforced for safely performing unfamiliar jobs.

What most people don't realize is that they can control their attention-and consequently become safer, more productive employees. A person's attention span can be consciously changed and controlled with practice and training.

- Emphases up-front planning and shared fact-finding. Remember you are building towards solutions that will last in your unique organizational culture.

- Keep it alive - don't allow flickering of momentum to blow out. Provide excellent and continuing training. Training should be practical, emphasize underlying principles as well as specific applications, include a common plan for preventing CTDs, show how to apply ergonomics off-the-job, and develop staff as problem solvers who take personal responsibility for workplace improvements. Experience shows strong training, when implemented in a strategic manner that incorporates overall organizational goals. can energize a safety system and culture.

- If you have to take immediate action, maintain your perspective, don't become overwhelmed. According to Johnson & Johnson's ERGO program project manager Art Longmate, CPE, "At Johnson & Johnson, we feel ergonomics is a key to succeeding in the future. Although we have 15 professional ergonomists, we have still decided to switch from a 'Professional' model to a 'Cultural' model. Rather than have our companies feel they have to adopt an ergo problem all at once,

we're trying to make the steps defined and easily attainable - we're defining some consistent risk assessment and training tools, using a video program, etc. *The way to encourage ergonomics responsibility is to help them work through molehills rather than try to overcome mountains.*"

- Target the "right" areas for success. If you are doing a pilot, think this through (there are at least three kinds of strategic pilot approaches). For example, often, the worst place to target to make a considerable dent in strains and sprains or slips and is in an area that needs it the most. Bear in mind poor safety statistics often reflect unsupportive supervision and other organizational influences that resist a pilot intervention. If your objective is to build momentum for buy-in and success, it is better to select a relatively high-status department that requests an intervention, where the supervisor or manger is an ally, where you can likely have a strong impact and where there are minimal distracting pressures that might overshadow the intervention. However, if your objective is to determine if the initiative will be successful overall, it makes more sense to select a sample group that reflects the demographics, experience and exposures of the greater workforce overall.

Conclusion.

By thinking and acting strategically, you can lead your organization towards enhanced management support, employee personal responsibility and create significant and lasting help in breaking through the strains and sprains plateau. These goals are not overly ambitious. Real and substantive change is happening right now in organizations throughout the world.

Bibliography

Pater, R. (1999). *Leading From Within: Martial Arts Skills for Dynamic Business and Management.* Park Street Press.

Pater, R. (2001, Spring). Leadership Skills for the 21st Century, "*The Compass.*" Newsletter of the ASSE Management Practice Speciality. pp. 4-5.

Pater, R. (2001, Spring). Moving Smart: Preventing Driver Strains and Sprains. *Newsletter of the ASSE Transportation Practice Speciality.* p.5.

Pater, R. (2001, February). Getting High Level Employee Participation. *The Professional Journal.* pp. 33-34.

Pater, R. (2001, January). Attention Control for Safety and Productivity. *Professional Safety.*

Pater, R. (2001, January). Q & A: How Do You Get Management on the Safety Bandwagon? *Industrial Safety & Hygiene News.* p.6.

Pater, R. (2002, November). *The Secrets of Getting Your Employees to Participate at a High Level of Involvement.* [on-line] Available www.nationalbusiness.org [2002, November 28].

Pater, R. (2000, October). The Power of Paying Attention. *Industrial Safety & Hygiene News.* pp. 42, 45.

Pater, R. (2000, March). Breaking the Chain of Repeat Accidents. *Safe Workplace*

Pater, R. & Glenn, J. (1999, July) Get a Grip on Hand Safety. Safety + Health. pp. 64-66.

Pater, R. (1999, June). Movement Safety: Planning to Prevent Sprains and Strains and Slips and Falls. *Industrial Safety & Hygiene News.* pp. 34-35.

Pater, R. (1998, August). Seeking Safety Leadership from the Top. *Industrial Safety & Hygiene News.*

Pater, R. (1998, July). Fighting the Uphill Battle. *Industrial Safety & Hygiene News.*

Pater, R. (1997, May). The Manager's Ergonomic Responsibility. *Occupational Safety & Health.* pp. 87-88, 94.

Pater, R. (1996, February). Breaking the Chain: Helping Accident Repeaters. *Professional Safety.* pp. 20-23.

A Retrospective Cohort Study Of Workers' Compensation Indicators (Part 1).

Dr. Alan Verdonk of Curtin University of Technology, **Dr. Milos Nedved & Dr. Janis Jansz** of Edith Cowan University.

ABSTRACT: Since 1984 the role of the government in Western Australia, has changed in relation to occupational safety and health. This study considers the effect of the occupational safety and health legislation using workers' compensation accident data.

Academic and general staff accident data from a Western Australian University were researched. The time period was 20 years - 1979 through 1998 inclusive. 2,773 worker's compensation claims were analysed using Mann Whitney -U tests and cross-tabulations of safety prevention expenditure against the claims. The work environment provided the full spectrum of workplace activities ranging from domicile duties (student housing services) to heavy machinery work (mechanical maintenance) through to construction activity (building and operations), along with exposures to hazardous substances through research programs, and different types of office work activities. There were less costs for workers' compensation claims with 'time off' claims after the Act and this was attributed to having fewer days off work from injuries or diseases.

The study is unique in that it studies the topic of occupational health and safety from a 'micro' perspective of safety performance on a tertiary education work environment. The study has been beneficial in that it backs up the Robens Committee recommendations premise to reduce injuries and diseases in the workplace. It was shown from this study, whilst costs associated with claims rose after the Act, the comparative rates show a trend downward on the numbers of claims. The impact of lost time claims also declined. Therefore this study illustrated the additional management directives and resources provided that were directly attributed to the introduction of the occupational safety and health legislation, promulgated in Western Australia in 1988, did impact in a positive way on the workers compensation claim numbers in a university environment.

Background to the study

Imagine the setting of an office environment in 1979. Relatively speaking not that long ago. Now look at your own office environment today - no doubt there are differences between your image of yesteryear and your office of today. Some differences would include the arrangement of your 'personal space' along with the computer, photocopier and printer made available to you by your employer. For an employee in Western Australia, these twenty plus years have meant many changes. Occupational safety and health, in concert with workers' compensation, has undergone major transformation. Specifically, and pertaining to this research, since 1984, the role of the government in Western Australia has changed in relation to occupational health and safety. This study investigates the effect of occupational health and safety legislation promulgated by the Western Australian Government in 1984, using workers' compensation accident data of a multi-site organisation for the period of 1979 to 1998 inclusive.

Managing the occupational safety and health program has become one of management's most important responsibilities because failure to manage this area may lead to injuries, illness, property damage and environmental damage.

Managing an occupational safety and health program is no different from managing other areas of responsibility. All managers and supervisors, regardless of their specific positions, industry, or organisation must organise and review the activities under their control. A traditional measure of safety performance has depended upon accident statistics and in particular workers' compensation data. This traditional approach, in measuring safety performance, is used in this research to indicate the impact by the occupational health and safety legislation introduced into Western Australia. Workers' compensation data provides an historical perspective and therefore lends itself to retrospective studies of the performance of occupational safety and health legislative requirements. The implementation of a coordinated safety program and the measurement of safety performance are complementary activities and this study was designed to assist in understanding the impact of the Western Australian occupational safety and health legislation using workers' compensation data.

Hypothesis

The hypothesis for this study was as follows;

The Western Australian Occupational Safety and Health Act 1984 (as amended) had a positive impact on reducing workers' compensation claims in a university environment.

This hypothesis was addressed by completing a historical case-study analysis, using the workers' compensation data from a Western Australian University, for the twenty years 1979 to 1998 inclusive. The effects of interventions in the form of the change in Western Australian occupational safety and health legislation in 1984, with amendments promulgated in 1988, resulting in safety program initiatives required by this legislation along with the executive management changes, through out the 20 years, are investigated, analysed and discussed. The effect of occupational safety and health legislative requirements and executive management policy directives are scrutinised against the workers' compensation claims history. The University placed a major emphasis on the management of occupational safety and health at the time of the promulgation of the Western Australian Occupational Safety, Health and Welfare Act 1984 with Regulations (in 1988).

After 1988, the *University allocated one percent of the total salaries each year*, for preventative measures and payment of the workers' compensation premium. This was in excess of *$1 million per annum*. In 1997, the University achieved a silver award for workplaces safety and health - acknowledging it as the only educational institution in Western Australian to meet the requirements of the WorkSafe WA Safety Plan Audit requirements. The "WorkSafe WA Plan" audits the management practices needed to establish and maintain working environments where employees are not exposed to hazards.

Safe working environments, with safe work practices, plant and systems of work, are the important components of the general duties outlined in the Western Australian occupational health and safety legislation.

The WorkSafe Plan (1995, pp. 4 - 7) states:
"Establishing and maintaining control is the basis of sound business management and this includes the management of occupational safety and health. Effective management should result in working environments where risks are controlled and goods and services are produced efficiently and safely.

Establishing effective safety management systems is a lot more than simply identifying hazards, assessing risks and implementing risk controls, although these are essential processes. It is about a demonstrated commitment by the most senior people in an organisation to set safety objectives, oversee planning and implementation, consider feedback from performance reviews and continuously improve the system.

WorkSafe Plan is an assessment process that rates safety management systems and directs

attention to areas that could be improved. It can be used to compare the performance of organisations in the same industry and it can be repeated to regularly check on progress. Whilst it is generally accepted that medium and large organisations require comprehensive management systems, using the WorkSafe Plan makes good sense for organisations of all sizes.

WorkSafe Plan can be used to:
provide information on desirable safety management practices;
identify the strengths and weaknesses of management systems;
provide a measure for safety performance; and
direct attention to areas that could be improved.

WorkSafe Plan encourages the continuous improvement of safety performance as part of a best practice approach to safety management....

WorkSafe Plan Elements
WorkSafe Plan has five elements and each one has a standard that describes the performance expected for that element. The five elements are:

Management commitment
Planning
Consultation
Hazard Management and
Training."

The five elements of the plan have a number of indicators that are used to measure the extent to which the standards have been achieved. There are 50 indicators across the five elements. Each indicator is given a score out of ten, using a graduated rating method, and the scores are averaged to provide an overall rating of performance in each element. This study used the elements of the WorkSafe Plan to identify areas of interest that warrant closer inspection.

Injury Classifications
The injury classification system used in this research was set out by WorkSafe Australia in the Australian Standard AS 1885, "Workplace Injury and Disease Recording Standard." Analysis of the accident rates - Frequency, Incidence, and Severity, were completed for the full research period.

Methods & Materials
The workers' compensation data was analysed and documentation of occupational safety and health programs and expenditure was obtained through the University's Human Resources Department and Finance Department. A pilot study was performed in another University to ascertain if the methodology was robust and if the data was available in a form suitable to complete a more comprehensive study.

Workers' Compensation Data
The data outlining the workers' compensation performance was available from the University. For the purposes of this research study, the University and the insurers agreed to provide all data in electronic form subject to a confidentiality agreement. This data was validated against all hard copy records located at the University and coding irregularities were cross-checked and corrected.

The academic and general staff workers' compensation data from a Western Australian University was collated into categories. This data was coded using the Standards Association of Australia HB16-1988 and placed on the central computer system at the University and processed using the SPSS statistical package for Windows version 10.

The raw data was converted into Accident Rates - Frequency Rates, Incidence Rates, and Severity Rates as defined by Australian Standard AS 1855 part 1 (1990).

The time period was 20 years - 1979 through 1998 inclusive. The work environment provided a comprehensive range of workplace activities from domicile duties (student housing services) to heavy machinery work (mechanical maintenance) through to construction activity (building and operations) along with contrasting types of office work activities and hazardous chemical exposure through the numerous research situations.

The staff numbers were 2949 staff in 1979 increasing to 6938 staff in 1998. The ages of the staff population ranged from school leavers to staff of retirement age (in the latter years this being beyond the age of 65 years). The demographics indicate an aging workforce population with the staff remaining in the employ of the University for extended periods of their working lives. There were more female staff members than male staff members and a greater number of male staff held more senior positions. This tendency was changing in the latter years.

The annual reports for the University provided information on the number of staff, however this is shown as Full Time Equivalent (FTE) staffing numbers. This does not reflect the actual number of staff, that is head count number, but rather the hours worked equivalent to standard hours worked per position. To overcome this "head count" requirement, for producing accident rates, the number of Group Certificates sent to the Australian Taxation Office for each year was obtained. The inference being the number of Group Certificates represents the actual number of staff.

The workers' compensation data was presented in calendar-year format and the dollar amounts were standardised by using the consumer price index obtained from the Australian Bureau of Statistics. All the dollar values were converted into 1998 dollars.

Pilot Study
A Pilot Study to test the research methodology was undertaken using historical workers' compensation data from another Western Australian University, for the six years, January to December, of 1993 through 1998, inclusive. Examined in the Pilot study were the effects of a modification to the existing Western Australian Occupational Safety and Health Legislation that occurred in October 1995. Comparisons of intervention data in the form of introduction of an Occupational Safety and Health Adviser in 1994, the 1995 amendment to the Act, establishment of Occupational Safety and Health Committees and Occupational Safety and Health Representatives in 1995, and the introduction of manual handling training in 1996.

Both Universities used the same insurance company for these periods. The Universities and the insurer agreed to provide all data in a computerised electronic form. Therefore, no observations or questioning of people was conducted. The occupational safety and health programs at the two Universities were fully researched and descriptions of the management changes directly influenced by legislative requirements were analyzed.

The pilot study showed that the methodology used in this research was appropriate and reliable.

Data Analysis - Procedures
Evidence was researched to discover if managers, employees or safety and health representatives had any formal or informal training on legislative responsibilities, hazard identification, assessment or control for the twenty year period 1979 to 1998. From 1991, this was registered on the University's Human Resources computing system. Prior to 1991 samples of archived and present Personnel Files were examined. In total, sixty-eight managers personnel files were examined and six hundred and ninety four (10% of the total population in 1998) employee personnel files were examined to find evidence of training on legislative responsibilities, hazard identification, assessment or control.

All safety policies, procedures and forms for the reporting and investigation of accidents, and hazard reporting were collected and reviewed. These were analysed against the workers' compensation claims experiences over the full 20 years.

Duty Statements or Position Descriptions were reviewed to ascertain reference of responsibilities for occupational safety and health.

The Intervention Dates

The 1979 to 1998 annual workers' compensation injury data were categorized into intervention indicator periods. The intervention dates are based on;

intervention indicator {1} (1984), represents the appointment of a Safety Officer to the University and the introduction to the Western Australian Occupational Safety, Health and Welfare Act 1984;

intervention indicator {2} (1988), corresponds with promulgation of the Western Australian Occupational Safety, Health and Welfare Act 1984 (as amended) and the establishment of the University occupational safety and health committees along with the introduction of the University occupational safety and health policy;

intervention indicator {3} (1989), corresponds with the appointment of University elected safety and health representatives;

intervention indicator {4} (1991), represents the introduction of the University occupational safety and health training programs.

intervention indicator {5} (1993), represents the introduction of the University Risk Management Unit with the introduction of a full time Rehabilitation Coordinator.

Intervention indicator periods {6} corresponds to the changes in senior management personnel to ascertain any correlation with senior management directives (and commitment) and occupational safety and health performance.

(start)

CEO 1 =	Jan. 1979	to	Feb. 1980
CEO 2=	Feb. 1980	to	Jan.1987
CEO 3 =	Jan. 1987	to	March 1988
CEO.4 =	March 1988	to	Jan.1997
CEO 5 =	Jan.1997	to	Dec.1998

(finish)

The intervention period {1} to {6} was analyzed to determine any correlation between;

- Number of claims;
- Working days lost;
- Types of Injuries/Disease;
- Agent (hazards) causing Injuries/Disease;
- Site of body Injured/Diseased
- Costs;
- Lost time injuries, and
- Common law payments.

The interventions provided correlation data for the requirements of the Western Australian Occupational Health and Safety Act 1984 and workers' compensation claims experiences. In addition, to the data on workers' compensation, the total yearly expenditure on the safety program were evaluated against claims experiences.

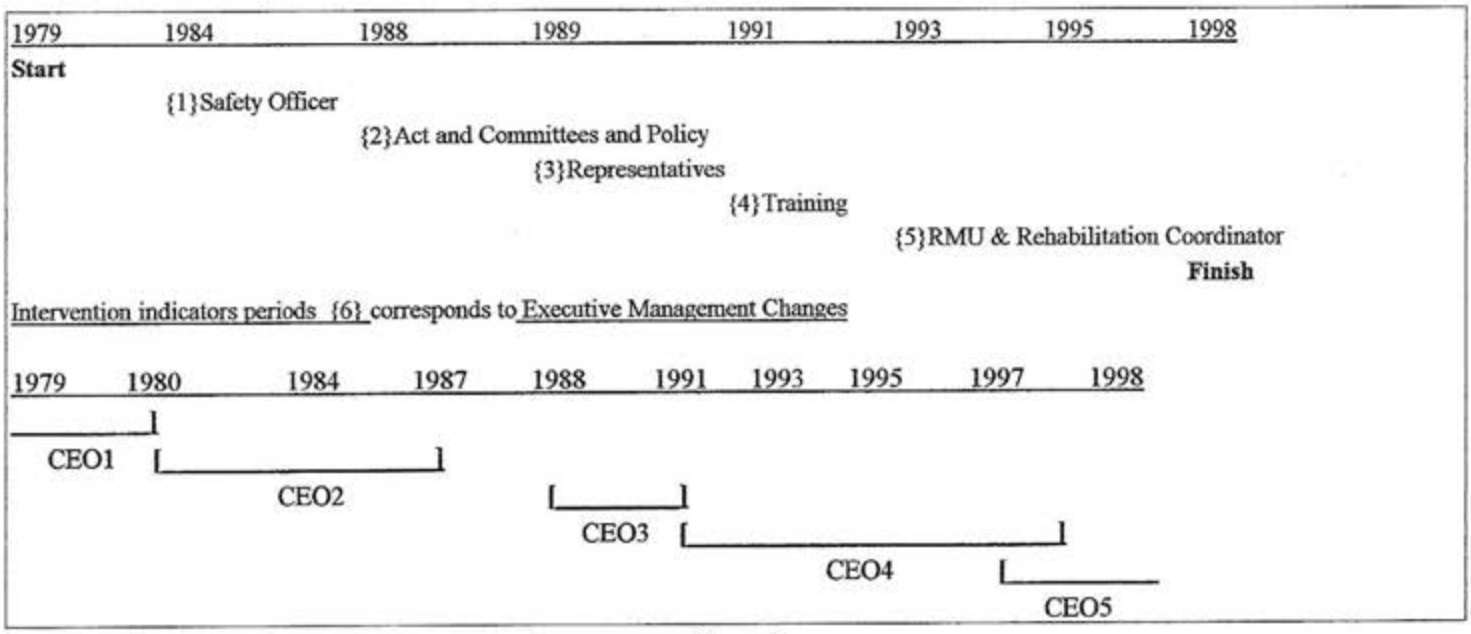


Figure 1
Time line for Organisational Change relating to Occupational Safety and Health

Statistical Analysis - Procedures

Coakes and Steed, (1998) p. 202 advises, *"the Mann-Whitney U tests the hypothesis that two independent samples come from populations having the same distribution. That is, this test is the equivalent to the independent groups t-test."*

As this research study evaluates workers' compensation claims from a Western Australian University this test was used to compare the different categories of claim types and costs. As data for each of the intervention indicator periods are not normally distributed, the non-parametric equivalent of the 't' test to be used to analyse and compare the study periods, was the Mann-Whitney - U Test. The level of significance used to interpret the research results was $p = 0.05$. The computer statistical package used for the analysis was SPSS 10.0 for Windows.

As already mentioned, the accident rates as defined by Australian Standard AS 1885, were calculated for frequency rates, incident rates and severity rates for all 20 years of the study period.

According to Sanders and McCormick (1992, p. 37) reliability is the; *"degree of consistency or stability of the measures of a variable over time or a cross representative samples."* A similar definition is provided by Christie (1988, p. 83) in which he states reliability is: *"the degree of stability exhibited when a measurement is repeated under identical conditions. Reliability refers to the degree to which the results of a measurement procedure can be replicated."*

A check of the data for reliability was undertaken on the University Accident or Injury Forms provided by the employee. These were checked against the data provided on the Workers' Compensation Claim Form for consistency and reliability. This data was also checked against the injury coding. For accuracy of the coding data, corrections were made of differences that were observed by independently reviewing each of the claims in question.

To support the data used in this research on the question of reliability, legislative requirements dictate that the information supplied must be confirmed before the acceptance of liability for a workers' compensation claim. A claim was not approved unless the correct procedures had been undertaken.

The data used in this research was considered reliable because:

- the data was required in a prescribed form as a statutory requirement;
- most of the data provided was of a personal nature;
- there were no technical difficulties within the data;
- the data was provided to the insurer in a short time frame in the 1970's and early 1980's and within three days of the occurrence, since 1991 as this became a statutory requirement;
- the workers' compensation form on which the data was provided by the injured employee was checked and verified for consistency and correctness by four independent people.

The checking process required:

(a) a witness(s) to verify that the information provided was a true and accurate account of the accident and injury details. The witness(s) provided their signature on the form.
(b) the employee's immediate supervisor was required to verify (a) above.
(c) the treating medical practitioner was required to confirm the site of injury.
(d) the insurer verified all of the above and other data supplied on the form.

While reliability is concerned with the consistency and repeatability, validity focuses on the accuracy of the results. A valid test is one that actually measures what it sets out to measure.

As Christie (1988, p. 83) suggests, *"validity is an expression of the degree to which a measurement measures what it purports to measure."*

The data collected and used in this research study was workers' compensation data provided in a legally prescribed format and was typical of the data collected and used by all workers' compensation insurers, State and Commonwealth authorities. As per statutory requirements, recurrent costs and days lost associated to an injury after the annual period cut-off date were incorporated into the annual period that the injury was reported. Active workers' compensation claims may incur further costs and working days lost after the annual period in which they occurred. Given this, the costs used in this research study were all costs (including common law payments) incurred in the annual period in which the injury occurred, this being the actual costs until closure of claims, even for the 1998 period. Therefore, as all claims were 'finalized' the data is very unlikely to be further influenced in terms of additional costs and additional working days lost. That is the data set is complete.

In considering validity, the primary question of this research applies to the impact of the legislative change in Western Australia on a University. The introduction of the occupational safety and health legislative requirements by policy, consultation through safety representatives and committees, management commitment, planning, hazard management and training were analyzed against the workers' compensation claims experiences of ten years prior to and ten years post introduction of this Western Australian legislation.

Total expenditure on the safety program and legislative requirements relating to the number of health and safety representatives and committees as well as audits and training provided data that could be quantified to assist addressing the validity question for this research. As workers' compensation data is used by governmental agencies to measure safety performance and liability has been accepted for all the claims to be used in this research and management commitment in the form of expenditure and executive directives with adherence to the legislative requirements - the data is considered reliable and valid.

Limitations

The organisations chosen for this study may be categorized as community service based. This organisations contains a variety of work places that were used for this study. However the use of the results of this research study may not necessarily apply to other types of industries, particularly high-risk industries, for example nuclear industry, mining, major construction, long haulage transport etc. where the work practices such as shift work and exposure to hazardous materials are core to the existence of the organisations. This limitation follows on from the work of Genn (1993).

There was some concern's that under reporting of accidents was possible, however it was considered the number of non reported accidents, by staff, was not significant. All managers and most staff were informed (or familiar) with the reporting system of telephoning a known number, located on a sticker placed on all telephone hand pieces, to report emergencies and accidents. It was also guaranteed that all accidents that required medical treatment (whether first aid only or from a doctor) at the University Health Service were reported in this study. Other on campus accidents that required medical attention off campus were reported through the workers' compensation system used in this study.

The safety performance indicators were conducted for the years 1979 to 1998. The data for these years were considered adequate for this part of the analysis. It was considered these accident related data were representative of the work places under analysis. The work activities were always diverse and the rationale to average out the dollar costs to 1998 indexed costs and review the accident results was considered acceptable as it was understood all the work activities were influenced by an established safety program after the 1984 period.

Total budget expenditure and number of committees as well as representatives along with policy directives and procedures measure the management performance. The quality of performance from these management measures may vary between individual staff performing their functions. Total dollars spent does not necessarily mean efficient and effective spending and may not provide a true indication of the performance. It was only used as an indicator.

A difficulty in using traditional measures of risk (accident data) was the limitation it had of measuring hazards causing occupational diseases when considering the safety program. That is, it is acknowledged there was a limitation of the measuring technique mainly due to the latent period associated with these occupational health factors. However, it is considered because the period of time for this study was 20 years this limitation may only effect to the claims for the latter years.

All the work places used were dynamic in nature. That is, whilst the work places for this study changed over the years, these changes were not related to the general work nature, for this study, that being a University. It then follows that whilst components of the safety program were introduced at various intervals, and the accident data was taken from 1979 through to 1998 inclusive, it should be noted the work place changes may also have a latent time frame influence on the results. It is considered the 20-year period was adequate to accommodate this influence.

The main findings of this study were that safety legislation in Western Australia caused considerable resources to be re-allocated to manage the requirements of the law. The blueprint of the mechanism for greater involvement in safety related decision-making was provided through the occupational safety and health representatives and committees as required by this legislation.

Using workers' compensation claims as a measure, it was found that the Western Australian Occupational Safety and Health Act 1984 (as Amended) did have a positive impact on reducing the comparative rates of workers' compensation claims within a University environment. It was found from the comparative rates when comparing before and after 1988 (the time the legislation was introduced) cost of claims per $100 of payroll, frequency, incidence, and severity rates were less after 1988.

Further information about the findings of this study and recommendations arising from it will be published in future issues of this Journal.

References

Christie, D. (1988). *A Guide to Occupational Epidemiology*. Sydney: CCH Australia Limited.

Coakes, S. J. and Steed, L.G. (1998). *SPSS: Analysis Without Anguish: Versions 7.0,7.5,8.0 for Windows*. Brisbane: Jacaranda Wiley.

Genn, H. (1993). Business Responses to the Regulation of Health and Safety in England. *Law and Policy, 15*(3), 219-231.

Sanders, S. M. and McCormick, E. J. (1992). *Human Factors in Engineering Design*. Sydney: McGraw-Hill.

WorkSafe Western Australia (1995). *Work Safe Plan*. [online] Available: http://www.safetyline.wa [2000, June 11].

Globalization, Multiculturalism, Culture & Professionalism

Dr. Henk Hemerik, Ass. Mech. Eng., Grad. Dip. Admin., Mbus, PhD. Honorary Member of the World Safety Organization, Consultant for ADB Manila, World Bank Washington DC. This paper was presented at the World Safety Organization's International Office for Malaysia, Occupational Safety & Health Seminar held from the 17th-18th of October 2002 in the Dynasty Hotel, Miri, Sarawak, Malaysia.

ABSTRACT: Ways that Managers and Environmental, Health and Safety Professionals can effectively deal with globalization, cultural differences and be a real professional are discussed.

Introduction

In the last decade of the 20th century a new phenomenon has emerged that is affecting the world trade and manufacturing more than any other expression in our vocabulary. This phenomenon is called: GLOBALIZATION. Globalization has had and still has an important impact on countries in the South East Asian Region such as Singapore, Indonesia, the Philippines, Malaysia, Thailand and also Australia. Many large companies from the United States, Europe, and Japan have opened up factories and offices in our region. Just to name a few, Sony is manufacturing in Malaysia, Philips is manufacturing in Indonesia etc. But this trend is not just limited to manufacturing because large Insurance companies and Banks now also operate in this region.

Globalization has seen an influx of foreign employees, in particular in managerial positions, into the region. How do these managers cope with the various aspects of life in the foreign countries and how well are they equipped to deal with the various challenges, in particular with respect to safety and health, culture and understanding their subordinates in a professional manner will be looked at in this paper.

Safety & Health

The Safety and Health profession is not something that was born a few years ago. It goes back to the 18th century with the invention of the steam engine which brought about the industrial revolution in Great Britain and beyond. It has come a long way and the safety and health of workers has made a great leap forward with the introduction of the recommendations from the Roben's report in the 1970's. The Occupational Safety, Health and Welfare Act was a direct result of the Roben's report. This act has been introduced in many Commonwealth countries such as Australia, Malaysia and Singapore. The most important part of the act no doubt is the section dealing with the responsibilities of both management and workers or the *Duty of Care* part. In addition there are sections on penalties for not complying with the Act, the appointment and duties of Inspectors, etc.

It is not the purpose of this paper to discuss the Act in detail. However, it is important to mention that the basic philosophy behind the Act is collaboration and consultation between three parties which are the Government, the Employers and the Employees. Therefore the question that can be asked is: How well are all people associated with the implementation of the Act trained to do their job? Is the expatriate manager aware of his/her obligations? Are Government departments aware of their responsibilities? Are the employees adhering to the responsibilities they have been given in the act?

Globalization is thought to be the answer to all the economic woes of the under-developed countries. No doubt it is very good for the multi-national companies to manufacture in countries where labor is very cheap, big profits can be made and Occupational Safety and Health is either non existent or, if the country is covered by the Act, little or no effort is made to uphold this Act. It is therefore important that government organizations allocate funds to train inspectors, ensure that inspections are carried out on a regular basis and, if necessary, offenders are prosecuted. Occupational Safety and Health is not just an idea that floats around in a vacuum. It is a profession and people trained in this field are professionals and as such must show a high degree of professionalism with intimate knowledge of the Act, abilities to act as consultants, and above all must be honest.

Management must play an important roll here. Consultation with all levels in the organization is a requirement that can not be under-estimated. The saying that: 'Managers are born and not made' may have been true 50 or more years ago, but it certainly does not apply now. Managers must be trained not only in all aspects related to the products the company and its marketing, but also in the human sciences and, because of that, they can as qualified professionals, demand high salaries.

Professionalism

With the extending boundaries, partly due to globalization, over which business these days is conducted, it is important that everybody involved is fully aware that business must be conducted in a professional way. An important link in the chain of command in any business is no doubt the director's or manager's secretary. Often the question is asked: 'what is the difference between a good and a great secretary'? Managers who are happy with the professional performance of their secretaries, will tell you that their secretaries are great because they:

a. take pride in their work, and show a personal commitment to quality;
b. reach out for responsibility;
c. do whatever it takes to get the job done;
d. really listen to the needs of those they serve;
e. are honest, trustworthy, and loyal; and
f. are open to constructive critique on how to improve, (Maister, 1997).

All of this can be summarized in one phrase: 'Great secretaries *care*'.

Two obvious points need to be made about this list. First and foremost, it is applicable to everyone in the organization, not just the secretaries. With virtually no modifications, this list could serve to delineate the defining characteristics of what differentiates a great consultant from a good one, a great lawyer from a good one, and so on. Indeed, this list is a reasonable *definition* of what it means to be a professional. Second, this list has nothing to do with technical skills. Few secretaries are deemed to be *'great'* because of their ability to type 95 words a minute or file documents in nanoseconds. Similarly, very few professionals become known by their clients as *'great'* purely as a result of technical abilities. The opposite of the word *'professional'* is not *'unprofessional'* but rather *'technician'*.

How many of so-called professionals are prepared to be held accountable for behaving according to the standards set by the above list? Part of the problem is what people believe professionalism to be. Real professionalism has little, if anything, to do with which business one is in, what role within that business one performs, or how many degrees one has.

Rather, it implies a pride in work, a commitment to quality, a dedication to the interests of the client, and a sincere desire to help. However, traditional definitions of professionalism are filled with references to status, educational attainment, 'noble' callings, and things like the right of practitioners to autonomy - the privilege of practicing free of direction. All of these definitions are self-interested.

Perhaps one reason for the scarcity of real professionalism may be that the recruiting process in professional firms is flawed. Real professionalism is about attitudes, and perhaps even about character. Yet few firms screen very effectively for this in their hiring, either at entry level or when bringing in more-experienced, lateral-entry hiring. Most hiring processes are about educational qualifications and technical skills. Too many professionals don't do what they do because they want to help their clients; they are in it only for the money or the personal prestige. These professionals may become good, and even earn good incomes, but they never will be considered great.

Being a professional is neither about money nor about professional fulfilment. Both of these are consequences of an unqualified dedication to excellence in serving clients and their needs. As Dale Carnegie wrote many years ago: "You'll have more fun and success helping other people achieve their goals than you will trying to reach your own goals". Perhaps it is time for our schools and professional firms alike to stop teaching students that they are to strive to be the best and the brightest, the special elite in the noblest profession, whatever that profession happens to be. Maybe schools and firms should find ways to teach more about what it is to serve a client, and about how to work with people whether they are your juniors, your seniors, your colleagues or of a different race or religion.

An important factor that suppresses people's desire to act professionally is the environment in which they work - how they are managed. It is easier to find the discipline and motivation to behave professionally if everyone around is doing the same. Everyone likes to feel that what they are doing has a purpose - that they are doing something meaningful in the world. If all anyone ever talks about is money, it gets very depressing. It is just not possible to pay to be dedicated, motivational professionals. Ultimately people must be inspired to be as professional as they know how to be. *To get people to be professionals, they must be treated as professionals and nothing less should be tolerated.*

Finally there are two questions that everyone needs to think about:

First: Do other people consider me a professional?

Second: Do I deal with those who work with me in such a way as to encourage their commitment and professionalism, or do I sometimes act to suppress it? How good am I at bringing out the professionalism in others?

Globalism & Culture

Globalization is a phenomenon that will stay with us and the problems associated with it should not be underestimated. Probably the most important aspect of globalization is culture. With the intermingling of people from various parts of the world with very different cultures it would be naive to say that no problems will be encountered. However there are ways of, if not avoiding, but certainly minimizing the effects of clashes between cultures.

Good office manners may not be listed in a job description, but they certainly play a crucial part in anyone's career. The ability to handle yourself properly today outweighs even technical skills (Kay duPont, 1993). When the experts on business manners are questioned, each would probably give slightly different explanations of what constitutes good behavior in business. The codes of business conduct in Japan or China differ greatly from those in Alabama or California. Within the United States itself, what is acceptable in New York might be offensive in New Mexico.

Business etiquette relies on tradition, culture, social expectations, and behavior standards. Those things are based on understanding, kindness, courtesy, efficiency, and common sense. Most organizations engaged in substantial international business will have some managers working overseas within all assignment options. Unfortunately, the failure rate of expatriates assigned to various countries is substantial, ranging between 25 and 40 percent. Such failures are expensive in the direct costs of bringing an expatriate home early and providing a replacement. Indirect costs, such as loss of self-esteem of executives and resultant business difficulties in the subsidiary, add to the total (Mendenhall & Oddou, 1985). Shortcomings in expatriate selection and training are at least the blame for high failure rates.

Most multinational corporations use technical skills as the major criterion to select individuals for overseas assignments. While technical skills are important for expatriate success, evidence also indicates the need to consider relational skills, the ability of an expatriate to relate effectively with host nationals. Necessary communication skills involve a willingness to use the hosts national language; confidence in carrying on communication with others; an ability to engage in local small talk, such as jokes, and comments on movies and sport events; and the desire to understand and relate well to host nationals (Mendenhall & Oddou, 1985).

Unfortunately, sufficient training of expatriates for assignment is often lacking. Inadequate expatriate training seems to stem from the opinion among human-resources administrators that training is ineffective, dissatisfaction of expatriate trainees with training, insufficient time for adequate training before departure, or views that such assignments are too short to warrant expensive training (Mendenhall & Oddou, 1985). Yet insufficient training can lead to serious difficulties as one expatriate manager discovered. Shortly after arrival in France the manager rented a luxurious apartment and invited all his office personnel to a large party. Unfortunately, he did not realize that it is unusual for French employees to be invited to their superior's home. Furthermore, the party involved people from all organizational levels, as well as their spouses, individuals who normally did not mix socially. This awkward situation got things off to a bad start, from which the manager never recovered (Copeland & Griggs, 1986).

The expatriate manager will be the focus of dealing with cultures. It has been recorded that some time ago an expatriate manager arranged a meeting in his office with a possible new Asian client which, if successful, would result in his company getting a big contract. At the beginning of the meeting everybody exchanged business cards as is usual. The client delegation consisted of 4 people. During the discussions the expatriate manager started to roll up one of the business cards that were given to him. Suddenly the delegation stopped talking and stared at him. They stood up and left the office without continuing the conversation. When they had left the manager realized he had rolled up the business card of the managing director. The moral of this story is that business cards are extremely important to Asian executives and rolling it up is an insult.

On the basis of his major study of a large multinational corporation, Hofstede (1980) argues that managers must consider particularly the power-distance index in determining appropriate leadership styles in different countries. In high-power-distance countries (such as Mexico, the Philippines and India), individuals accepts large differences in power distribution in institutions and organizations, and subordinates expect superiors to act autocratically, be somewhat paternalistic, be subject to different rules than

subordinates and enjoy privileges not available to them.

In medium-power-distance countries (such as Australia, New Zealand, the United States, Japan and Italy), subordinates expect consultation but will accept some autocratic behavior. They also expect laws and rules to apply to all, but expect some level of privileges and status symbols for superiors that are not available to subordinates.

In lower-power-distance countries (such as Sweden, Denmark and Israel), subordinates expect consultation on most issues, prefer a participative democratic leadership style, and may rebel or strike if superiors seem to step outside their authority. Typically, laws and rules are seen as applying to all employees, and privileges and status symbols for superiors are viewed as unacceptable (Hofstede 1980). Research such as Hofstede's provides a basic framework for thinking about leadership issues in different cultures. Organizational social responsibility and managerial ethics are other areas requiring special managerial consideration when organizations operate internationally.

The drive for globalization is certainly not restricted to the United States and European companies. More and more frequently it can be found that companies expanding internationally have their beginnings in the Asia-Pacific region. This is the case with South Korea's second largest car-maker, Kia Motors Corporation, that is actively involved in globalization. The '21st century globalization plan' was drawn up at a meeting of Kia's top executives in Jakarta as they took part in a ground-breaking ceremony for Indonesia's national car project. The plan called on Kia to produce 520,000 cars and 200,000 commercial vehicles abroad by 2001. Kia has now set up an Asian network involving Indonesia, the Philippines, Vietnam, India, Thailand and Malaysia to produce cars. Kia is now negotiating to set up a separate overseas network to produce buses and other commercial vehicles in seven countries including a joint-venture in Brazil.

Malaysia has also entered the globalization process. A good example of this is the Johor State Economic Development Corporation (JSEDC), a corporate body which has more than 150 companies organized around its 16 business divisions with nearly 19.000 staff in Malaysia and overseas (Bartol et. al, 1999). These 150 companies are very diverse. One makes ice; another manages a snooker center; others run bus services, manufacture door frames and window louvers, publish books, breed prawns, make toys, log timbers, manage tours and farm deer. The future holds some large challenges. The economic growth of the last few years has resulted in a labor shortage, and encouraging foreign investment in the state will continue to be an important aspect of JSEDC activities. Economic growth and industrialization are considered to be an on-going process which will probably never end. The JSEDC is trying to attract a selection of high-tech industries, both local and from overseas, and has been working on a joint-venture basis to develop technology parks near the University Technology Malaysia campus.

A key joint-venture partner in the JSEDC Techno Park is Singapore-based Lee Rubber. The Techno park, part of a wider Technopolis district, will be located near Skudai and a proposed highway that will link the second crossing to the North-South Expressway. According to Mr. Muhyiddin Mohd Yassin, chairman of the JSEDC, skills development centers have been established. Needless to say, the skills development centers are run along commercial lines. Mr. Mohd Yassin said that participants are being charged because nothing is for free. They pay for their training and so on. But this is the attraction of the market system. People are prepared to pay because they know that in the end they gain the certificate and with the certificate a better paying job.

In an organizations it is important for any manager to realize that the cultural profiles of the people he is working with will influence how far they are committed to the group's activities (Bartol et. al, 1999). An experiment done with groups of Asian, Afro, Hispanic, and Anglo-American workers showed marked differences. The first three represented a collectivist culture, which means that they make decisions as a group, and the fourth group represented an individualist culture meaning that they make decisions as individuals.

It was discovered that:

a. groups composed of collectivist individuals acted cooperatively more often than did the groups composed solely of individualists;
b. under task conditions, when cooperative behavior was expected from others, the collectivists tended to increase their level of cooperative behavior but the individualists did not.

In general, diverse groups are more likely to succeed when members:

a. value the exchange of alternative points of view;
b. cooperate to build group decisions;
c. respect each other's experiences and share their own;
d. value the opportunity for cross-cultural learning;
e. are tolerant of uncertainty and try to overcome the inefficiencies that arise when members of different cultures work together.

For cross-cultural groups the process of learning to work together is fostered by structured learning and training. However, the successful management of diversity is never easy and may be expensive in terms of adjustment time, training costs, and mistakes. Cross-cultural relationships impose stresses and strains, members of different cultures value different priorities, and differences in language and culture can cause serious misunderstandings.

The escape from attempting to manage cultural diversity is to ignore it. This means that management:

a. ignores cultural differences within the workforce;
b. downplays the significance of cultural differences.

This policy is followed when:

a. management lacks skills and resources to handle diversity;
b. the task offers no opportunities for deriving positive affects from diversity;
c. the negative effects outweigh the positive effects;
d. refusing to recognize diversity seems likely to minimize the negative effects.

This policy may work when culture groups are assigned different tasks and beyond sharing essential resources are otherwise independent. But when groups and group members are reciprocally integrated and need to collaborate, deep-seated ambiguities arise from not recognizing cultural differences. The policy of ignoring diversity can easily fail, while the opportunities for applying it to competitive advantage are sacrificed.

Dynamic cultures have never been stable. This was true even 400 years before the birth of Christ. In all areas of life, including the workplace, people must adjust to change. Today's manager has to develop skills of identifying those events that cause shifts in the value system, and to predict how these cultural shifts will affect his/her business. For example, these shifts may lead to changes in:

a. service and product markets;
b. industries; Old industries disappear, new industries are born;
c. the labor market; Old skills fall out of demand, new skills are at a premium; new social groups seek employment;
d. needs of workforce; Employees need different relations with superiors, peers, and subordinates; new structures and systems are needed to organize and motivate performance;

e. the environment; eg., political and legal constraints change; social agencies take on different responsibilities (in the Malaysian case, the government has had to invest more in agencies responsible for family welfare, marriage, counseling, and relieving social problems among the young).

Not everybody is convinced that globalization is the answer to all our economic woes. Stiglitz (2002) sums it up as follows: "The faceless symbols of the world economic order are under attack everywhere. Formerly uneventful meetings of obscure technocrats discussing mundane subjects such as concessional loans and trade quotas have now become the scene of raging street battles and huge demonstrations. The protests at the Seattle meeting of the World Trade Organization in 1999 were a shock. Since then, the movement has grown stronger and the fury has spread. Virtually every major meeting of the International Monetary Fund, the World Bank, and the World Trade Organization is now the scene of conflict and turmoil. The death of a protestor in Genoa in 2001 was just the beginning of what may be many more casualties in the war against globalization."

Conclusion

Despite the many demonstrations against globalization in various countries, it cannot be stopped. Multi-national companies will continue to open new businesses in countries other than their own. A good example of this is China where for example more and more McDonald's restaurants are being opened. As it cannot be stopped anybody interested in benefitting from the changing business climate must be prepared to accept the new corporate culture. Every would-be manager must be prepared to increase his/her knowledge of countries other than his/her own. Not only is it important to be familiar with the basic cultures of these countries but also the corporate cultures.

The running of a business in Australia is vastly different from running a business in Indonesia. Government regulations and restrictions must be studied before even contemplating accepting a job overseas. If you are a heavy drinker then do not apply for a job in Saudi-Arabia or Brunei where alcohol is a no-no.

Religion can have a big impact on the way of life in a country and in the past Westerners have been in trouble with the law because of complete ignorance of religious laws and the culture associated with that religion. It is very clear that globalization has made it necessary for workers at all levels, but in particular at the managerial level, to acquire additional skills and become more and more professional in the execution of their duties.

But it does not stop with the overseas workers. The locals must also be aware of differences in cultures. Although most people in the South East Asia Rim either speak English as a second language or have a reasonable command of English, English is a language that has various meanings for the same word. Workers both from overseas and locally must be fully aware of that. There is a vast difference between 'American' English and 'English' English as it is spoken in many countries in the Asian area. Additional studies will have to be undertaken to keep abreast with the latest developments. However, anybody willing to spend time and money to acquire new skills will in the end reap the benefits from our drive to pursue more and more globalization.

Professionalism does not stop with an academic qualification. Workers at all levels of the organization, from the sales girl in the department store to the Chief Executive Officer of a multi-national corporation, must understand that professionalism in their job is essential for the success or failure of the company. Because of the globalization process today, professionalism does not stop at home but is equally important abroad.

References

Bartol K., Martin D., Tein M. & Matthews G. (1999). *Management, A Pacific Rim Focus* (2nd ed.). Sydney, NSW: The McGraw-Hill Companies, Inc.

Copeland, L. & Griggs, L. (1986, June). Getting the best from Foreign Employees. *Management Review*. pp. 19-26.

Hofstede, G. (1980, Summer). Motivation, Leadership, and Organization: Do American Theories apply abroad? *Organizational Dynamics*. pp. 42-63

Kay duPont, M. (1993) *Business Etiquette and Professionalism*. Menlo Park, California, USA: Crisp Publications Inc.

Maister, D. (1997). *True Professionalism*. New York, NY: The Free Press.

Mendenhall, M & Oddou, G. (1985) The Dimensions of Expatriate Acculturation: A Review. *Academy of Management Review. 10*, pp. 39-47.

Stiglitz, J. (2002). *Globalization and its Discontents*. New York, NY: W.W. Norton and Company.

Biochemical Terrorism

Mr. John A. Singley, Ph.D., WSO-CSE, CSP, RPIH, Professor Division of Environmental Science and Safety Technology College of Information Technology and Engineering, Marshall University, Huntington, West Virginia

Abstract: The concept of biological and chemical terrorism is not new. Of the two weapons, biological has an age advantage over chemical. However, any biological or chemical material that can penetrate modern personal protective equipment, including respirators, could qualify for terrorist use. Moreover, biochemical weapons meet the terrorist's trends of rising numbers of casualties per terrorist strike. Terrorists also could use such weapons to achieve other goals such as disruption of functioning operations by business and government. Even the potential of such a strike or a hoax that a strike will take place can be as effective as the actual use of these weapons. There are some disadvantages to biochemical terrorism from the terror's viewpoint. Moral revulsion by the world's citizens could erode whatever existing support terrorist might have for their cause. Further, biochemical requires a high degree organization, presents tough technological challenges and certain skills within the terrorist organization. The borderline between biological and chemical weapons has become fuzzy because of technological advances. Therefore antiterrorist organizations need to be thoroughly aware of the potential for either type of strike. As terrorist skill with these weapons grow, the job of preventing such attacks becomes more difficult.

Terrorism as defined by Webster's New World College Dictionary (Agnes, 1999) is the act of terrorizing; using force or threats to demoralize intimidate or subjugate, especially such use as a political weapon. The concept of biological and chemical terrorism is not new. Of the two agents, biological agents have an age advantage, over chemical agents. (Eitzen, 1997) (Iverson, 1999). In the 6th Century B.C. the Assyrians poisoned the wells of their enemies with rye ergot. During the same century the Athenian used skunk cabbage to poison the water supplies of the city of Krissa during its siege. Biowarfare during sieges seemed to be popular as the Tartars threw plague-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.

Two other bioterror tactics were seen in historical times. The first of these tactics was the use of dead animals to poison water supplies. This was done at least once during Queen Ann's War in the American colonies. The Iroquois Indians contaminated the water supply of British troops using the skin of dead animals. In addition, during the American Civil War, Confederate troops poisoned water supplies with carcasses of dead animals, as reported in the memoirs of the Union General William T. Sherman. The other common biological tactic was the use of gifts to unsuspecting people to spread biological agents. During the 15th Century, Pizarro facilitated his conquest of South America by giving natives gifts of varioladen clothing. The British used similar tactics during the American French and Indian War (elsewhere known as the 7 year war). At Fort Pitt the commandant, Captain Ecuyer, gave Indians blankets and handkerchief contaminated with smallpox. Further, Sir Jeffrey Amherst gave similar laced blankets to Indians loyal to the French. Thus we see biological warfare has a long and checkered history in the annals of mankind's warfare. Most of these early uses of biological agents were done before we understood anything about germs. In those times, we only understood the results that could be obtained by using biological agents.

Of the two types of agents, biological and chemical, biological has the most terror potential, if one considers the earlier definition of terrorism. If a chemical attack is frightening, biological attack is a nightmare. While chemical agents can cause immediate deaths, biological agents can not only kill, but can also be contagious and effect reproduction. Thus biological agents can be more dangerous material. Chemical agents, on the other hand, have a more recent history. Dating back to the times we fully understood chemicals as toxic material. Chemical warfare agents have been traditionally thought of as agents to be used to kill the enemy in normal battlefields (Sidell, Patrick & Dashall, 2000). Thus their history as battlefield weapons dates back to only the 1st World War (Palazzo, 2000) and their use as terrorist agent against civilians to the late 20th Century. The most notable civilian attacks were Iraq against its Kurdish population and Japanese terrorist in the mid-1900's. A 1969 United Nations report defines chemical warfare agents as gaseous, liquid or solid chemicals that could be used with a direct toxic effect on man, animals or plants. With this definition, chemical agents moved from battlefield weapons to weapons of terrorism. Moreover, Parceleus' statement about toxicity (to paraphrase) "all things are poisonous, only the dose makes the difference" becomes important in the area of biochemical terrorism. We have thousands of poisonous chemicals, but only a few can be considered either as military weapons or terrorist weapons. Most of the chemical agents fall into five basic categories, nerve agents, cyanide like agents, blistering agents, pulmonary agents and riot control agents. Further, the chemical agents can be classified also into lethal of incapacitating categories. There are some chemicals that have been used by the military that do not fall into the chemical weapons category. These include napalm and smokes such as phosphoreus smokes. For the most part, the chemical agents used during the 1st World War, such as chlorine and phosgene, were gases. However, today's agents are generally liquids or solids.

Biological weapons whether as military weapons or terrorist weapons require either the use of live organisms or the toxins of organism. Spores of biological materials would be counted as live organisms. NATO (North Atlantic Treaty Organization) defines a biological agent as a weapon whose purpose is to injure or destroy humans, animals or plants. Biological agents can both kill and incapacitate. Ebola virus can kill as many as 90% of its victims in about a two-week period. At present, we have no cure or treatment of Ebola. In 1992, the same Japanese group that precipitated the use of chemical terror in Japan traveled to Zaire to obtain Ebola virus samples and learn how to cultivate them. In 1995, shortly after the Tokyo chemical incident, a laboratory technician in Ohio ordered the bubonic plague bacterium from a Maryland biomedical supply firm. He was mailed three vials of Yerseria pestis. Only his unfamiliarity with routine laboratory techniques lead to his being arrested. He later pleaded guilty to federal mail fraud. Interestingly, he needed only a fake letterhead and a credit card to get the material. This incident prompted a former government official to indicate that a major biological arsenal could be build in a 15-foot by 15-foot room needing only as little as $10,000 worth of equipment.

Sidell, Patrick & Dashall (2000) list four broad categories of biological agents. They are bacteria, rickettsia, toxins, and viruses. For some strange reason, the handbook omits protozoa, although such animals when introduced into city drinking water have been responsible for thousands of illnesses and hundreds of deaths in the United States alone (Singley & Thompson, 2001). Jane's Handbook includes the well known biological agents, such as inhalation Anthrax, cholera plague, Ebola, smallpox and botulism. Moreover, it includes such lesser-known agents as racin, Staphylococcal enteriotoxin B, T-2

Mycotoxins, Equine encephalitis, Tularemia and Q-fever as potential biological agents. Of the listed agents only Anthrax has currently been used as a terrorist agent. However, this does not diminish or negate the potential use of the others.

In 1972, one hundred thirty nine countries verified the Biological Weapons Convention. This convention includes such steps for control as on-site inspections. Given the small amount of expenditures and space needed to develop a bio-terrorism arsenal many say that the circumvention of this International agreement is easy. However, inspections of records of purchase and inventories for biological laboratories, pharmaceutical companies or even breweries of beer could produce evidence of potential bio-terrorism weapons and could lead to a tightening of acquiring or transfer of weapon type pathogens. At least this would make it more difficult to obtain pathogens for terrorist purposes.

Why with the potential for greater harm to the population than chemical agents have biological agents been so infrequently used for terrorism? Several explanations are plausible for this fact. One, there is a lack of sophisticated technology necessary to deliver the pathogens. Two, the potential users may fear infecting themselves. Three, there has been sentiment by the people that they are morally against biological weapons.

This last explanation is borne out by the 1972 Convention, which refers to biological weaponry as "repugnant to the conscious of mankind." This natural aversion for the use of biological weapons may have caused terrorist to reconsider the use of such weapons, lest their use alienate the public from their cause. There has been legal persistence for this position in the laws of Greek and Roman populations and even certain codes in India. Other considerations why biological terrorism has been minimal, even in this era of rampant terrorism, are the criteria for conducting effective biological terrorism. There are four components that are critical to the use of biological agents. One is the agent itself. The agent must be toxic to people, animals or plants and be able to be produced in large quantities. Further, the agent must be stable throughout its developmental history, delivery to the target and dissemination in the target area. Another criterion is to get the pathogenic material into an aerosol to provide the most potential deaths or injuries. Early work in the military included the uses of standard munitions for delivery and aerosol production. Such techniques may be well beyond the current technology of terrorist groups. However, this latter criterion can easily be circumvented by the use of simple garden sprayers or crop dusting techniques. This type of delivery system and aerosol production are well within the capability of known terrorist groups. There is still one additional deterrent to the use of biological agents. That is the weather. Only the most optimal conditions will support the delivery of biological agents to a huge population. Moreover, sunlight can destroy many of the potential agents, making a night delivery ideal. However, night deliver adds yet another layer of potential problems to the terrorists. For these reasons the spread of biological agents as aerosols is unlikely to occur (Cole, 1996).

More likely to occur is the repeat of the ancient tactics of biological warfare. In fact, the infection of water supplies, clothing and equipment of people present easy methods of delivery. We have seen these tactics work well in more ancient times and there is no reason to believe they would still not be effective. Consider for example, the cases of illnesses and death following the accidental introduction of Cryptospordium into water supplies or the transmission of Ebola virus through contact with living quarters and other items used in everyday living in Zaire. These ancient tactics are well within the technology of most terrorists, in particular those with a crusade where their individual lives become unimportant.

There are certain characteristics of achievement that terrorist groups have recently fixed upon. One, the indiscriminate use of force. Two, the use of technological advances to reach their goals. Three, spectacular media impact to amplify the terror aspect. Four, a decline in the number of terrorist attacks in time. Five, while decreasing the number of attacks, the number of causalities has increased per attack. Most of these characteristics favor biological weapon attack except the technology aspect. While the known terrorist group may possess mechanical expertise, the use of biological weapons requires expertise of a very sophisticated nature (Cole, 1996). Moreover, the terrorist group needs to have such expertise within the existing organization since reaching out beyond the current group could subject the group to detection. However, with the spread of terrorist organizations, such expertise is not outside the realm of possibility.

Chemical terrorism, on the other hand, is easier to deliver than biological terrorism. Most chemicals do not appreciably deteriorate with time. Further, they are easier to add to things like water and foodstuff. Chemicals could easily be used to destroy both animal and plant crops. Their method of delivery is easier. For example pesticide spraying and crop dusting are well known agricultural techniques, although the vagrancies of weather continue to play a large role with spraying and dusting. Much of the information about the use and effects of chemical weapons was gained during the 1st World War (Palazzo, 2001). The information falls into two broad categories, casualty agents and harassing agents. Among the casualty agents there are sub-classes such as blood agents, choking agents, nerve agents and vesicants. Harassing agents include riot control agents (Lachrymal and vomiting agents) and incapacitating agents (depressants, psychedelic drugs and stimulants).

Mustard agents are classified as vesicants or blistering agents. This category name is derived from mustard agents ability to cause injuries resembling burns with blisters. Mustards have a delayed effect with symptoms not occurring until 2-24 hours afer exposure. During the Iraq-Iran War, Iraq used several chemical agents including mustard agents. From a terrorist standpoint, mustard is a good choice because it causes many injuries requiring long-term care. In addition, mustard agents are simple to manufacture. Good examples of a blood agent are the arsines. Arsines are composed of a mustard agent mixed with Lewisite. The injuries caused by the Lewisite are similar to those caused by mustard alone. One important difference is the symptoms in Lewisite poisoning are immediate. However, because of the combination of the two agents, the material causes both immediate and delayed effects. There is a specific antidote to Lewisite called British Anti Lewisite (BAL). BAL gives excellent protection to local skin injuries both prior to exposure and after exposure. BAL can be used also against systemic poisoning.

Since the 2nd World War, nerve agents have almost entirely dominated the field of chemical weapons. They are stable, easily dispersed, and highly toxic and have very rapid effects by either cutaneous absorption or via respiration. All nerve agents belong to the chemical group of agents called organo-phosphoric compounds. Many belong to the same class as pesticides. In addition, nerve agents are fairly simple to manufacture and their raw materials are both inexpensive and readily available. All nerve agents are colorless liquids, making them difficult to detect. The more modern nerve agents are generally non-volatile and therefore are persistent chemical warfare agents over a long period of time. Many of these agents are soluble in water, even cold water, making them excellent choices for terrorist activities. Further, nerve agents have extremely rapid effects, including muscular paralysis.

Among the non-causality agents or harassing agents are the tear gases. These gases fall into the broad category of lachrymators. In low concentrations they cause pain to the eyes, the

flow of tears and difficulty in keeping ones eyes open. While they have been used mainly as training gases or riot control gases, they have been used also in warfare. They are generally dispersed as aerosols. Of interests is the fact that animals in contrast to people have low sensitivity to tear-gases. For this reason when used for crowd control, dogs and horses can still be used even if tear gas is present. It is doubtful if terrorist would use such gases, as their purpose of high causalities would not be achieved. However, if vomiting gases (another type of non-causality agent) are used in conjunction with other agents e.g. nerve gases, the non-causality agents may have a place in the terrorists play book.

There is another type of chemical agent that falls outside the classes listed above. This is hydrogen cyanide. It is a type of chemical agent that can be classified as causing general poisoning. It was supposedly used by Iraq both against Iran and against its own citizens, the Kurds. It is a gas with high toxicity and in sufficient amounts can rapidly lead to death. The Nazis in gas chambers used Zyklon B, a form of hydrogen cyanide. If released in a confined space it can quickly reach deadly levels. The toxicity effect is rapid, one usually seeing no symptoms, only sudden collapse and death.

In summary, while any substance that can be absorbed through the skin or easily inhaled into the body, could be eligible for biochemical weaponry, there are only a limited number of agents that currently are classified a potential terrorist weapons. Of these a still smaller number can legitimately be considered as highly potential weapons. Chemical agents would still be at the top of the list of potential weapons. However, the borderline between biological and chemical weapons has blurred because of rapid advances in biotechnology. Since both biological and chemical weapons have been used in the past, there is no reason not to believe they would be used in the future.

Bibliography:

Agnes, M., Editor (1999). Webster's new world college dictionary, 4th edition, New York: Macmillan

Cole, L.C. (1996). The specter of biological weapons, Scientific America, December

Eitzen, E.M. and E.T. Takafujil (1997). Historical overview of biological warfare. Textbook of military medicine, Medical aspects of chemical and biological warfare, Office of the surgeon general, Department of the army, pp 415-424;

Iverson, R.L. (1999). Biological warfare, A short history; http://www.wood.arms.mil/CHBULLETIN/Jan99/Biowarfare.htm.

Palazzo, A. (2000). Seeking victory on the western front. Lincoln: University of Nebraska Press

Sidell, F.R., Patrick, W.C. and Dashall, T.R. (2000). Jane's Chem-Bio Handbook. Alexandria, VA: Jane's Information Group

Singley, J.A. and Thompson, N.H. (2001), Waterborne pathogens: The hidden germ, Water conditioning & Purification, pp 72-75

Diary Of Events

World Safety Organization
Title: 17th International Environmental Safety & Health Conference & Expo
Venue: The Holiday Inn Denver International Airport Conference Center, Denver Colorado, USA
Dates: 3-6 November, 2003
Contact: Debbie Burgess Telephone (660) 747 3132, Fax (660) 747 2647, Email: wsowmc@socket.net

Title: Classification for Transport Training Course
Venue: Manchester Airport, United Kingdom
Date: 4th February, 2003
Contact: Chemical Hazards Communication Society, Email: chcs@chcs.org.uk Fax: +44 (0) 114 267 8936

Title: Minimising Human Errors & Violations
Venue: Café Royal, London, England
Date: 27-28 February, 2003
Contact: Joanne Roberts, Email: joanne.roberts@informa.com Telephone: +44 (0) 20 7017 5090.

Title: 68th Road Safety Congress Safer Driving: Reducing risks, crashes & casualties
Venue: Hilton Hotel, Blackpool, UK
Date: 3-5 March, 2003
Contact: The Royal Society for the Prevention of Accidents, www.rospa.com Telephone: +44 (0) 121 248 2120

Title: Safety & Health Expo 2003
Venue: Hong Kong Convention Centre, Hong Kong, SAR China
Date: 18-20 March, 2003
Contact: Tracy Chan, Publicity Officer, Occupational Safety & Health Council

Title: Surviving EU information: strategies & skills for success: 12th Annual Conference
Venue: Robinson College, Cambridge, UK
Date: 31 March - 1 April, 2003
Contact: Catherine Webb, Email: eia@libraries.manchester.gov.uk Telephone: +44 (0) 161 228 3691

Title: American Industrial Hygiene Conference & Expo: Navigating Uncharted Territory
Venue: Dallas, Texas, USA
Date: 10-15 May, 2003
Contact: Al Hce, Email: cdavis@aiha.org Telephone: +1 703 849 8888

Title: 8th International Symposium of the ISSA Research Section: Tools for the application of European Directives on health at the workplace - the example of chemical risk
Venue: Athens, Greece
Date: 19-21 May, 2003
Contact: ELINYAE, Hellenic Institute for Occupational Health & Safety, Email: mtrianti@elinyae.gr Telephone: +30 10 820 0220

Title: Toxicokinetic & Toxicodynamic Modelling in Occupational Health
Venue: Training Center, Gripsholm, Sweden
Date: 15-19 June, 2003
Contact: Gunilla Rasi, Email: gunilla.rasi@ttl.fi Telephone: +358 9 4747 2398

Title: Work-related Respiratory Hypersensitivity
Venue: The Sunborn Yacht Hotel, Naantali, Finland
Date: 10-15 July, 2003
Contact: Pirjo Turtianen, Email: pirjo.turtiainen@ttl.fi Telephone: +358 9 4747 2349

Title: Bullying & Harassment at work
Venue: Hotel Eckero, Aland, Finland
Date: 11-15 August, 2003
Contact: Gunilla Rasi, Email: gunilla.rasi@ttl.fi 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 Telephone: +358 9 4747 2398

Title: Occupational Safety & Health in the Construction: Impact of new demands & global management: 27th International Symposium ISSA Construction Section Lisbon, Portugal
Venue: Portugal
Date: 22-24 October, 2003
Contact: Telephone: +351 21 792 7059, Email: aiss2003@idict.gov.pt

Title: Food Safety in Europe 2003 Conference
Venue: Royal National Hotel, Russell Square, London, UK
Date: 3rd November, 2003
Contact: Mary Meadows, Email: mary@angelbc.co.uk Telephone: +44 (0) 1926 512 424

Title: European Occupational Safety, Health & the Environment 2003 Conference
Venue: Royal National Hotel, Russell Square, London, UK
Date: 4-5 November, 2003
Contact: Mary Meadows, Email: mary@angelbc.co.uk Telephone: +44 (0) 1926 512 424

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 of 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".

Published by the: WSO World Management Center
106 W Young Suite G, PO Box 518
Warrensburg, Missouri, 64093 U.S.A.
Telephone (660) 747-3132 Fax (660) 747-2647
www.worldsafety.org
wowmc@socket.net