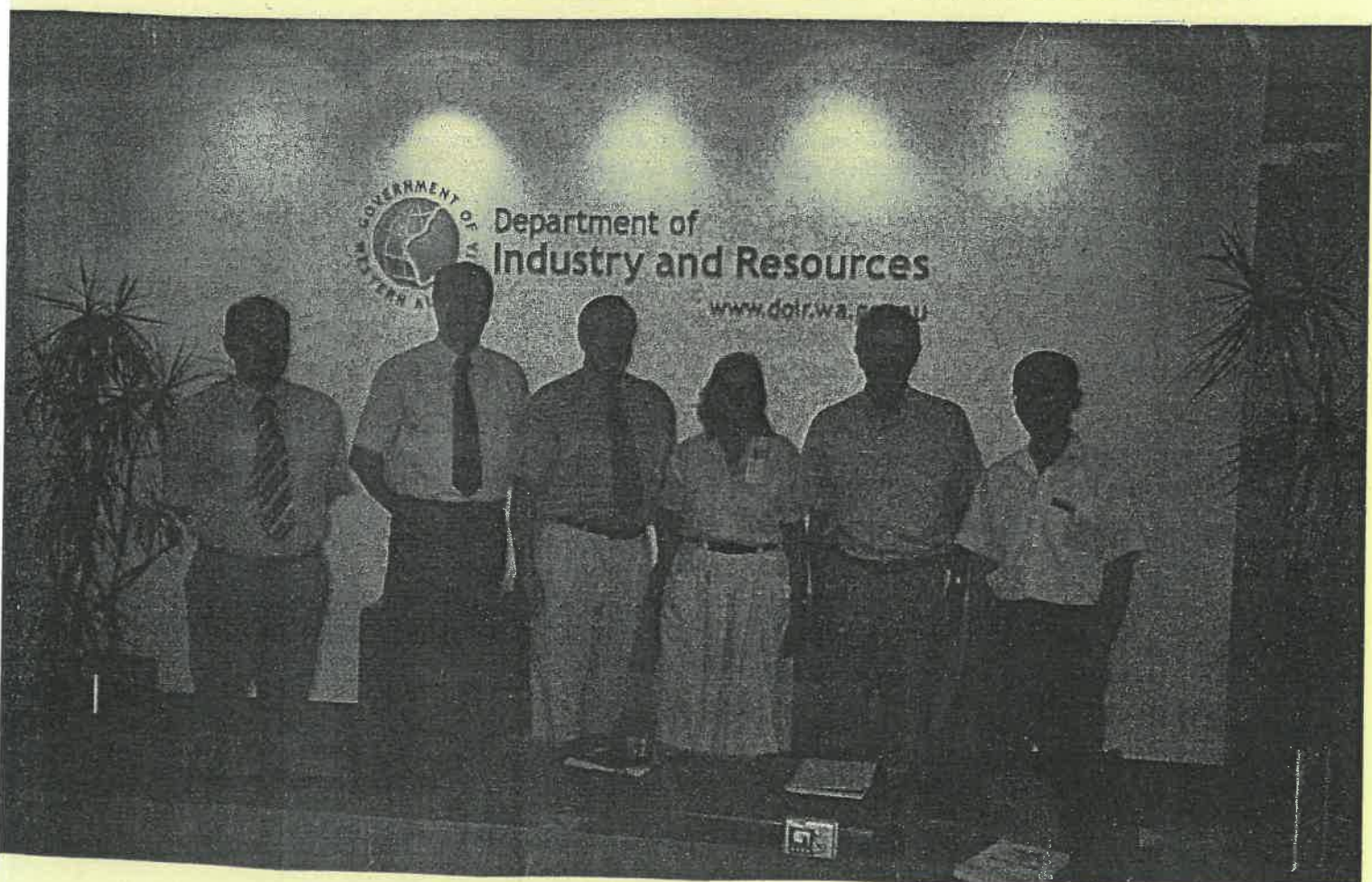


WORLD SAFETY JOURNAL

ESP - Enhanced Safety Principles

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- **Asbestos: The Hidden Menace - Part 2**
 - **Accident Models/Theories and Their Use in the Design of Emergency Procedures and Equipment**
 - **Report On The Current & Proposed Occupational Health & Safety Practices In The Australian Nickel Industry**
 - **Occupational Stress**
 - **The Effects of Organizational Safety and Health Culture On Female Employee Retention In The Rail Industry**
-



Pictured above: Members of the WSO's International Office of the Czech Republic, visiting Australia

WORLD SAFETY ORGANIZATION (WSO)

Profile

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

World Safety Organization Activities

The World Safety Organization:

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

Membership Benefits

The World Safety Organization:

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

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Dr. Janis Jansz, F.S.I.A.
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Australia, and Member of
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June
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December

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Editorial

By: Lon S. McDaniel, CEO
World Safety Organization

Dear Colleagues;

First let me tell you that if you were not able to make the WSO's 18th International Environmental Safety and Health Conference & Exposition, you missed out on excellent presentations. All attendees were very impressed on the caliber of speakers/presenters this year. You really need to try to make next years conference.

The WSO's 19th International Safety and Health Professional Development Conference, will be May 15 - 17, 2006, in Belleville Ontario Canada (Belleville is Northeast of Toronto). Our conference is being co-sponsored by the WSO and Electrolab Training Systems. So please start making your arrangements now. You will need to start making sure that your passports and visas are in order. Starting, January 1, 1006, customs will be stepping up their security checks, so please be prepared.

Did you know that WSO Certifications are accredited through the International Certification Accreditation Board (ICAB). The WSO is also working on getting further accreditation through the ANSI's program "Personnel Certification Standards ISO/IEC 17024. One of the pre-requisites for this is that we have a signed code of ethics form in every members file. So if you are a WSO member and have not filled this form out yet, please contact the World Management Center and make arrangements for one of the forms to be sent to you.

We are also in the process of getting our exams on line. Which means that once an applicants certification package has been evaluated and if approved, would be able to take their exam at their computer, if this would be more convenient for the applicant than finding a monitor for the exam to be mailed to. This could potentially save the applicant some time and energy. We have also implemented new re-evaluation form. This form is filled out every three years by our certified members, showing how the certified member has grown and stayed current in the ever changing safety field.

Another huge mile stone is...The WSO is 30 years old this year. We would like to think that the WSO has come a long way. However, we must also say that the WSO is still growing, not only growing but getting better. If you have any thoughts or suggestions for the WSO on how it might further improve, please drop us a line or call us. Our email is info@worldsafety.org our telephone numbers are (660) 747-3132; (660) 747-2235 fax number (660) 747-2647, our address is World Safety Organization, PO Box 518, Warrensburg Missouri 64093 USA. Or you can also check out our newly revamped website at www.worldsafety.org.

If we can be of assistance, please do not hesitate to contact us.

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:

Debbie Burgess

World Safety Organization

106 W Young Avenue, Suite G, PO Box 518

Warrensburg Missouri, 64093, United States of America

Or Emailed to editorialstaff@worldsafety.org

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

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

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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 Organization is open to all individuals and entities involved in the safety and accident prevention field. Regardless of race, color, creed, ideology, religion, social status, sex or political beliefs.

Membership Categories

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

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

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

Annual Membership fee in United States Dollars is as follows:

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

*) For your countries fee rate, please contact the World Management Center

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

APPLICATION FOR WORLD SAFETY ORGANIZATION MEMBERSHIP

Please print or type:

Name (Last, first, middle): _____

Complete Mailing Address (please indicate if this is a Home or Work address): _____

Work Telephone Number: _____ Fax Number: _____

Home Telephone Number: _____ email: _____

For Affiliate Members only

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

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

- | | | |
|---|--|--|
| <input type="checkbox"/> Occupational Safety & Health | <input type="checkbox"/> Fire Safety/Science | <input type="checkbox"/> Environmental Health & Safety |
| <input type="checkbox"/> Security/Safety | <input type="checkbox"/> Safety/Loss Control Science | <input type="checkbox"/> Public Health/Safety |
| <input type="checkbox"/> Construction Safety | <input type="checkbox"/> Transport Safety | <input type="checkbox"/> Industrial Hygiene |
| <input type="checkbox"/> Safety Research | <input type="checkbox"/> Aviation Safety | <input type="checkbox"/> Ergonomics |
| <input type="checkbox"/> Product Safety | <input type="checkbox"/> Risk Management | <input type="checkbox"/> Petroleum Safety |
| <input type="checkbox"/> Nuclear Safety | <input type="checkbox"/> HazMat Management | <input type="checkbox"/> Other _____ |

Please forward Application and check/money order to:
 WSO, World Management Center, 106 West Young Avenue Suite G,
 PO Box 518, Warrensburg, MO, 64093, USA

World Safety Organization International Office Reports

The following are the reports of four of the World Safety Organization International Offices that were presented and discussed at the World Safety Organization's 18th Environmental Safety and Health Conference in Denver Colorado May 1-4, 2005. The first report comes from the World Safety Organization's International Office for the Philippines.

PHILIPPINES

Annual Activities Report for 2004 for the World Safety Organization's International Office for the Philippines.

I am very proud report to you the highlights of the activities and accelerated growth of the World Safety Organization's International Office for the Philippines over the last year on the following significant items:

1. "Making Safety a Way of Life Worldwide" Awareness Advocacies
2. World Safety Organization (WSO) International Membership promotion
3. Training Programs and Related Services
4. WSO Philippine Chapter Activities.

1. "Making Safety a Way of Life...Worldwide" Awareness Advocacies.

The WSO was involved in several advocacy campaigns in the promotion of accident prevention, disaster and emergency preparedness and in the promotion of "Making Safety of Life...Worldwide" in collaboration with local community organizations, safety organizations, school organizations, the government and media organizations throughout the Philippines.

One of the most significant activities was the Memorandum of Understanding (MOU) signed between WSO, the City Government of Vigan (Listed as Heritage City by UNESCO) and the University of Northern Philippines appointing WSO as the consultant to the city on Disaster and Emergency Preparedness Management. In December 13-14, 2004, the Spanish Government sponsored Disaster and Emergency Preparedness Management Training which was conducted by WSO for the faculties of the University of Northern Philippines (UNP) and administrators of the of the City of Vigan. The program included the Fire Chief, Chief of Police, Fire Brigade & Emergency Response Team and other key responsible personnel who participated in the successful training.

The WSO collaborated with the Safety, Quality & Leadership Team (SQLT), an organization of Intel contractors in the Philippines, which held its 1st Safety Congress on the 2nd of July 2004 at Richmond Hotel, Pasig City. Eng. Alfredo A. De La Rosa, Jr., Director of the WSO International Office for the Philippines, was invited to present papers on the subject "*What Can a Two Unit Subject Do To Instill A Culture of Safety*". This was initiated to enlighten the Commission on Higher Education (CHED), Philippines on the standardization of safety subjects for undergraduate students. The Dean of Schools and Universities, the Board of Examiners of the Professional Regulations Commission, members of the academic community, managers and executive of the industrial organizations, safety professionals were in attendance.

The WSO was also invited by the Institute of Integrated Electrical Engineers of the Philippines, Inc. (IIEE) in its annual convention on November 22, 2003, Eng. De La Rosa gave a technical presentation on the Occupational Safety and Health Assessment Series (OSHAS 18001) which was well appreciated by the Philippines electrical engineers.

WSO, though the representation of Eng. Alfredo A. De La Rosa, Jr., was honored by being invited as the keynote/convention speaker in Quezon City Industrial Safety Convention in its 32nd Anniversary the 19th of October 2003 at the Occupational Safety and Health Centre,

Quezon City, Philippines.

WSO, through the representation of Eng. Alfredo A. De La Rosa, Jr. was honoured to be invited as a keynote speaker and Inducting Officer in the 18th Annual Convention of the Philippine Society of Non-Destructive Testing (PSNT) at the Sulo Hotel, Quezon City, Philippines.

The World Safety Organization is the charter and founding member of the Association of Safety and Health Training Organization of the Philippines, Inc. (ASHTOP) and thereby co-sponsored its 1st General Convention on May 5-7, 2004 at the Tagaytay International Convention Center, Tagaytay City, Philippines. The WSO was awarded the most number of invitees that participated. In conjunction with the conventions, the WSO sponsored the 2nd WSO Golf Tournament in the promotion camaraderie amongst safety professionals in the Philippines. Eng. De La Rosa was also emceed at the convention. Eng. Ben Hur O. Refuerzo, WSO Affiliate member is the current Vice-Chairman of ASHTOP.

The WSO sponsored the School Safety Seminar for the grade school students of University of Sto. Tomas on March 28-29, 2004. Discussion with various community groups and primary schools is in progress for the WSO Philippine Chapter in advocacy build-up in promoting child and school safety awareness.

The WSO has continuously supported other local safety organizations by sponsoring activities related to the promotion of Occupational Health, Safety and Accident Prevention. The WSO, though it's International Office Director Alfredo A. De La Rosa, Jr., has co-founded the Association of Safety Practitioners of the Philippines, Inc. (ASPPPI) and is proud to be named and listed in the history profile of this association.

The WSO has continuously supported the Safety Organization of the Philippines, Inc. (SOPPI) and are committed to co-sponsor its Fire Safety Congress to be held on April 11-12, 2005 as part of the advocacy build-up and the promotion of safety in the industrial organizations.

The WSO has institutionalized the awarding of Safety Recognition for those companies achieving milestones in their Zero Accident Program, No Lost-Time Efforts, etc. Safety Recognition has been awarded to companies with exemplary occupational safety and health and accident program. This has helped in the occupational safety motivation of management and workers to maintain a safe workplace and safe work processes.

2. WSO International Membership promotions

The World Safety Organization in the Philippines is directing its effort in promoting Affiliate and Institutional International Membership of the World Safety Organization. The reduction of Affiliate Membership Fees to USD 40.00 for Filipinos is a very significant decision by the leaders of the WSO WMC.

The WSO professional certification program is also being promoted and has solicited interest amongst safety professionals in the Philippines. There were several inquiries received though email and phone calls. People who inquire were provided with the necessary information. Queries were also directed to the WSO World Management Center and people were invited to visit the WSO website.

Communication between the WSO International Office in the Philippines and the WSO World Management Center is very much evident.

Several brochures and WSO membership application forms were reprinted. These were distributed mostly at exhibits, safety conventions, safety symposiums, etc. The brochures and other information about the World Safety Organization have become a permanent part of the seminar kit distributed during seminars and special events in the Philippines. We accept the challenge to generate substantial membership enlistments to the World Safety Organization for the year 2005.

3. Training Program and Related Services

The World Safety Organization-International Office for Philippines is duly accredited by the Department of Labor and Employment. The WSO is an authorized partner of the government in its objective to increase the competence of safety practitioners in the Philippines in the annual report submitted to Department of Labor and Employment, Philippines for 2004.

The WSO doubled its achievements in 2003 -2004 and emerged as the most active partner with the government among it's peers. WSO conducted 57 training /seminars in 2004, 32 of which were the government prescribed Basic Occupational Safety and Health Course (40 hours), the rest were other occupational safety and health related courses.

These achievements have provided **1,440 individuals** with excellent safety training provided by the WSO. This education also benefitted **518 Philippine companies** because of the safety training that was acquired by their representatives who actively participated in the WSO Training Programs.

In 2004, the WSO started training program in the Visayas and Mindanao Region. Our International Office has conducted several programs in Cebu, 2 successful program in Cagayan De Oro City, Mindanao and 2 successful programs in Davao City, Mindanao. Most of these activities were in collaboration with the Regional Offices of the Department of Labor whereby we also trained government Labor Inspectors in every region, sponsored/free of charge by WSO. The WSO has in turn gained new books and training equipments as well as the provision of necessary and required benefits to its employees who have been with the WSO in the Philippines since 1995.

We are very proud that the WSO International Office in the Philippines has become the premium occupational safety and health training provider in the Philippines with a proven track record of providing training to major oil companies, major petrochemical, semiconductor and other manufacturing companies. Recently, the WSO has assisted Petron Corporations' safety programs to have its contractors and key personnel be trained and eventually accredited as Safety Practitioners by the Philippine Government.

The World Safety Organization-International Office for the Philippines was also granted the regular accreditation as an OSH Consulting Organization by the Department of Labor & Employment. WSO Certifications on OSH compliance and other Environmental Health and Safety assessments has become the one of the most credible safety qualifications and are a basis for safety reviews in the workplace in the

Philippines.

4. WSO Philippine Chapter

The WSO Philippine Chapter is heading towards new directions in focusing on safety awareness in schools and local communities. Two hours and half day seminar modules were designed for WSO sponsored free seminars for schools and different villages throughout the country. Initially, the coverage will be Metro Manila and then the rest of the country.

Trainers and facilitators for these projects will be supported free of charge by safety professionals teaching under the World Safety Organization-International Office for the Philippines. The objective of this project is to instil a culture of safety for the young kids, for school and home safety as well as safety awareness for the parents and the local community local government units (barangays).

Other possible advocacy projects will be the printing of safety colouring books for kids to be distributed to the grade schools and other projects that may be directed to the Executive Action Committee (EAC) of the WSO World Management Center. The revival of the World Safety Journal, Philippine Edition and the WSO Newsletter, Philippine edition, is also being considered to support the advocacy programs of the World Safety Organization in the Philippines.

To aid the momentum of growth and progress of the WSO activities in the Philippines, we have envisioned in the near future to hold a WSO Regional Conference or convince the WSO leadership and the WSO Board of Directors to hold the Annual World Safety and Accident Prevention Conference in Manila, Philippines in the near future.

The WSO Philippine Chapter has been re-organized to effectively run the advocacy projects. Officer bearers are as follows:

World Safety Organization Philippine Chapter List of Officers

President & Chairman of the Board:

Eng. Alfredo A. De La Rosa, Jr.

Vice President-Vice Chairman of the Board:

Eng. James F. Porter, Jr.

Vice President- Training:

Eng. Ben Hur O. Refuerzo

Vice President- Finance & Business Development:

Eng. Richard S. Cheng

Secretary:

Mr. Ronald M. Cayabyab

Council Committee Members:

Eng. Alexander B. Trillana

Eng. Dindo I. Tison

Eng. Eduardo S. Ajero

Chairman Emeritus & Adviser:

Dr. Simeon Nicolas Chan

Eng. Frumencio T. Tan

Ms. Valeriana G. Reyes

The address for the World Safety Organisation International Office for the Philippines is, Unit C., Dominion Building, 162 B. Gonzales Street, Loyola Heights, 1101 Quezon City, Philippines. Phone: (632) 434 8445. Fax: (632) 434 5060.

respectfully submitted by: Alfredo A. De La Rosa, Jr.,

Email: info@wsophil.org

Director, WSO International Office for the Philippines

The next report comes from the World Safety Organization International Office in Macedonia

MACEDONIA

This past year was pretty busy for the World Safety Organization International Office for Macedonia which is located with the

Macedonian Occupational Safety and Health Association.

In January 2004, in conjunction with the Government of the Republic of Macedonia, Sector for Euro Integration, we organized a Round Table

Forum where occupational safety and health specialist from Macedonia were invited and participated in a discussion about "Aligning the Macedonian Occupational Safety and Health Regulation with the European Union". Nearly 120 Occupational Safety and Health Specialist participated. As a result of this Round Table Discussion we have produced a Study where differences in Local and European Union regulations were emphasized and suggested methods for their overcoming the differences were recorded for government use.

In March 2004 we participate in the World Health Organization Program, conducted by Macedonian Labour Medicine. We assisted in preparing a National Strategy on how Macedonian Companies should approach performing Previous and Periodical Medical Check ups, identify target groups and frequency of performing these medical check ups. What needs to be done is now to determine the occupations which will be subjected to these examinations and already this list is submitted to the Ministry of Health and Ministry of Labour for their consideration.

During April 2004 we organized an Occupational Safety and Health Seminar where we had Macedonian Occupational Safety and Health Association (MOSHA) Members and Occupational Safety and Health Specialist presenting their studies regarding "Right choice and usage of Personal Protective Equipment (PPE) - new requirements and market offer". This seminar was visited by 90 Occupational Safety and Health Specialist from Macedonia. During this Seminar people also had a chance to participate in the Expo of PPE prepared by the Sponsors.

Through out the year the World Safety Organization International Office for Macedonia in conjunction with MOSHA has delivered various training sessions where Safety Representatives from the Garment Industry and the Construction Industry were introduced to the rights and obligations that the Safety Representative has, the scope of the Occupational Safety and Health Representative work, work hazard

assessment, communicating hazards, team building, effective communication, etc. During last year we have trained 984 Safety Representatives. During 2005 we plan to open an Info center where all occupational safety and health representatives can get relevant occupational safety and health information and support from occupational safety and health professionals.

In November 2004 the World Safety Organization International Office for Macedonia, in conjunction with MOSHA, participated in the Euro OSH Conference held in London United Kingdom where Occupational Safety and Health Specialist from around the world shared their experience and knowledge.

In 2004 the World Safety Organization International Office for Macedonia in conjunction with MOSHA prepared and submitted a project proposal to the Norwegian Ministry of foreign affairs. The main goal of this project was to assist with the "Implementation and Enforcement of EU Occupational Safety and Health Standards in the Garment Industry". This project will be conducted over 4 years and the forecasted budget to run the program is 2.072.818,50. The project has been approved and it officially commenced on January 1st 2005. The Project inauguration was performed by the Vice Prime Minister of the Government of the Republic Macedonia, Ms. Radmila Sekerinska.

As a forthcoming activity we see opening of an International Labour Organisation (ILO) CIS Centre in Macedonia. We have preliminary approval from the ILO - CEET office in Budapest Hungary for opening this research collaboration center.

Our new address is Makedosnko zdruzenie za zastita pri rabota. Ul. "Nevena Georgieva Dunja" br. 13 lokal 1, 1000 Skopje, Macedonia. Our E-mail address is kontakt@mzzpr.org.mk Our web address is [www: www.mzzpr.org.mk](http://www.mzzpr.org.mk)

respectfully submitted by: **Milan Petkovski**
Director WSO International Office for Macedonia.

The third report comes from the World Safety Organization International Office for Australia

AUSTRALIA

Annual activities report for 2004 for the World Safety Organization's International Office for Australia.

1. Educational activities.

Over the last year there have been several tertiary education courses that have been developed by the staff of the World Safety Organization International Office for Australia who are on the academic staff of Edith Cowan University in Perth Western Australia. These courses have been approved by the University, and two of them are already being ran. The first is a Graduate Certificate in Occupational Safety and Health. This course has the following units of study.

- Prevention of accidents and ill health at work 1;
- Occupational health and safety management, technology and ergonomics 1, and
- Rehabilitation, compensation and health promotion.

This course provides basic knowledge to qualify graduates to work world wide as Safety Professionals.

The second course is a Master of Occupational and Environmental Safety and Health. This professional Masters degree bridges the traditional divide between the two related disciplines of occupational safety and environmental health. The course was developed to better equip Safety, Health and Environmental Managers to cross over these traditional boundaries. The course was designed to be flexible in delivery with exit points at a Graduate Certificate, Postgraduate Diploma and Master level. The first 3 units of study in this course are the above Graduate Certificate units. In addition to these units of study

the course contains the following units.

Postgraduate Diploma in Occupational Safety and Health.

- Occupational hygiene and toxicology.
- System safety management and emergency planning.
- Prevention of accidents and ill health at work 2.

Master of Occupational and Environmental Safety and Health.

(The above 6 units as well as the following units of study)

- Occupational health and safety management, technology and ergonomics 2.
- Fundamentals of environmental and occupational safety and health.
- Principles of environmental health.

The third course developed was a Graduate Certificate in Emergency Management. This course was designed to develop graduates with the skills and knowledge to understand the legal requirements for emergency management, conduct a risk analysis and risk control program, formulate action plans to manage local, national and regional man made and natural disasters, develop business continuity policies and plans and to be an effective leader and team member in emergency management and disaster prevention. The course caters for the information knowledge requirements of a wide range of emergency management practitioners including emergency service officers, safety professionals, business owners, occupational health nurses, risk managers, security personnel and others who need to increase their skills or up date their knowledge and skills in emergency management and business continuity planning. This course has the following units

of study.

- Foundation studies in emergency management.
- Corporate risk management.
- System safety management and emergency planning.

The first enrolments for the Emergency Management course will be in semester one, 2006.

2. Research and publications

Two students completed PhD research studies. Dr. Nick Merdith completed a PhD which identified ways to prevent back injuries occurring due to occupational activities. Dr. Brent Pasula completed research which identified causes of stress and occupational safety and health problems that occurred following the merger of companies.

The following research is also being conducted.

- Occupational Respiratory Health Surveillance at Murin Murrin Mine Site. [Part of a research grant for Establishing best practice protocols in the management of occupational and environmental health in a high risk mining ore processing environment.] (Martyn Cross)
- An evaluation of the efficacy of a generic safety induction system for the Australian Mining Industry. (Ian Douglas)
- Study of occupational enclosed spaces fatalities. (Ciaran MacCarron)
- Creating a zero incident culture in a Western Australian Foundry. (Margaret Thompson)
- What factors influence the uptake of Occupational Health and Safety Management Systems in Tasmanian Small Businesses? (Karen D'Alessandro)
- Towards best practice: Effective ways to communicate workplace health risks. (Dianne Allen)
- Covert violence in nursing - A Western Australian experience (Susette Bakker)
- Identification of the incidence and causes of musculoskeletal discomfort in diesel fitters changing the head cylinders on a coal hauler. (Kellie Wallis)
- Identification of current practices of pollution minimization in the Australian mining and mineral processing industry Catherine Driussi, Dr. Milos Nedved & Dr. Janis Jansz. Four articles have been accepted for publication in the Journal of Cleaner Production related to this research.
- Challenges and opportunities for the occupational safety and health for women who work in the transport industry [Funded by a research grant from the Department of Planning and Infrastructure.] (Dr. Janis Jansz).

Through this Office there were also CD (1), book chapters (4) and articles (14) published, or accepted for publication, related to occupational safety and health.

3. Conference presentations

The following conference papers were presented in 2004-2005.

Jansz, J. (2004, February) *The Human Face of Workplace Safety*. Human Resource Management Conference. Perth, Western Australia.

Jansz, J. (2004, June) *Reducing the occurrence of work-related injuries and disease in Western Australia*. 7th World Conference on Injury Prevention and Safety Promotion. Vienna, Austria.

Hanrahan, F. & Jansz, J. (2004, June) *An association study of company safety culture and leadership on the success of motor vehicle safety systems*. 7th World Conference on Injury Prevention and Safety Promotion. Vienna, Austria.

Nedved, M. (2004, December) *Occupational Hygiene in South East Asian Developing Countries*. 22nd National Conference of the Australian Institute of Occupational Hygienist. Perth, Western Australia.

Jansz, J. & Wallace, A. (2005, January) *Safety Management Systems in Small Businesses*. International Conference on Occupational Health Services. Helsinki, Finland.

4. International Activities

In May 2004 Dr Janis Jansz visited the World Safety Organization's International Office for Poland where she was made welcome by the Director Professor Danuta Koradecka. Joint research opportunities were discussed and ways to continue to work together to improve occupational safety and health for both countries were identified.

While in Europe Dr. Janis Jansz worked at the Delft University of Technology in the Netherlands (the 1st of April to the 20th of May) and the Mining University in Leoben in Austria (the 21st of May to the 14th of June). While at the Mining University Dr Jansz was involved in the OMENTIN project (identifying ways to build safe mining tailing dams) and worked with staff from the Montanuniversitat in Austria, the Luea University of Technology in Sweden, the North University of Baia Mare in Romania and the Department of Geology and Mineral Resources at the University of Miskolc in Hungary.

In February 2005 the World Safety Organization's International Office for Australia was visited by the team of experts in the field of chemical safety and major hazard control from the World Safety Organization's International Office for the Czech Republic. The Director, Dr. Milos Palecek, was accompanied on this visit by Dr. Stanislav Maly, Dr. Bohuslav Pokorny, Dr. Pavel Forint, Professor Pavel Danihelka and Dr. Michal Stibitz.

Opportunities for joint collaborative research projects were discussed by these visitors with Dr. Milos Nedved, Dr. Jacques Oosthuizen and Dr. Janis Jansz. From this visit a research proposal is being developed to conduct parallel research on identifying causes and prevention strategies for violence in healthcare workplaces in Australia and Europe. From the 25th of February to the 2nd of March the members of the WSO's International Office for Australia also took part in discussions between this expert team and the most important Western Australian occupational safety authorities who included the Department of Industry and Resources (where a presentation was given and had discussions were held about methods for control of chemical pollutions and spills), the Department of Planning and Infrastructure (where a presentation was given on and discussions were held about effective environmental planning), WorkSafe Western Australia (where a presentation was given on, and discussions were held about government strategies for accident prevention) and the BP Refinery Safety Management Specialist at Kwinana (where the latest knowledge about fire safety and explosion prevention was displayed and discussed). These visitors then left Perth to go to Sydney to visit the National Safety Council in New South Wales.

Summary

Much work has been accomplished during 2004 and 2005 to identify and implement ways to improve occupational safety and health, not only for the people in Australia, but also through sharing knowledge internationally.

respectfully submitted by: Dr. Janis Jansz

Email: j.mussett@ecu.edu.au

Director WSO's International Office for Australia

The last World Safety Organization's International Office Report that was presented at the World Safety Organization 18th Environmental Safety and Health Conference in Denver Colorado, May of 2005 was from Lebanon. This report was as follows.

LEBANON

Much of the work of the World Safety Organization's International Office in Lebanon in promoting safety was through television and radio interviews, conference presentations and article publications in journals, magazines and newspapers.

1. Television appearances

Heya Television

- "Road Safety Issues", February 28, 2005
- "Road Safety Issues", February 17, 2005
- "Chronobiology", December 28, 2004
- "Road Safety Issues", April 16, 2004

Lebanese Television

- "Safety Issues: HabtourLand", Aa Liban Lakouna, January 30, 2005
- "Road Safety Issues", Michwar, January 13, 2005
- "Road Safety Issues: Road Priorities", Michwar, May 17, 2004
- "Road Safety Issues: Road Maintenance", Michwar, May 10, 2004
- "Road Safety Issues: Smoking in Cars", Michwar, May 4, 2004
- "Road Safety Issues: Illegal Parking and Road Safety", Michwar, April 28, 2004
- "Road Safety Issues", Michwar, April 20, 2004
- "Road Safety Issues", Michwar, April 13, 2004
- "Road Safety Issues: The Ten Commandments", Michwar, March 30, 2004
- "Road Safety Issues: First-Aid Certificate and Car Inspection", Michwar, March 23, 2004
- "Road Safety Issues: Guide for Drivers and Pedestrians", Michwar, March 16, 2004
- "Road Safety Issues: Characteristics of Drivers Involved in Road Accidents", Michwar, March 9, 2004
- "Road Safety Issues: Road Signs", Michwar, March 2, 2004
- "Road Safety Issues: Bike Helmets", Michwar, February 26, 2004
- "Road Safety Issues: The Meaning of Road Safety", Michwar, January 27, 2004
- "Road Safety Issues: Road Construction and potholes", Michwar, January 20, 2004
- "Road Safety Issues: Yearly Car Inspection", Michwar, January 13, 2004
- "Road Safety Issues: Driving During Winter Time", Michwar, January 6, 2004
- "Road Safety Issues: Traffic Adolescence", Michwar, December 30, 2003
- "Road Safety Issues: Highway Entrances", Michwar, December 23, 2003
- "Road Safety Issues: Traffic Priorities", Michwar, December 16, 2003
- "Road Safety Issues: Traffic Awareness", Michwar, December 9, 2003
- "Road Safety Issues", Michwar, December 2, 2003
- "Urban Planning: Bicyclists and Pedestrians", Michwar, November 25, 2003
- "Duties and Rights of Pedestrians", Michwar, November 18, 2003
- "WSO Award for Safety Work", Michwar, November 11, 2003

Tele Lumiere

- "Road Safety Issues", Sawt El-Shahb, October 27, 2004
- "Road Safety Issues", Kaday An Nas, January 27, 2004

New TV

- "Road Safety Issues", April 8, 2004

2. Radio Interviews and Appearances

Lebanese Broadcasting

- "Traffic Safety", March 10, 2005. (Phone intervention) (Ministry of Information), Lebanon.
- "Traffic Safety: Trucks", July 9th, 2004. (Ministry of Information), Lebanon

Voice of Lebanon, Lebanon

- "Traffic Safety: Traffic Education and Insurance", January 24, 2005
- "Traffic Safety: Traffic Education", January 17, 2005
- "Traffic Safety", April 7, 2004

Radio Strike, Lebanon

- "Traffic Safety", April 2, 2004

3. Professional Publications, Presentations, Journal, Magazine and Newspaper Articles

USA

- **Choueiri, E.M., Choueiri, B.M., and Choueiri, G.M.,** "Juvenile Delinquency and Rehabilitating Juvenile Offenders," The Correctional Trainer, official publication of The International Association of Correctional Training Personnel (An affiliate of the American Correctional Association), U.S.A., Spring 2005, pp. 4-6.
- **Choueiri, E.M., Choueiri, B.M., and Choueiri, G.M.,** "A Breeding Ground for Violence," The Correctional Trainer, official publication of The International Association of Correctional Training Personnel (An affiliate of the American Correctional Association), U.S.A., Winter 2005, pp. 30-32.
- **Choueiri, E.M., Choueiri, B.M., and Choueiri, G.M.,** "The Control Theory/Reality Therapy Approach to Dealing with Offenders," The Correctional Trainer, official publication of The International Association of Correctional Training Personnel (An affiliate of the American Correctional Association), U.S.A., Fall 2004, pp. 32-33.
- **Choueiri, E.M., Choueiri, B.M., and Choueiri, G.M.,** "Help Them Learn Their Way Out: Educate Them," The Correctional Trainer, official publication of The International Association of Correctional Training Personnel (An affiliate of the American Correctional Association), U.S.A., Spring/Summer 2004, pp. 8-9.
- **Choueiri, E.M., Choueiri, B.M., and Choueiri, G.M.,** "Juvenile Delinquency: A Case Study," The Correctional Trainer, official publication of The International Association of Correctional Training Personnel (An affiliate of the American Correctional Association), U.S.A., Winter 2004, pp. 19-21.
- **Choueiri, E.M., Choueiri, G.M., and Choueiri, B.M.,** "Improvement of Traffic Management to Enhance Tourism in Lebanon", Proceedings of the 17th International Environmental Health & Safety Conference & Exposition, World Safety Organization, Denver, Colorado, USA, 3-5 November 2002, pp. 5-7.

Slovenia

- **Choueiri, E.M., Atallah, O., and Hawila, E.,** "The Safety of Non-Urban Roads in Lebanon," Proceedings of 'Global Safety' conference, Portoroz, Slovenia, September 20-22, 2004.
- **Choueiri, E.M., Atallah, O., and Hawila, E.,** "Analysis of the Road Safety Status in Lebanon," Proceedings of 'Global Safety' conference, Portoroz, Slovenia, September 20-22, 2004.
- **Choueiri, E.M., Atallah, O., and Hawila, E.,** "The Impact of Safety Education, Training and Information on Road Safety: Lebanon," Proceedings of 'Global Safety' conference, Portoroz, Slovenia, September 20-22, 2004.

Netherlands

- "The Potential for Re-Establishing Rail Freight Transport in Lebanon," Rail Engineering International, Edition 1004, Number 4, Veenendaal, The Netherlands, pp. 3-6.
- "The 11th International Scientific Symposium of the Arab Union of Railways, Beirut, Lebanon, 5-8 October 2003," Rail Engineering International, Edition 2003, Number 4, Veenendaal, The Netherlands, pp. 11-12.

Lebanon

- "Driving a Car: A Collection of Abilities and Rules that Secures Safety Rights for Everyone on the Road", Al-Jaish, a Journal issued by the Lebanese Army Directorate of Information, No. 237, March 2005, pp. 70-72.
- "Prayers for the Martyr and the Nation", Al-Mustaqbal Newspaper, Tuesday, March 15, 2005, p. 21.
- "Vehicle Fires: Causes and Prevention", An-Nahar Newspaper, Saturday, March 5, 2005, p. 7.
- "Forgive Me Mr. President", Al-Mustaqbal Newspaper, Monday, February 28, 2005, p. 15.
- "Kids and Youngsters are, as Pedestrians, the Most at Risk Inside Cities", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 236, February 2005, pp. 73-74.
- "As If The Problem Was In The Law", An-Nahar Newspaper, Tuesday, February 15, 2005, p. 15.
- "Where is the Place of Traffic Education in School Curricula", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 235, January 2005, pp. 76-77.
- "The Arab Strategy For Road Safety", An-Nahar Newspaper, Monday, January 17, 2005, p. 7.
- "An Investigation File on: Roads and Cars", Ta'miN, a bi-monthly journal specialized in the field of insurance, December/January, No. 57-58, 2005, pp. 58-59.

Subjects:

- A Camera ... for Erratic Driving, p. 58
 - Three Factors that Must Be Considered: Do Municipalities Exercise Their Role in Facilitating the Movement of the Handicapped, pp. 58-59
 - Factors that Cause Traffic Accidents, p. 59
 - Ten Commandments for Winter, p. 59
- "The Fire Extinguisher", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, January 2005, p. 5.
- "For Better Driving During Winter", An-Nahar Newspaper, Sunday, January 9, 2005, p. 5.
- "Adopting Traffic Education in Educational Programs Yields to Erasing Illiteracy Amongst Drivers and on Roads", An-Nahar Newspaper, Tuesday, December 28, 2004, p. 8.
- "File Management, Management & Organization of Meetings, Reception & Public Relations, Successful Office Management, Psychology of the Secretariat & Office Managers, Specific Employee Problems", Presentation made at the workshop sponsored by Brain Power Center, Beirut, December 25-28, 2004
- "Traffic Noise is the Most Dangerous Pollutant on Humans", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 234, December 2004, pp. 104-105.
- "Electronic Data Interchange", Idarat Al Ahmal (Business Administration), Periodical "Road Safety Issues", Presentation made at the seminar sponsored by Makhzoumi Foundation, Ras El-Nabh, December 20, 2004
- "The Dangers of Communication Devices Inside Vehicles", Al-Bank wa Al mouthathmer (Bank and Investor), No. 61, November/December 2004, p. 83.
- "Road Safety Issues", Presentation made at the seminar sponsored by Makhzoumi Foundation, Al Mazraha, December 16, 2004

- "Road Safety Issues", Presentation made at the seminar sponsored by Makhzoumi Foundation, Tarik El-Jadideh, December 9, 2004
- "Road Safety Issues", Presentation made at the workshop sponsored by Green Hand Association, Aley, December 5, 2004
- "Road Safety Issues", Presentation made at the seminar sponsored by Makhzoumi Foundation, Achrafieh, December 2, 2004
- "When Will We Apply Road Manners", An-Nahar Newspaper, Wednesday, December 1, 2004, p. 8.
- "When Will We Apply Road Manners", An-Nahar Newspaper, Wednesday, December 1, 2004, p. 8.
- "Driving ... Between Responsibility and Values (4)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, December 2004, p. 47
- "Know Your Rights and Duties", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, December 2004, p. 5.
- "e-commerce and e-government", Presentation made at the workshop sponsored by Brain Power Center, Beirut, November 27, 2004
- "An Investigation File on: Roads and Cars", Ta'miN, a bi-monthly journal specialized in the field of insurance, October/November, No. 55-56, 2004, pp. 44-47.

Subjects:

- A Look-Back at the First Year of Car Inspection, p. 44
 - Neglecting Them Can Lead to Traffic Accidents: Well-Inflated Tires are Regarded as Safe and Secure Factor, pp. 44-45.
 - A Camera Inside Your Car that Alerts You in Case you Fall Asleep or in Car Veers Off, p. 44
 - While Driving, Concentrate on the Smallest Details ... and Expect Accidents, p. 45
 - Seat Belts that Function from Brake Pedals, p. 45
 - The Internet and Traffic Accidents, p. 46
 - Air Bags and Traffic Accidents, pp. 46-47
 - The Dangerous Factors Leading to Traffic Accidents, p. 47.
- "Safety of the Work Environment from Computer Damages", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 233, November 2004, pp. 86-87.
- "Driving ... Between Responsibility and Values (3)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, November 2004, p. 45.
- "Safety on the Road", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, November 2004, pp. 6,7.
- "Controlling Speed on Roads", An-Nahar Newspaper, Saturday, October 16, 2004, p. 8.
- "e-commerce", Presentation made at the Lebanese Management Association, Beirut, October 6, 2004
- "The Costs of Traffic Accidents", An-Nahar Newspaper, Monday, October 4, 2004, p. 8.
- "Traffic Accidents in Lebanon: Their causes and Measures to Avoid Them", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 232, October 2004, pp. 61-63.
- "Driving ... Between Responsibility and Values (2)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, October 2004, p. 48.
- "A Trip in the School Bus", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, October 2004, pp. 6-7.
- "Road Safety", Presentation made at the Workshop sponsored by the World Health Organization, Municipality of Mazboud, Mazboud, September 11, 2004.
- "The Role of Information in Traffic Safety", An-Nahar Newspaper, Tuesday, September 7, 2004, p. 7.
- "Road Safety", Presentation made at the Workshop sponsored by the World

- Health "Driving ... Between Responsibility and Values", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, September 2004, p. 43.
- "The City of Games, Forms and Beautiful Colors", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, September 2004, pp. 6,7.
- "An Investigation File on: Roads and Cars", Ta'miN, a bi-monthly journal specialized in the field of insurance, August/September, No. 53-54, 2004, pp. 40-44.

Subjects:

- Don't Speed ... Death is Faster, p. 40
 - Traffic Accidents in Lebanon: Their Causes ... Driver, Road, Vehicle and Environmental Factors, pp. 40-43
 - Road Bumps, p. 42
 - Road Signs Are Four Kinds: Warning, Regulatory, Directional, and Workzone, pp. 43-44
- "The Role of Insurance Companies in Providing Awareness on Traffic Safety Issues", Ta'miN, a bi-monthly journal specialized in the field of insurance, August-September, No. 53-54, 2004, p. 39.
- "Food Poisoning: Its Types and the Role of Citizens and Municipalities in Avoiding it", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 230/231, August/September 2004, pp. 260-261.
- "Your Safety Concerns Us", Sada Al-Thakanat, Biweekly Newspaper Published by the Lebanese Army, No. 161, 15 August - 15 September 2004, p. 29.
- "Awareness is the Shortest Path to Avoid Traffic Accidents", An-Nahar Newspaper, Wednesday, August 18, 2004, p. 6.
- "Traffic Adolescence ... How to Deal with it (2)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, August 2004, p. 47.
- "Stop ... The Signal is Red, Continue ... The Signal is Green", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, August 2004, pp. 6,7.
- "New Horizons for Developing the Transport Sector", Al-Bank wa Al-moutathamer (Bank and Investor), No. 58, July/August 2004, pp. 148-149.
- "Special Concepts About Electronic Commerce", Al-Mouhaseb Al-Moujaz (The Certified Accountant), No. 19, July 2004, pp. 27-28.
- "There is a Solution to Every Problem", An-Nahar Newspaper, Saturday, July 26, 2004, p. 9.
- "Traffic Safety is a Common Responsibility", An-Nahar Newspaper, Saturday, July 24, 2004, p. 8.
- "Potholes, Road Nails and Bumps: Specialized in Breaking Cars", An-Nahar Newspaper, Saturday, July 17, 2004, p. 7.
- "The Bicycle: Will it Compete with the Car", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 229, July 2004, pp. 54-55.
- "An Investigation File on: Roads and Cars", Ta'miN, a bi-monthly journal specialized in the field of insurance, June/July, No. 51-52, 2004, pp. 56,57.

Subjects:

- 3,000 Persons Die Daily in Road Accidents Worldwide, pp. 56-57
 - From Here and There, p. 57
 - "Giving the Road its Right to Avoid Traffic Accidents", An-Nahar Newspaper, Saturday, July 10, 2004, p. 7.
 - "Traffic Adolescence ... How to Deal with it (1)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, July 2004, p. 45.
- "Roadway Lines", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, July 2004, pp. 6,7.
- "The Belt is for Everyone ... Even for Dogs!" An-Nahar Newspaper, Wednesday, June 23, 2004, p. 7.

- "Recommendations for Reducing Gasoline Consumption in Cars", An-Nahar Newspaper, Friday, June 11, 2004, p. 7.
- "Segway, a Bike which May Change the Meaning of Urban Transport", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 228, June 2004, pp. 79-80.
- "For Safe Driving ... Learn the Ten Commandments (4)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, June 2004, p. 42.
- "Shapes and Colors ... Symbols and Signs", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, June 2004, pp. 6,7.
- Abbas, Talal; Choueiri, E.M. et al.: "A Study on Road Safety in Lebanon", World Health Organization and Ministry of Public Health, Lebanon, May 2004.
- "Night Lighting Untidiness", An-Nahar Newspaper, Monday, May 31, 2004, p. 14.
- "The Meaning of Road Safety", Presentation Made at the Seminar Entitled "University Day for Driving Awareness" Held at Notre Dame University, Zouk Mosbeh, Lebanon, Monday, May 31, 2004.
- "The Future of Transport in Lebanon", Presentation Made at the Seminar Entitled "Transport and Logistics" Held at Holy Spirit University, Kaslik, Lebanon, Thursday, May 13, 2004.
- "The Role of Air Bags in Reducing Accidents", An-Nahar Newspaper, Thursday, May 8, 2004, p. 8.
- "Chronobiology", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 227, May 2004, pp. 102-103.
- "For Safe Driving ... Learn the Ten Commandments (3)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, May 2004, p. 38.
- "Cleanliness is Next to Godliness", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, May 2004, pp. 6,7.
- "Road Maintenance is a Safety Issue in Reducing Road Accidents", Ta'miN, a bi-monthly journal specialized in the field of insurance, April-May, No. 49-50, 2004, p. 62.
- "The Negative Effects of Smoking on Drivers", An-Nahar Newspaper, Monday, April 26, 2004, p. 8.
- "Necessary Equipment and Measures for Car Maintenance that Provide Protection to the Driver and to others on the Road", An-Nahar Newspaper, Friday, April 16, 2004, p. 8.
- "Role of Education in Road Safety", Round-Table Presentation made at "Road Safety is No Accident" seminar sponsored by the Department of Family Medicine & the World Health Organization on the occasion of the World Health Day 2004, West Hall, American University of Beirut, April 16, 2004.
- "Technologies for Business Processes: Business Transformation", Presentation made at "Development Perspectives of SMEs: From Corporate Governance to Financial Markets" conference, UNESCO Palace, Beirut, Lebanon, April 13-15, 2004.
- "Road Safety Issues", Presentation made at "Road Safety: An Engineering Perspective" Seminar, sponsored by the CEE Department at the Faculty of Engineering and Architecture (FEA) at the American University of Beirut (AUB) & the World Health Organization, AUB, Tuesday, April 6, 2004.
- "Pedestrians: Don't they Deserve More Adequate Roads", An-Nahar Newspaper, Friday, April 2, 2004, p. 8.
- "Gardens and Parks: A Healthy and Environmental Demand", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 226, April 2004, pp. 56-57.
- "For Safe Driving ... Learn the Ten Commandments (2)", Al-Amn, a monthly journal p"Try Pedestrian Bridges", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, April 2004, pp. 6,7.

- "Public Safety Issues", Presentation made at the Workshop "Citizen's Guide for Public Safety", sponsored by the Ministry of Administrative Development, UNESCO Palace, Beirut, March 31, 2004.
- "Road Safety Issues", Presentation made at the Faculty of Engineering, Beirut Arab University, March 24, 2004.
- "Your Safety Concerns Us", Sada Al-Thakanat, Biweekly Newspaper Published by the Lebanese Army, No. 153, 1-15 March 2004, p. 22.
- "Compulsory Vehicle Inspection and Its Relationship with Public or Road Safety", TamiN, a bi-monthly journal specialized in the field of insurance, February-March, No. 47-48, 2004, pp. 46-49.
- "The Safety of Our Time", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 225, March 2004, p. 89.
- "For Safe Driving ... Learn the Ten Commandments (1)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, March 2004, p. 34.
- "A Trip on the Road", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, March 2004, pp. 6,7.
- "Guide for Drivers and Pedestrians: Their Rights and Duties", a Special Annex to Al-Amn, No. 146, March 2004, (40 pages).
- "Guide for Drivers and Pedestrians: Their Rights and Duties", 2004, (24 pages).
- "F" First-Aid Certificate", An-Nahar Newspaper, Monday, March 8, 2004, p. 7.
- "So You Won't Regret", Sada Al-Thakanat, Biweekly Newspaper Published by the Lebanese Army, No. 152, 1-29 February 2004, p. 29.
- "Safe Stopping Distance", An-Nahar Newspaper, Saturday, February 28, 2004, p. 7.
- "Not Abiding by Safety Rules Makes the House the Most Dangerous Location for its Old and Young Inhabitants", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 224, February 2004, pp. 80-81.
- "Safe Stopping Distance", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, February 2004, p. 41.
- "As in the House, the Same on the Road", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, February 2004, pp. 6,7.
- "The Influence of Psychological Factors in Road Accidents", An-Nahar Newspaper, Saturday, February 14, 2004, p. 6.
- "Will a Helmet Protect Bike Riders", An-Nahar Newspaper, Monday, February 9, 2004, p. 8.
- "For Safe Driving ... Learn the Ten Commandments", An-Nahar Newspaper, Wednesday, January 21, 2004, p. 7.
- "How Can we Provide our Children with Opportunities to Benefit from Information without Danger", Al-Jaish, a journal issued by the Lebanese Army Directorate of Information, No. 223, January 2004, pp. 77-79.
- "Road Signs and Symbols (4)", Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, January 2004, p. 43.
- "A Trip on the Bicycle", Fata Al-Amn, a monthly journal published by the Directorate General of Internal Security Forces, January 2004, pp. 6,7.
- "Your Safety Concerns Us", Sada Al-Thakanat, Biweekly Newspaper Published by the Lebanese Army, No. 148, 1-15 December 2003, p. 21.
- "Issues in Need of Adopting while Driving to Stop Traffic Adolescence", An-Nahar Newspaper, Monday, December 29, 2003, p. 7.
- "Facing the Aggressive Driver with Calm and Reporting his Actions to the Authorities", An-Nahar Newspaper, Wednesday, December 24, 2003, p. 8.
- "A Call to the Students of Economical Sciences - 2", An-Nahar Newspaper, Monday, December 15, 2003, p. 19.
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Summary

All of the International Office Reports presented at the World Safety Conference in May of 2005 showed that each of these International Offices was promoting occupational safety in their own countries, and often in other countries. Promotion was mainly through the provision of safety information and discussions in professional meetings, through classroom and community teaching and through the writing of publications about safety. In some cases, particularly in Poland, the Czech Republic and in Australia the International Offices were generating new occupational safety knowledge through conducting research.



Asbestos: The Hidden Menace - Part 2

By Mrs. Karen Mitchell, BA, App. Sc. (OT). Mrs. Mitchell is an Occupational Therapist working in a large community based organization that provides home-based services for the aged care sector. (Part one of this article appeared in the previous issue of the World Safety Journal)

Abstract

Asbestos exposure has the potential to result in severe, disabling and untreatable illnesses. While this appears undisputed when exposed to high levels of asbestos, risk following exposure to smaller levels, such as those encountered by home modification workers as outlined in Part 1 of this article, appears more controversial and therefore harder to definitively determine. This article evaluates evidence related to the potential effects of exposure of to low levels of asbestos fibres by trades people who make home modifications.

Introduction

The effects of asbestos on health are a growing concern. The National Occupational Health and Safety Commission estimate that exposures to asbestos between 1987 and 2010 will cause 16,000 mesothelioma and 40,000 lung cancer deaths (Kazan-Allen, 2003). In fact, Yeung, Rogers & Johnson (1999) and Lavelle (2004) both report that Australia has one of the highest national incidences of mesothelioma per capita in the world, with Yeung, Rogers & Johnson (1999) indicating that there were 3758 cases between 1979 to 1995 nationwide, with the rate still rising.

If it is in good condition and the surface is sealed completely to prevent release of the fibres, asbestos may be considered safe (US EPA nd, and Johnston 2000). Mlynarek, Corn & Blake (1996) state that the Environmental Protection Agency consider health risk to occupants from inhalation of asbestos in buildings as very low, and suggest that it is safer left undisturbed. Wagner (1997), Dawson (2004) and Corbridge & Kamp (2004) appear to agree with this statement, and ArchiCentre Ltd (2003) indicates that "... the presence of asbestos products in houses is no cause for alarm and should be left in place" (p.1). This, of course, would appear contingent on the assumption that the asbestos is completely sealed and in good condition. The reason for asbestos' safety when intact is that the fibres have been bound together in a solid matrix. The risk to health only arises as the fibres are liberated by tooling, cutting, drilling, sanding, or via any other form of abrasion (Lavelle, 2004, and US EPA, nd), or weathering / damage.

Effects of asbestos exposure in the home modification industry

The occupational grouping considered at highest risk of asbestos related health disorders includes those involved in the

building industry (Yeung, Rogers & Johnson 1999, Yeung & Rogers 2001, and Cravens 1998). Yeung, Rogers & Johnson (1999) indicate that the building industry produced the largest number of cases of mesothelioma between 1979 to 1995, with trades' people such as electricians and plumbers indicating that they had disturbed asbestos products during repairs, renovation and installation. Johnston (2000) indicates that 90% of mesothelioma victims are men, mainly from building trades. Yeung, Rogers & Johnson (1999) report that the largest number of registered mesothelioma cases came from the trades of carpenters, electricians, painters and labourers during handling, cutting and installation of materials, and then continued maintenance and demolition. Yeung & Rogers (2001) also indicate that, of 51 cases of mesothelioma reported between 1980 and 1985 within the building trade, 46 of these were carpenters. Yeung, Rogers & Johnson (1999) and Yeung & Rogers (2001) attribute the increasing cases within the building industry to the post-war construction boom, and the introduction of power tools, which increases potential for dust exposure.

Becklake (1992), cited in Wagner (1997), also discusses the exposure-response relationships between asbestos exposure and pulmonary fibrosis, and their variation across industries. Wagner (1997) states that these relationships are consistent with the theories that health risk can therefore be modified by "process specific factors" (p.1311), indicating application of management strategies can have an impact on long-term health. While little may be done for the organisation's workers regarding asbestos already installed in homes, strategies may be deployed to reduce dust levels from power tools by using hand tools, wearing protective equipment, eliminating drafts, and controlling dust using wet methods.

However, it is difficult to research and therefore accurately predict extent of asbestos exposure and actual risk level for the workers of the organization reviewed in Part One. The ability to extrapolate and make assumptions from existing research to a specific type of workgroup carries limitations. Camus, Siemiatycki & Meek (1998) state that the estimates used for controlling environmental asbestos exposure by regulatory authorities rely on "... unverified assumptions and imprecise data" (p. 1570). It is not ethical to conduct experimental research (Wagner, 1997), and the long latency periods between exposure and illness would hamper the ability to remember conditions (amount, type, time) of exposure by the time the negative health effects become known and therefore research subject identified. Commission on Life Sciences (1984) states that "... performing the experiments and interpreting the results are more complicated for diseases with long latency periods" (p.98), and EWG Action Fund (2004, *The Asbestos Epidemic in America*) indicates that the varying latency makes it difficult with cohort studies to estimate when people may develop the disease. Lange (2002) and Billauer & Giamboni (1988) also note that epidemiological studies have focused on people exposed to high levels of asbestos fibers during their work, and pose questions regarding reliability of using such results to estimate possible exposure and resultant risk at lower levels of exposure. The EWG Action Fund (2004, *Tiny Amounts Are Deadly*) also suggests bias may occur and therefore results underestimated due to misdiagnosis of asbestosis as emphysema or other respiratory ailments.

Other limitations proposed by Lee (2001) on research methods to study the effect of asbestos on health and therefore predict risk for workers include:

- Reliance on death certificates as a

source of information may be inaccurate (Lee, 2001). Also, as death certificates do not often note other conditions, the effect of asbestos and even potential contribution to the cited cause of death may be missed. For example, it may cite cause of death as heart failure or lung cancer, rather than heart failure due to asbestosis, or lung cancer as a result of asbestos exposure (if this could be determined). Markowitz (1997) cited in EWG Action Fund (2004, The Asbestos Epidemic in America) states that mesothelioma and asbestosis deaths might be significantly under-represented due to misdiagnosis of both diseases.

- Difficulties in estimating actual exposure to asbestos (Lee, 2001). This would be particularly difficult for studies of people who have developed asbestos related diseases, and who need to recall exposure history. Estimation of past exposures are likely to be very subjective
- Inaccuracies in smoking history (Lee, 2001). This affects studies relating to the interaction of asbestos and smoking, however also raises the query of whether the studies take into account non-occupational exposure, previous employments, and exposures to other carcinogens.
- Reliance on data obtained from proxy respondents (Lee, 2001). This would include families and colleagues, which would make an accurate history very difficult to obtain, particularly if the subject is deceased or unable to communicate.

Therefore it is very difficult to determine the extent to which research can be applied to the unique situations experienced by the organization's workers, and consequently determine the necessity and degree of precautions that need to be incorporated into working procedures and equipment.

When evaluating the potential for risk of asbestos exposure for workers employed by the organization as well as contractors, it becomes apparent that there are three major issues that need clarifying. Published literature may assist with this, although it is evident that there are still many inconsistencies and disagreements between studies, in addition to the difficulties noted previously.

The first key issue arises from assumptions as noted in Part 1 that had been suggested, including if asbestos is in the walls, a suitable alternative management process is to drill in the floor to install a rail, that asbestos is easily and visibly identifiable without formal testing or damage to the material, and that asbestos products will be very rarely encountered in residential buildings. These assumptions need to be challenged as many articles and research studies have indicated that asbestos is not always easily recognized, was very prevalent in building products for houses spanning the 1940's to the 1980's, and may also be under the surface of the floor in addition to walls and ceilings (for example, as noted in Lavelle, 2004).

Kazan-Allen (2003) indicates that, by 1954, Australia consumed the highest number of asbestos cement products per capita in the world, with thousands of homes, public and commercial buildings being constructed with asbestos products, including asbestos fibro roofs, floors and walls, and insulation materials. According to Yeung, Rogers & Johnson (1999), Australia was one of the biggest consumers of asbestos, particularly in building products, throughout the 1950's, and Skinner (2004) suggests that any board in a house older than 20 years old potentially could be or contain asbestos. Lavelle (2004) asserts that approximately one third of homes built between 1945 and 1980 will contain asbestos in walls, ceilings, eaves, kitchens, bathrooms, sheds/garages and vinyl floor tiles. ArchiCentre Ltd (2003) even goes as far as to estimate that "*most* [italics added] houses built before 1983 will contain asbestos in some form" (p.1).

Asbestos may be recognizable to some tradesmen. US Environmental Protection Agency (nd) states that people who work frequently with asbestos materials such as plumbers, contractors and heating specialists are often able to guess whether the material contains asbestos. However US Environmental Protection Agency (nd) then proceeds to mention that the only sure method is via laboratory testing of the sample material, and workers should not rely on visual determination. Dawson (2004) states that it is not possible to tell whether a material contains asbestos unless it is labeled. In his interview on Today

Tonight (Wenn, 2004), Matt Judkins from "Reno Brothers" stated that asbestos is often hidden away from view behind tiles, which has significant implications not only for the major bathroom renovations, but also drilling into the tiles to install the handrails.

The most common use for asbestos sheets was for cladding, which is also known as "fibro" (ArchiCentre Ltd, 2003), which was phased out in 1989 (Lavelle, 2004). Other sources of asbestos in building material, according to US Environmental Protection Agency (nd) and EWG Action Fund (2004, 'Take Home' Exposure) are pipe insulation including hot water pipes, insulation in external walls, floor and roof space (blown-in and batts) particularly in homes dating 1930-1950, floor coverings (sheet vinyl or underlay), vinyl tiles, liners near older electrical boxes, insulation around furnaces, and insulation around floors and walls adjacent to wood burning stoves (the latter three of which would be seldom encountered in the type of work done by community based workers who install equipment into homes to help make living safer and more comfortable for aged residents).

Other sources of asbestos in buildings that may be encountered in handrail installations and bathroom / toilet renovations, as listed by Phillips (2004), include asbestos via Hessian tape around hot water pipes, which has a 25% chance of containing asbestos, brick cladding, and asbestos sheeting that resembles plasterboard. In addition to these, Manuel (1999) includes textured ceilings and backing of rubber flooring, Dawson (2004) adds soundproofing or decorative material sprayed on walls and ceilings, and adhesives used to install vinyl asbestos, asphalt or rubber tiles in addition to the tiles themselves, and EWG Action Fund (2004, 'Take Home' Exposure) adds surfaces such as heating and electrical ducts, ceiling tiles, fireproofing materials, caulking/putties, adhesives, vinyl wall coverings and spackling compounds. These examples demonstrate that there is a vast array of different surfaces, not just on the walls, where workers could potentially release asbestos fibers during home modifications, particularly the larger renovations, and that asbestos may be liberated from drilling into the floor in addition to walls, if it is present

in cement or floor coverings (including underlay or adhesive).

The next key issue relates to the significance of the health effects, and the long time it takes between initial exposure and signs of illness, suggesting that workers could potentially be exposed for years or even decades before an illness provides a warning of unacceptable exposure. In his interview on ABC a.m., chest physician and researcher, Professor Bruce Robinson, stated "... there's an incubation period of 35 years for this disease [mesothelioma], and you just can't wait around for 35 years ..." (Skinner, 2004, p. 18). The significance of the health effects, the severity of the illnesses, and the lack of treatment available to provide a cure appear undisputed in literature. Weisenburger and Chiu (2002) did note contention about whether or not non-Hodgkins lymphoma could be attributed to asbestos, however this particular condition had not been mentioned in any of the other studies or documents reviewed.

An additional factor that may also increase risk of health effects, and potentially relevant to the organization's workers and contractors, is smoking. The interrelationship of smoking and asbestos in the risk of contracting asbestos-related disease has been the focus of many studies. Wagner (1997) suggests smoking is not related to risk of mesothelioma, although it does increase risk of lung cancer. Generally other studies have indicated that smokers have a higher risk of illness particularly lung cancer and asbestosis when also exposed to asbestos compared to non-smokers (Ohar, Sterling, Bleecker & Donohue 2004, Dement et al. 2003, Wagner 1997, Cravens 1998, Corbridge & Kamp 2004, Lee 2001, and EWG Action Fund 2004, *Tiny Amounts Are Deadly*), with some studies indicating that asbestos and smoking has a multiplicative / synergistic relationship (US EPA nd, Lee 2001, CLS 1984, and Lavelle 2004). Corbridge & Kamp (2004) suggest that smokers may also have a reduced latency period before onset of the disease process. Whether workers smoke, and possibly even how much, could therefore have implications on increasing the risk of asbestos related illness for workers, even if their exposure is relatively small.

The final and major key issue is whether the amount of exposure experienced with the frequent handrail installations, and the infrequent bathroom / major renovations, are sufficient to have long-term detrimental health effects. This appears to be the area of greatest controversy amongst studies. As there have not been any studies directly completed on workers involved with this type of home modifications on a daily basis. Literature discussing low exposure building maintenance tasks and home renovations was used as an estimate of the level and type of exposure the home modification organization's workers and contractors may be exposed to.

Many articles and studies suggest that home renovations have been deemed to be the next wave of asbestos-related health conditions of the future. Even a relatively short exposure can affect health. Leigh (2003) cited by EWG Action Fund (2004, 'Take Home' Exposure) reports that 3% of mesothelioma cases occur in workers with less than 3 months exposure, with one subject developing it after 16 hours of exposure time, and Greenberg (1974). EWG Action Fund (2004, 'Take Home' Exposure) identifies one case where the mesothelioma sufferer had only had one day's worth of exposure cutting asbestos cement sheeting. In his interview on ABC a.m., Sir Llew Edwards, chairman of the trust set up by James Hardies for compensation of makers and users of asbestos cement products who contract mesothelioma, stated "I think it's the home renovation area that the biggest danger in the next 20, 30, 40 years will occur" (Skinner, 2004, p. 14).

One factor that can increase risk of asbestos related illness, despite low-level work / minor damage to the work surface, lies within the behavior of asbestos fibers themselves if they are released. Because of their microscopic size and shape, the fibers may remain suspended in the air, and therefore the worker's breathing zone, for long periods of time after the initial release (US EPA, nd). Cravens (1998) even suggests fibers can remain airborne for up to 80 hours. Therefore it would not be satisfactory, for example, for workers to wear a mask while drilling a hole in the wall suspected of containing asbestos, and then removing the mask while completing

the handrail installation, as the fibers may remain present in the air while they are completing the work.

There also appears to be a relationship between time and type of exposure, as well as amount of exposure in one given point in time. Mlynarek, Corn & Blake (1996) suggest that cumulative exposure to asbestos dust is important to the risk of development of asbestosis, Ohar, Sterling, Bleecker & Donohue (2004) indicate that development and severity of asbestos related illnesses are related to both dose and time of asbestos exposure. Lee (2001) proposes this same relationship exists for the development of lung cancer. Bofetta (1998), cited in Pohlabein et al. (2002) suggests a linear relationship between cumulative asbestos exposure and lung cancer risk, with the proposal that an each fibre/ml³ year of exposure increases the risk of lung cancer by 1%. A study by Luo, Liu, Mu, Tsai & Wen (2003) discovered a higher incidence of pleural plaques, mesothelioma, and lung cancer in subjects at Da-yao who were exposed to Crocodylidae asbestos at low levels however throughout their life-time. Dement et al (2003) also, in their study of asbestos related diseases for workers at Department of Energy nuclear sites, concluded that there is a correlation between duration of work at the sites and the risk of respiratory disease as demonstrated by radiographic changes. This has significant implications for workers who, although they are potentially only being exposed to a small amount of asbestos at one single moment when drilling holes to install handrails, work in several different houses per day over potentially many years of service.

There seems to be little controversy regarding the risk of asbestos-related illness when exposed to high levels of asbestos, as noted by Camus, Siemiatycki & Meek (1998) who states "It has been recognized for several decades that exposure to asbestos at high levels ... can cause lung cancer and mesothelioma..." (p.1565), however differing opinions and findings have occurred in regards to whether there is a risk with low levels of exposure, and how significant this risk is. Yeung, Rogers & Johnson (1999) also note controversies related to significance of intensity of exposure, including trace environmental or

low-level occupational exposure, and their contribution to mesothelioma statistics in Australia.

An example of low level exposure can be seen with the occurrence of asbestos fibers being discovered in wives and children of asbestos workers (Finnegan, 1998). Pohlabeln et al (2002) suggest that exposure for individuals with relatively low exposure may be underestimated, as closer attention tends to be paid to jobs traditionally associated with asbestos exposure. Michael Edwards was quoted in "Fibro Linked" (2003) as estimating one third of cases of mesothelioma in Western Australia in 2002, being a result of only limited contact, and the Asbestos Diseases Society stated their greatest concern is renovations of older houses, estimating that 40 mesothelioma cases in 2002 were reported by people with limited contact. EWG Action Fund (2004, *The Asbestos Epidemic in America*) even suggests that the level deemed safe according to the US Occupational Safety and Health Administration (OSHA) does not protect workers, with Stayner (1997) cited as discovering that 1 in every 200 workers will develop lung cancer, and 1 in 500 will develop asbestosis even if exposed within the safe levels throughout their career. However CLS (1984) reviews several articles, identifying that "... more severe forms [of asbestosis] would be unlikely to occur among those exposed to relatively low levels of particles" (p.113). Lavelle (2004) also states that asbestosis "... requires a great deal of exposure to asbestos to develop" (Asbestosis section, p. 1), however adds that mesothelioma may develop after very little exposure (in regards to time or amount).

While some studies attempt to measure risk at low-level exposure, this research has been limited by some of the factors listed earlier, including difficulty determining exact level of asbestos exposure, lack of clarification in some studies regarding what is deemed to be "low-level", and difficulty ascertaining if subjects have had other previous occupational or non-occupational exposures at higher levels or for longer periods of time. Selikoff, Churg & Hammond (1984) indicate that their subjects, building trades insulation workers, have relatively light and intermittent

exposure to asbestos, yet had unexpectedly high incidences of lung cancer, mesothelioma, other cancers and asbestosis. However what constitutes as light exposure, and how this would compare to that of the workers at this particular organisation is difficult to determine. According to Borak & Russi (1995)'s system of classification, it appears that the level of exposure for the organisation's workers could be considered Class III (repair and maintenance where asbestos materials may be disturbed) and Class IV (potential contact with known or presumed asbestos containing materials including clean-up).

Some studies indicate that the risk of asbestos related disease has been over-exaggerated, and regulations overcautious, as noted by Lange (2002) who stated "... some have suggested that these concerns [leading to regulatory standards] are more related to public fears than actual health outcomes ..." (p.294). Lange and Thomulka (2001) cited by Lange (2002) state that some regulations have been based on anecdotal information rather than scientific testing. Churg (1993) disagrees with the concept that low level chrysotile exposure will result in mesothelioma, asbestosis or lung cancer, as he believes these all require high levels of exposure, and suggests that even if cancer risk is determined a possibility at any level of exposure, that the risks would be much smaller than risks encountered in everyday activities. Cravens (1998) and McLellan (2002) also indicate that risk will only occur with a significant release of asbestos fibres, and both Cravens (1998) and Commission on Life Sciences (1984) suggest this is unlikely to occur under normal circumstances due to the strength of binding materials used.

However other studies such as US EPA (nd) and Minter (1993) imply that no amount of exposure is acceptable, as there is no level of asbestos exposure that can be deemed safe, and that significant health effects can result from even very minute exposures or one occurrence in a lifetime. Borak & Russi (1995) state that it "... is not known whether there is some level of asbestos exposure that is 'safe'...no-one knows whether cancer can result from exposure to only one asbestos fiber" (p.39), which Selikoff (cited by Finnegan, 1998)

had also suggested in 1966 may be the case. Corbridge & Kamp (2004) also indicate that there is no level of exposure "... that is free of controversy" (p.49). In light of controversial findings in different research studies, it does not appear satisfactory to discount concerns for the organization's workers, as there is a lack of concrete evidence to disprove risk from low doses of asbestos exposure.

The prevalence of asbestos containing building products suggests that the anecdotal estimate made within the organization when the issue was raised of only a couple of houses in the past few years containing asbestos appears to have been grossly underestimated. There certainly does appear sufficient evidence to suggest that the larger modifications, usually conducted by contractors, need to incorporate formalized assessment and consider the potentiality of asbestos prior to commencement of any work.

Conclusions

What does appear controversial, due to the contradictory evidence of the health impact of exposure to relatively small amounts of asbestos, is whether the workers are exposed to sufficient fibers to warrant tighter procedures when completing the minor home modifications, such as the installation of handrails in walls and fixing ramps and banister rails into walls and floors. These minor tasks require drilling into walls and floors as a daily occurrence.

It is the opinion of this author that, despite the differing opinions regarding risks with low-level exposure in published literature, there is sufficient evidence to support the need to implement procedures such as the universal precautions and management strategies as noted in Part 1 of this article when completing these modifications. In particular, concerns regarding risk of cancer in literature at very minimal asbestos exposure, and the synergistic relationship with asbestos and tobacco increasing risk for smokers, suggests that any exposure could potentially place a staff member at risk of a serious, irreversible and potentially fatal asbestos-related condition.

While exposure may be intermittent and rare, of particular concern is the serious nature of the health effects, the inability to detect symptoms and clinical signs of

disease until the disease is well advanced, the long latency periods, and the poor prognosis for treatment. This appears to place the home modification workers and contractors at an unacceptable level of risk, unless positive action is taken to anticipate and cater for the potential existence of asbestos when completing home modifications.

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DIARY OF EVENTS

World Safety Organization

Title: WSO's 19th International Safety and Health Professional Development Conference

Venue: Ramada Inn on the Bay, Belleville, Ontario, Canada

Dates: June 4 - 7, 2006

Cost: \$500.⁰⁰ (U.S. funds) for WSO members & \$575.⁰⁰ U.S. funds for non WSO members

Contact: Debbie Burgess telephone: (660) 747-3132 fax: (660) 747-2647 email: debbie_burgess@worldsafety.org
website: www.worldsafety.org

Institute of Chemical Engineers

Title: 7th World Congress of Chemical Engineering

Venue: Scottish Exhibition & Conference Center, Glasgow, Scotland

Date: 10-14th July, 2005

Contact: Congress Secretariat, telephone: (+44 0) 20 8743 3106 fax: (+44 0) 20 8743 1010 email: info@chemengcongress2005.com

National Safety Council

Title: 17th World Congress on Safety & Health at Work

Venue: Orange Country Convention Center, Orlando, Florida, United States of America

Date: 18th -22nd September, 2005

Contact: Congress Secretariat, National Safety Council, 1121 Spring Lake Drive, Itasca, Illinois USA., 60143
telephone: (800) 621- 7619 or +1 603 775- 2056

Title: APEX 2005 – The International Access Platform Exhibition & Conference

Venue: Netherlands

Date: 22nd – 24th September, 2005

Contact: Joyce Eefink, MEEC Maastricht, Industrial Promotions International. PO Box 225, 7470 AE Goor, The Netherlands
telephone: +31 (0) 547 27156 fax: +31 (0) 547 261238 email: joyce@ipi-bl.nl website: www.apexshow.com

Title: Safety is No Accident. International Trade Fair with Congress & special events

Venue: Dusseldorf, Germany

Date: 24th – 27th October, 2005

Contact: Messe Dusseldorf, Germany, website: www.AplusA-online.de

Title: 4th International Congress on Women, Work & Health

Venue: New Delhi, India

Date: 27-30 November, 2005

Contact: Secretariat, telephone: (+91 11) 2301 2752 fax: (+91 11) 2301 5307 email: wwh@societyforworkinglife.org

NIOSH + the American Psychology Association + the National Institute of Justice of the U.S. Department of Justice + the National Institution on Disability and Rehabilitation Research of the U.S. Department of Education + the U.S. Department of Labor.

Title: Work, Stress & Health 2006: Making a difference in the Workplace.

Venue: Hyatt Regency Miami Hotel, Miami, Florida, United States of America.

Date: 2nd – 4th March 2006.

Contact: Wesley Baker, telephone: +1 202 336 6033 fax: +1 202 336 6117 website: www.apa.org/pi/work/callforpapers.html

Accident Models / Theories And Their Use In The Design Of Emergency Procedures And Equipment

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Assist Director, WSO's International Office for Australia.

Abstract

This study describes the Three Mile Island Nuclear Accident as a case study example to identify accident causes. It then continues on to describe how this and other accidents could have been prevented using accident prevention models.

Three Mile Island Nuclear Accident.

Three Mile Island lies in Pennsylvania, in the middle of the Susquehanna River. On the 28th March 1979, in the early morning, two hundred alarms sounded in the control room within two minutes. Unit 2 of the nuclear power station was moving towards a serious nuclear accident.

The President's Commission on the Accident at Three Mile Island (The Accident at Three Mile Island, 1979) after conducting a study and investigation into the events of that accident and the conditions existing prior to the accident, concluded:

1. The accident at Three Mile Island occurred as a result of a series of human, institutional, and mechanical failures.
2. Equipment failures initiated the events of March 28 and contributed to the failure of operating personnel (operators, engineers, and supervisors) to recognize the actual conditions of the plant. Their training was deficient and left them unprepared for the events that took place. These operating personnel made some improper decisions, took some improper actions, and failed to take some correct actions, causing what should have been a minor incident to develop into the TMI accident.
3. The pilot-operated relief valve at the top of the pressurizer opened as expected when pressure rose but failed to close when pressure decreased, thereby creating an opening in the primary coolant system – a small-break loss-of-coolant accident. The relief valve indicator light in the control room showed only that the signal had been sent to close the valve rather than the fact that the valve remained open. The operators, relying on the indicator light and believing that the valve had closed, did not heed other indications and were unaware of the valve failure;

the loss of coolant continued for over two hours. The TMI emergency procedure for a stuck-open valve did not state that unless the valve was closed, a loss of coolant would exist.

4. The high pressure injection system – a major design safety system – came on automatically. However, the operators were conditioned to maintain the specified water level in the pressurizer and were concerned that the plant was “going solid” that is, filled with water. Therefore, they cut back the injection from 1,000 gallons per minute to less than 100 gallons per minute. For extended periods on March 28, the injection system was either not operating or operating at an insufficient rate. This led to much of the core being uncovered for extended periods on March 28 and resulted in severe damage to the core. If the injection system had not been throttled, core damage would have been prevented in spite of a stuck-open valve.
5. TMI management and engineering personnel also had difficulty in analyzing events. Even after supervisory personnel took charge, significant delays occurred before core damage was fully recognized, and stable cooling of the core was achieved.

How did the accident occur?

Weiss (1979) details the series of events as follows: “Nuclear Regulatory Commission sources have theorized that it started with a little bit of water going into an air tube in the feed water system (secondary cooling system). That cooling system circulates water to a steam generator which draws heat from the primary cooling system that actually cools more than 100 tons of nuclear fuel rods in the reactors core. The unwanted water crept into a tube connected with feed water pumps. The moisture in the air caused a safety valve to

close which in turn caused automatic shutdown of the feed water pumps.

Feed water failures, whilst undesirable, are common as were the two appropriate automatic plant responses that followed. First the turbines tripped (shut down) and secondly the three backup feed water pumps started up. Normally, feed water would have been recirculated to the steam generators within seconds to complete another circuit of the secondary cooling system. However, there were problems – someone had closed the two valves through which the emergency feed water was supposed to flow, preventing the feed water from doing its job in cooling the reactor. Without secondary coolant to take away primary coolant heat, reactor temperature and pressure began to climb dangerously.

Within six seconds two special relief valves in primary coolant system opened to ease pressure. The electromagnetic relief valves sit atop the reactors pressurizer – an electrically heated tank of water that the plant operators use to regulate pressure in the primary coolant systems. This coolant loop is kept under high pressure to prevent the superheated water from boiling. Highly pressurized primary coolant courses through the core, drawing heat away from the fuel rods and through the steam generator, passing some of that heat to the secondary coolant system, which drives the power generating turbines.

Primary coolant then recirculates back to the core to repeat the process. However the pressure continued to rise for a number of seconds activating an automatic reactor shutdown system. Eventually the pressure dropped back to normal.

However, one of the relief valves stuck open after the pressure had dropped, draining vital coolant from the fuel rods. This loss of coolant accident resulted in steam and water pouring out of the valve. Reactor pressure continued to drop until another automatic safety device, the

Emergency Core Cooling System was triggered and cold water was forced into the reactor. However, the hole remained and hundreds of thousands of gallons of highly reactive water spilt onto the floor of the high domed compartment building that houses the reactor. Sump pumps operating automatically pumped the water out of the radiation shielded containment into an auxiliary building where a faulty tank periodically released radioactive elements into the atmosphere.

At this stage, operators turned the emergency cooling system off – a response they were trained to make. They assumed that the pressurize levels adequately reflected the levels of coolant in the reactor. Assured that these levels were sufficient they switched off the system.

Eight minutes after the feed water blockage, plant operators had discovered the closed valves and opened them releasing a rush of cold water into the steam generators which had boiled dry. This was too much for the steam generators to take and leaks developed between the two systems allowing radioactivity into the secondary system and into the environment. Eventually one steam generator was closed off to plug the leaks of water.

With the emergency cooling system shut off and the pressurizer valve continuing to spill radioactive primary coolant onto the containment floor, the pressure levels in the reactor continues to drop. Eleven minutes in to the accident, operators restarted the cooling system. Soon the massive pumps responsible for circulating the primary coolant began to vibrate dangerously due to gaps in coolant flow caused by steam, (normally the water was highly pressurized so no steam was in the systems). The vibration threatened to break apart the pipes, causing a full loss of coolant. With that fear in mind, operators turned the big pumps off more than an hour in to the mishap. Had there not been a hole in the system, the operator's action may have helped things. As it was, shutting off the main pumps worsened things. Within minutes, core temperature went off scale at 750°F and a technician taking readings from in-core thermometers said he was getting readings of 2300°F.

At 6.20am, technicians got around to closing the hole in the primary coolant system by using a bypass valve to isolate the stuck pressurize valve. It was later noted that the gauge showed a temperature of 155° above safety shut off level. Operators said that it normally operated high so they discounted the importance of the reading. Pressures and temperature continued to fluctuate. Parts of the core were uncovered for about 15 hours. Temperature in the core soared well past the safety level. When the metal tubes that held the uranium fuel pellets in the core sagged, deadly fission products were released into primary coolant, the containment building and ultimately the atmosphere."

As it can be seen from the above accident sequence, the failure of emergency equipment and very little useful information given by the alarm panel indicators to the control room personnel were among the most important contributing factors leading to the Three Mile Island accident. Similar situations can, in the future, be avoided by improved design and operating procedures for emergencies.

Accident models / theories and their use.

Jean Surry (1971) developed the model – "A Decision Model of the Accident Process", which is particularly suited for the design and operation of emergency equipment, both within industrial safety and the military or police security fields.

Surry's model starts with the total environment, both spatial and temporal, of man. It can be described in terms of particular phenomena and their interactions; for instance the physical variables of temperature, atmospheric conditions, spatial layout, man's health and physical condition, etc. The potential injury agent is also described here in terms of its lethal qualities and its mode of use by the man. Such environments are constantly being changed by man and nature. This stage is also the present situation of the tasks required, the equipment to be used, the man's knowledge and training, etc. Every activity of man develops, as does this accident model, out and forward in time from this background "stage".

By his action or even non-action, the danger to a man grows out of such an environment. If there are any negative responses to the following questions during the "danger build-up" cycle the danger will become imminent:

- a) Is there any warning of the growth of the danger?
- b) Can the man see this warning (or detect it by any other sense)?
- c) Does he understand the meaning of this warning?
- d) Does he know how to avoid such potential danger?
- e) Does he choose to avoid it?
- f) Is he able to avoid it?

If the replies are all in the affirmative, the danger will not grow and no injury can ensue.

The same series of questions may be posed in the "danger release" cycle:

- a) Is there any indication of the danger release?
- b) Does the potential victim detect this information?
- c) Does he recognize the meaning of this information?
- d) Does he know how to avoid the released danger?
- e) Does he choose to avoid it?
- f) Is he physically capable of avoiding it?

Any negative response to one of these questions will lead inevitably to injury.

An accident can be the result of many different routes through the model. For example, it is as much an accident if no warning is ever given, as when the warning of danger build-up is misinterpreted. Also one route in the second phase leads to injury or damage if the warning signs are observed, understood, and the known method of avoidance is not tried. If two men arrive at the second avoidance choice by the same route, despite the fact that neither are actually capable of avoiding injury, the man that makes no attempt to avoid injury is committing self-harm, while the man that attempted but failed, had an accident.

On inspection, the two cycles of questions in the model essentially describes the principles of an information processing system. Information (the warning of the

danger) is converted (encoded) from external data into an electrochemical signal in the body by one of the senses. The brain processes this information by comparison with past data (memory) and the appropriate solution is found. This is converted (decoded) from the electrochemical form to body action (to avoid the danger).

Almost every accident that occurs can be traced ultimately to human error (Stephenson, 1999, Gottlieb, 2003, Attwood, Deeb & Danz-Reece, 2004, The Noordwijk Risk Foundation, 2002, Tweedale, 2003). Once a human is involved in an operation of a system e.g. emergency control system, there is a possibility that he/she will make a mistake, which can be referred to as a human error. Surry's model explains some of the human errors in the areas of perception, cognitive processes, and physiological response.

Based on the research carried out by Surry and Kidd (Singleton, 1972) to assist in the examination of human error, Wigglesworth has developed a seven stage classification (Wigglesworth, 1972). This classification is useful as it provides an analytical approach which leads logically to improvements in the design of the man-machine-environment system.

TYPES OF HUMAN ERROR

1. FAILURE OF DETECTION
2. INCORRECT IDENTIFICATION
3. FAILURE TO REACH DECISION
4. INCORRECT DECISION
5. FAILURE TO ACT
6. INCORRECT CONTROL SELECTION
7. INCORRECT CONTROL ADJUSTMENT

Each of these types of error is either a missing or inappropriate response to some signal or stimulus.

This classification provides a basis for investigation of human error in an accident phenomenon. If the type and cause of error can be identified, it can then be traced back to the appropriate human factor. This information can initiate an analytical approach to reduce the probability of the human repeating an error (failing in an appropriate response to some stimulus, or committing an

inappropriate response to it), which in turn will reduce the probability of injury.

Examples which would illustrate the above are as follows:

- An operator, operating a control panel in an industrial plant fails to see a warning light indicating the need for immediate remedial action (e.g., switching on a cooling system). This operator continues to operate the plant without taking such a remedial action with the consequence of an explosion in the plant. This accident involves an error which can be classified as failure of detection. The cause of error could be poor contrast, or too low intensity of the warning light, or both.
- Also in the above case, the operator can see the warning light, which, however is unfamiliar to him. The operator could ignore such warning and continue the previous activity with the same consequence – an explosion in the plant. This type of error would be classified as failure to reach a decision. The cause of error would be the lack of information.
- A security officer, supervising a closed circuit television security system, notices the sign of a break-in and makes the decision to activate the alarm system, simultaneously closing security doors. In endeavouring to do this security officer operates another control - thus opening another door. As a consequence, the intruder escapes, with some loot, through such a door. This type of error would be incorrect control selection and its cause would be unintentional activation.

In the effort to minimize the potential for human error resulting from poor design of tasks for the operators of emergency equipment (control equipment, security systems, etc.), the Task Demand Model has been developed by Klein (1976). As discussed by Wigglesworth (1972) Klein (1976) pointed out that, as long as the level of human performance is greater than the level demanded by the task, there will be no accident.

However, accidents can occur in one of three ways. First, there can be a sudden and severe decrease in human

performance as for example when a driver drops a lighted cigarette in his lap, when an insect moves in front of his face, or when the driver is dazzled by the headlights of an oncoming car. In each of these cases, the sudden severe decrease in performance, if it drops below the level of task demand, may be the source of an accident.

On the other hand, when the level of task demand suddenly and unexpectedly rises, if, for example, there is a vehicle component failure, a tire blowout, or if an oncoming vehicle skids out of control necessitating immediate and severe evasive action.

However, probably the most frequent situation is in the situations where the decrease in performance level is only slight. If this coincides in time with a slight rise in task demand, then an accident may occur. Decrease in human performance could result from slower reaction times due to the ageing process, or from fatigue, or from low blood sugar level, stress, from being in an unfamiliar situation, or from the effects of alcohol and other drugs. In this case, the level of human performance is much closer to the overall level of task demand so that a relatively minor increase in the latter may result in an accident.

Contrary to popular belief, the level of human performance can drop to a very low level not only in the situations of sudden task overload, but also in the situations where there is very little task demand.

The relationship that governs the ability of the operator to receive and process information is that between human performance and stress. That performance improves with increasing stress up to some optimal point; beyond that it deteriorates. When stress is low (as in some repetitive tasks) the person is not attentive and performance deteriorates as attention wanders. When stress is high (as in highly complex tasks or at moments of severe time constraints) the person is over-tense and erratic, performance deteriorates as overload prevents information processing. Stress is defined as the demands that the environment places on the individual. The role of stress

is of crucial importance in the prevention of accidents resulting from human error, since a person can only attend to one task at a time. If a second stimulus appears before a response to the previous one has been completed, a task demand overload on the person (stress) is very likely to result in one of the types of errors discussed earlier.

Conclusion

Understanding of the above phenomena and models of accident prevention and theories would be of invaluable help in the design of emergency equipment systems, as well as in the operation of such systems in industry.

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Report On The Current & Proposed Occupational Health & Safety Practices In The Australian Nickel Industry

By: Mr. Martyn Cross; MPH, MIBiol. Principle Occupational Hygienist at Minara Resources, Murrin Murrin Operations

Abstract

The European Union Existing Substance Risk Assessment (European Nickel Group) has reclassified the toxicity of nickel compounds and will require that practical control strategies be implemented to minimize nickel exposure to as low as reasonably practicable (ALARP). Therefore, AusNiNet, an Australian group of Nickel producers, decided to establish a working party to recommend practical control strategies in their industry. The members of the AusNiNet working party from WMC Resources, Minara Resources and QNI Yabula Refinery have commenced the implementation of occupational hygiene programs to control nickel exposure based on their recommendations given in this text. They are in collaboration to track the progress and share learning. This article describes what is being accomplished in Australia to meet the European Union's Directive 90/394 for occupational exposure control to nickel.

Introduction

Epidemiological studies have shown that excessive exposure to certain species of nickel is associated with lung and nasal cancers (Doll, 1990). Following the European Union Existing Substance Risk Assessment of nickel compounds in April 2004 it was decided that all soluble nickel compounds should be classified as category 1 carcinogens, known human carcinogens (upgrading from a category 3 carcinogen). This requires labeling with the risk phrase R49 - may cause cancer by inhalation. In a subsequent meeting in September 2004 it was decided that nickel metal will remain as a category 3 carcinogen until the outcome of the two year inhalation study in animals is reported in 2006/7 (NiPERA News Bulletin, No.126, 2004).

Due to the health effects of nickel compounds a reclassification by the European Union's scientific committee would indicate that revised occupational exposure limits will follow. As a consequence of directive 90/394 this will mean either,

- substitution, or
- a closed system, or
- an exposure level as low as technically possible.

This will require:-

- use of respiratory and other personal protective equipment
- employee educational packages
- health surveillance. (P. di Discordia, 2004).

Significance and purpose of the study

In anticipation of the revised occupational exposure standards for Nickel and its compounds, AusNiNet, an Australian group of Nickel producers, decided to establish a working party to investigate the

current occupational hygiene practices and ways of improving them. The primary aim was to study current occupational hygiene practice across similar nickel industries in Australia and to recommend practical control strategies to address the pending legislation. In addition the working party decided to benchmark themselves with the Lead Industry, which has had a strict hierarchy of controls in place for decades.

Method

At the AusNiNet August 2004 meeting in Western Australia the working party was tasked with some of the practical issues associated with the impact of pending legislation relating to the Nickel Industry. These included:-

- Various aspects of monitoring: static, personal, urine etc
- Work clothing being taken home for laundry so exposing family members to nickel compounds
- Work assignment of pregnant women in the workplace
- Eating in the workplace. Food vans coming on to the work site; canteens being located inside the plant perimeter; employees going into the canteen with contaminated clothing; placement of wash facilities and rules regarding the washing of hands and face before eating
- Smoking in the workplace (designated smoking areas)
- Control of contractors with regard to all of these issues. Company employees are much easier to control than, for instance, maintenance contractors
- Cleaning/control of contaminated equipment which is sent off site for repair and maintenance.

A working party of the AusNiNet group

consisting of Paul Fisher, Project Manager, Occupational Health and Hygiene, WMC Resources Ltd., Brian Peoples, Environmental Coordinator, WMC Kwinana Nickel Refinery, and Martyn Cross, Principal Occupational Hygienist, Minara Resources, Murrin Murrin Operation, met with Ron Connor, Manager Health Safety, Environment and Quality at the QNI Yabula Refinery to review occupational hygiene best practice in the Australian Nickel Industry. At this meeting it was decided to benchmark the Nickel industry against the Lead Industry, where a strict hierarchy of controls has been in place for decades. BHP Cannington, and Xstrata, Mount Isa Mines were visited. Whilst in Queensland there was the opportunity to visit WMC Fertilizers Pty Ltd, Phosphate Hill to review their occupational hygiene practices and health surveillance procedures implemented due to the potential for fluoride ion emissions from the process and the gypsum waste product.

Qualitative assessments of current practices were conducted by discussion between the AusNiNet working party team members who compared and contrasted their current and proposed procedures and practices at their respective sites. During the site visits the workplace physical conditions and procedures and practices were reviewed to determine best practice controls and occupational hygiene. In addition there were focused interviews with key health and safety staff responsible for the implementation of practical control strategies.

Workshop Outcomes - Proposed Occupational Hygiene Practices
Some of the practical issues associated

with the impact of pending legislation relating to the Nickel Industry include:-

Technical Solutions / Engineering Controls

To meet the intentions of the European Union directive of either a closed system, or an exposure level as low as technically possible, it will be necessary to use the best available technology whilst remaining cost effective. All Australian Nickel producers are striving for this and are introducing further engineering controls. The areas of focus are the control of fine dust emissions and the reduction of spillages and leaks outside the process. Collaboration has already commenced between these organizations to enhance engineering control strategies.

Transportation and storage of final product

Not only is it important to protect the process workers, it is necessary to minimize exposure of off-site workers and customers by the prevention of spillage and dust exposure during transportation and storage off site.

Employee Educational Package

It is considered essential that an employee educational package on the health hazards associated with nickel and its compounds and ways to prevent exposure be implemented in the nickel processing industry. Nickel toxicity issues such as reprotoxicity and carcinogenicity must be included in induction packages. This is consistent with the European Union directive 90/394. The benefit of such a strategy was demonstrated at the QNI Yabulu Refinery where there was a significant reduction in the nickel dust levels which directly correlated with the introduction of their educational strategy. This indicated that good occupational hygiene was a key component of controlling nickel exposure. The strategy included a regular newsletter. The essential components of the educational package were also incorporated into the employee and contractor induction system.

It is recommended that a standard approach across the Australian nickel industry be adopted.

Work Practices and Personal Hygiene Controls

Inevitably there is a requirement for strict

personal hygiene standards to help prevent exposure to nickel compounds. This includes:

- The wearing of respiratory protective equipment (RPE) in compliance with AS/NZS1715, including the "Beard Free" policy and face fit testing. The preferred RPE is a half face respirator with a "P2" filter or powered air purifying respirator.
- The wearing of personal protective clothing and gloves.
- The removal of dirty clothes and washing prior to leaving site.
- No smoking, eating, or drinking in "high risk areas" thereby eliminating hand to mouth contact.
- No sweeping or other dust generation.
- Decontamination of equipment which is sent off site for repair and maintenance.

Atmospheric (Dust) Monitoring

There is a need to standardize the occupational exposure standard used for metallic nickel, soluble and insoluble nickel. Different organizations in Australia are using different standards. The ACGIH occupational exposure standards (ACGIH, 2005) are currently recommended by this working party until this is changed by the European risk study.

There is a need for a standard atmospheric monitoring strategy across the Australian nickel industry. This should be in accordance with AS/NZS3640 and should utilize random sampling. The recommended method for all sample sizes and geometric standard deviations is the minimum variance unbiased estimate (MVUE) (Mulhausen, 1998). A six-month rolling average monitoring similar exposure groups is recommended to show trends in workplace nickel levels.

Health Surveillance

It is recommended that urine analysis be conducted as an indication of body burden. Lauwerys (2001) has shown that in subjects not occupationally exposed to nickel, that a nickel concentration in urine is normally less than 2ug/g creatinine. However as far as the working party is aware there is no recognized action level for removal of employees from the workplace when occupationally exposed to nickel. The working party recommends that a review is required at the 30-45ug/g

creatinine level and at 45 ug/g creatinine or greater that removal of the individual be considered. It is recommended that the Australian nickel industries coopt an academic organization to assist in this process. It is recommended that a background control urinary nickel level for the area be established in a non-exposed population close to the nickel processing plant.

Environmental Nickel Dust Emissions

This working party recommended that nickel dispersion sampling be conducted in accordance with AS/NZS3580.10.1 to establish the profile of nickel deposited across the process plant. This will help identify the most significant areas in which to conduct personal monitoring and where to focus on controlling emissions.

Conclusions

The members of the AusNiNet working party from WMC, Minara and QNI have commenced the implementation of occupational hygiene programs to control nickel exposure in line with the recommendations above and are in collaboration to track the progress and share leanings. These programs will include:-

- the introduction of technical solutions and further engineering controls
- a standardized nickel dust monitoring strategy
- good occupational hygiene and work practices
- an employee educational program
- a biological monitoring procedure, with urinary nickel action levels and standards, and high urinary nickel personal management plans.

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Skip's Corner

Lightning Strikes

At any time, some 2000 thunderstorms are occurring around the world, creating approximately 100 lightning "ground strikes" every second. In the United States alone, lightning causes the majority of forest fires and over \$2 Billion in property losses. Lightning is also the leading weather-related killer in the United States, causing between 100 and 200 deaths each year. In the continental United States, the second and third quarters of the year usually have the most lightning activity. Lightning can measure up to 30,000,000 volts at 100 amps in less than 1/10 of a second, and can be 1 inch in diameter. A lightning strike between a cloud and the ground averages 5-6 miles, but can travel as far as 10 miles.

Once the leading edge of a thunderstorm approaches to within 10 miles, there is immediate risk due to the possibility of lightning strikes coming from the thunderstorm's overhanging anvil cloud. For this reason, many lightning deaths occur with clear skies overhead. On average, thunder from a lightning strike can only be heard over a distance of 3-4 miles, depending on terrain, humidity, and background noise around you. By the time you can hear the thunder, the storm has already approached to within 3-4 miles. A sudden cold wind that many people use to gauge the approach of thunderstorm is the result of downdrafts and usually extends less than three miles from the thunderstorm's leading edge. By the time you feel the wind, the storm can be less than 3 miles away.

This data emphasizes the effects of a lightning strike and should encourage everyone to practice lightning safety. The following safety tips from the National Lightning Safety Institute can enhance personnel safety during thunderstorms.

- If outdoors, seek shelter. Get indoors or in an all-metal car (except a convertible), truck or van with the windows out.
- Get off the high ground! Avoid open spaces, solitary trees, hilltops, cliff faces, caves, bodies of water, and all metal objects.
- If caught away from shelter during a lightning storm. Adopt the lightning safety position; stay away from other people, take off metal objects, and crouch with feet together, head bowed and hands to knees
- If in doors avoid plumbing and other penetrating conductors. Stay away from open doors and windows. Turn off the telephone and remove conductors. Stay away from open doors and windows. Hang up the telephone and remove headsets. Turn off computers and television sets. Lightning can strike electrical or phone line and result in shock!



Occupational Stress

By: Mr. Simon Cuthbert, OS&H Inspector for the Western Australian Department of Consumer and Employment Protection.

Abstract

Occupational stress is becoming of great importance to workplaces across the globe. The cost of stress to human health and the health of the economy is much greater with stress claims than it is with standard claims. Businesses and Safety Professionals must consider preventative measures as a way to successfully manage occupational stress in the workplace. This article describes psychosocial, bioecological and personality causes of work related stress and the health effects of this stress. It also makes recommendations for occupational stress minimization and control methods.

Introduction

Stress is defined as "the result produced when a structure, system or organism is acted upon by forces that disrupt equilibrium or produce strain" (Venes, Thomas & Taber, 2001). Stress has been of major interest since the 1950's when Dr. Hans Selye first used the word in the book titled "The Stress of Life". Due to Seyle's English not being good he used the term stress instead of strain. By the time it was realized, the book was well into circulation and it was too late.

The causes of stress can be divided in to three main categories.

1. Psychosocial Causes – this cause of stress is a result of social behaviour and the way a person interprets that behaviour. Stressors such as overload, pressure to perform, deprivation and adapting to a workplace situation all fall into this category.
2. Bioecological Causes – involves the interaction of the person with their environment. Stressors such as excessive noise, extreme temperatures, bright light, static position strain and muscle overload can cause stress (Danielson, 2001).
3. Personality Causes – relates to the way in which an individual's self-perception, characteristic attitudes and behaviors contribute to excessive stress. For example stressors such as self-perception, self-esteem, self-confidence, anxiety and behavioural patterns.

Of the three main categories mentioned above, there are four types of stress that can develop in the person.

1. Over stress – known as hyper-stress
2. Under stress – known as hypo-stress
3. Bad stress – known as distress; and
4. Good stress – known as eustress

People should aim for a balance between hyper-stress and hypo-stress to minimize

distress and maximize eustress (Seyle, 1983).

Pathology and Physiology.

The term, *stress*, is actually borrowed from the study of physics and has been applied to Seyle's stress syndrome (Morris, 2000). The physics and engineering use of stress was in defining the pressure or force on a system. According to Seyle (1983) stress has a three part mechanism consisting of:

1. Direct effect of stressors on the body,
2. Internal responses that stimulate tissue defense or help destroy damaging substances; and
3. Internal responses that cause tissue surrender by inhibiting unnecessary or excessive defense.

The damaging effects of stress can be either changes in physiological processes that alter the body's resistance to disease or pathological changes. The pathological changes can consist of organ system fatigue or malfunction as a result of prolonged over activity of specific stress organs (Girdano and Everly, 1986).

Albrecht (1979) states that there are two different types of occupational stress that a person can be exposed to. The first is episodic stress which can vary in intensity and usually lasts for a short time. The second is chronic stress which is a continual stress with no extended break. Chronic stress is not controllable by the person suffering and may lead to muscle and tissue damage (Albrecht, 1979).

Of the two types of stress there are several different stages. The first stage, or primary stress, is the well known "fight or flight" stage which involves the body preparing to fight or to flee by releasing adrenalin into the bloodstream. At this stage the palms will become sweaty, the heart rate will also increase and digestion rate decreases causing butterflies and indigestion. Respiration will deepen at this stage along with the muscles tensing in preparation for a fight or a flight

(CMHA, 2004).

If the first stage of stress is not controlled, then the body moves into the second stage. This is where the body releases stored sugars and fats from the bodily reserves. This is done to keep the body in its heightened state. Symptoms of this stage are memory loss, anxiety, feeling pressured and illness such as cold and flu due to the immune system suffering (CMHA, 2004). The third stage is the point where the person is chronically stressed and the body's use of energy exceeds the amount of energy produced. This can lead to illnesses including heart disease, cerebral bleedings (ILOUIS, 2004) personality change, insomnia and mental illness (CMHA, 2004).

How has Stress become of regional and local importance?

Stress has become of regional, local and even global importance due to it being accepted by the courts and workers compensation tribunals as a legitimate claim able disability. WorkCover Western Australia has released research into workplace stress claims, indicating not only that stress is a claim able illness, but that it is also a concern.

According to WorkSafe Western Australia, during the years 1988 – 1993 in Western Australia, there was an increase of 600% in the number of stress claims made. Either by coincidence, or due to this data, there was a change in the Western Australian Workers Compensation and Rehabilitation Act 1981 definitions. The original definition of a disability was "a disease contracted by a worker in the course of his employment at or away from his place of employment and to which the employment was a contributing factor and contributed to a *recognizable* degree." On the 24th December 1993 it

changed to "a disease contracted by a worker in the course of his employment at or away from his place of employment and to which the employment was a contributing factor and contributed to a *significant* degree."

The change in definition actually had a negative effect and it became easier for employees to prove claims against their employer (Burton, 1999). Burton also states that WorkCover Western Australia has adopted a test that can be seen as generous when determining whether work was a significant contribution. Some Review Officers at WorkCover in Western Australia are adopting a subjective test to decide if work was a contributor, as opposed to an objective test. This has made it extremely difficult for employers to gain a successful defence in workplace stress claims.

The increase in successful claims is not only costly to business but is also costly to the individual and the community. This is by way of increased personal cost and increased public health costs. These health costs of stress rise due to the increase in the use of cigarettes, alcohol, prescription drugs, non-prescription drugs and increased rates of illness and accidents when employees report being stressed (Cotton, 1995).

The public health costs and costs of lost time can have a massive effect on a nation's economy. Data available from the United Kingdom suggest that 90,000,000 working days are lost every year because of absence from work caused by stress, at a cost of £7 billion through sick pay, lost production and National Health Service charges (Thompsons, 2002). In America during 1987 there were recorded employer losses of \$150 billion due to employee work related stress claims (Morris, 2000). In the latest data available on stress claims in Western Australia the average cost of a workers compensation claim for stress in the years 2000/2001 was \$32,631. This is nearly twice the average cost of all other claims which was \$16,357. This is only an estimate and could in fact be more due to claims that have not yet been finalized (WorkCover, 2002).

Groups such as the Australian Council for Trade Unions have been trying to get people to see the importance and presence of stress

in the workplace for many years (Peterson, 2003). This concern has support from such studies as the one conducted by Chandler, Berg and Barry (2003) in the United Kingdom (UK). This study provided strong and convincing evidence that stress has increased over the past ten years in all levels of organizations, including managerial positions (Peterson, 2003).

Even with findings such as those mentioned above, there has still been a noted denial of stress as a problem by the managerial groups of Australia, UK and the United States of America (USA). In fact, the denial of stress seems to be present in all countries with developed economies. In the UK workers are seen as lazy even though they actually work more hours than employees in all of the other European Union member countries (Peterson, 2003). Could this be due to the change in the levels of an organization that stress historically affected?

Before the 1990's it was the administrative and managerial personnel who had the lowest stress levels. During the 1990's this changed, with upper management and administrative personnel beginning to suffer stress more than their subordinates. This may be due to the increased pressure of economic managerial styles, lowering staff levels, multi-skilling and tighter budgets to increase competitiveness (Peterson, 2003).

Despite the opinions of management, it seems obvious that workplace stress is a problem. The ease of employees to make a successful claim and the difficulty employers have disproving these claims means that businesses and the economy will continue to suffer in years to come. Prevention is the only way that workplace stress will be controllable in the workplace.

Numerous factors (stressors) can be responsible for causing distress. The following is just a few of the many workplace stressors.

- Unclear Job Description. – If a person has no clear description of the tasks they are expected to perform or if the person is asked to do a bit of everything, this may lead to distress.
- Career concerns. – Job insecurity along with limited opportunity to advance, be promoted or for growth in skills.
- Environmental conditions. – If employees are exposed to extremes in temperature,

noise, smell, glare or other environmental factors, distress can develop. Distress can be in either physical or mental form.

- Unsupportive work environment. – Poor communication, bad management skills, lack of acknowledgment, lack of resources and lack of assistance are all part of the unsupportive work environment.
- Unexplained and constant change. – This is when there is rapid change for which an employee is not prepared or there is a constant changing of roles and/or work location.
- Interpersonal relationships. – Distress can be brought about by a social environment of a negative kind. This may be through lack of support from supervisors or bullying from other employees.
- Task design. – Some employees may be required to perform tasks that have little or no meaning, are fast paced and intense, are not utilizing the employees skills, have infrequent breaks or do not give employees any sense of control (CDC, 1999)
- Manual Handling. – The handling of materials in the incorrect manner can cause distress by way of injury such as prolapsed disc, ligament sprain and muscle strain (SafetyLine Institute, 1998).
- Overuse. – If employees are required to perform a repetitive movement for extended periods of time, required to use forceful movements to perform tasks or are required to hold postures for long periods they are at risk of developing body distress such as Repetitive Strain Injury (RSI), Carpel Tunnel Syndrome (CTS) or Tendosynovitis (NOHSC, 2004).
- Traumatic Incidents. – Following a traumatic incident employees may suffer distress as they attempt to cope with the situation within their own minds or the change in conditions. If an employee is not at work due to being involved in an incident then the hard truth is that other employees, or temporary contract staff, will have to cover this vacancy until the person involved can return.

The above mentioned may be

exaggerated if the employee is also suffering from stressors in their personal life. This is where there can be ambiguity in the claim for distress. Due to an employer not knowing what is going on in the employee's personal life, they will possibly argue that the distress is not a direct relation to work. If there have been some recent changes or introduction of any of the above stressors, and symptoms have only begun developing after this point, then this is an indicator that distress may be caused by work.

How is Workplace Distress currently affecting health?

Distress is linked to many types of health effects and even death. Below are some of the health effects linked to distress.

- **Cardiovascular Disease.** - Distress has been linked to the development of cardiovascular disease. Research in Sweden found that people who reported suffering from chronic distress were 14% more likely to develop cardiovascular disease and complications from cardiovascular disease such as stroke. The research also concluded that men who had suffered chronic distress were twice as likely to die from a stroke as their non-distressed peers were (Stoppler, 2004).
- **Stomach Disorders.** - Originally distress was thought to cause ulcers such as peptic ulcers. Researchers now believe that bacteria such as *Helicobacter Pylori* are responsible for the formation of these ulcers. Stress lowers the immune system which allows the bacteria to cause the ulcers. Further distress aggravates the ulcers once they have formed (CNN, 1996).
- **Musculoskeletal Disorders.** - According to research conducted by the National Institute for Occupational Safety and Health (NIOSH), it is widely believed that distress can increase the risk for development of back and upper extremity musculoskeletal disorders (NIOSH, 1999).
- **Depression.** - If the person remains distressed for long enough depression may set in. If the depression is bad enough then persons may harm themselves or even attempt to take their own life. In the United Kingdom there have been suicides attributed to work place distress. In the UK alone lifestyle and distress related illness accounts for

at least half of all premature deaths (Thompson's Solicitors, 2002).

Long-term health outcomes

Long-term health outcomes of distress can be as follows:

1. **Personal health issues** such as:
 - a. **Cardiovascular disease.** - This can become a major killer in the future if exposure to stress is not controlled. Instances of death due to cardiovascular disease will increase dramatically.
 - b. **Mental health.** - If stress is not effectively controlled, then mental health illnesses can also dramatically increase. This could have effects on other factors such as violence, drug addiction, alcoholism and suicide. Suicide rates in older people can increase and the public health system may be over run with adult mental illness cases.
 - c. **Migraine.** - It is believed that cases of migraine increase when employees become distressed.
 - d. **Eating disorders.** - People deal with distress and react to stress in different ways. Some people will lose their appetite whilst others who go on to the depression stage may eat for comfort. This can cause problems both of anorexia or obesity. This can in turn cause other conditions in the body such as cardiovascular disease.
 - e. **High blood pressure.** - By having a constantly elevated heart rate and blood pressure the instance of stroke can increase along with the instance of hypertension.
 - f. **Musculoskeletal disorders.** - These may increase due to the constant tension in the upper body during the stages of stress. Safety Professionals should deal with stress early on to prevent such happenings.

2. Economic Health

The economy can suffer greatly if distress cannot be managed or prevented. The nature of stress claims can mean that the cost to the nation may be millions if not billions of dollars per year in treatments and days lost. In Australia, the cost of occupational or work-related stress is approximately \$200 million per annum (Better Health, 2001). Industries may suffer due to increased workers compensation premiums and all of the hidden

costs associated with lost time injuries. The country's public health system may be burdened with unnecessary mental health illnesses.

3. Family Health

If stress is not managed effectively family health can suffer. Stress that causes mental health problems can place pressure upon families who do not understand what is happening. This can lead to tension and possibly a break down of the family unit. Broken families can then lead to some people turning to the incorrect treatment for their worries, such as drugs and drinking excess alcohol.

People should not be subjected to distress in the workplace. Work can cause stress. No person should ever have to go through the physical and mental illness that stress can cause.

Interventions

Various interventions can reduce or eliminate the risk of workplace distress. Employers should implement preventative strategies rather than waiting for cases of stress to occur and then dealing with them. The following are some recommendations to minimize the occurrence of work related distress.

- Employers can monitor the rate of absenteeism, which can be a good indicator of what staff morale is like (Burton, 1999).
- Employers must be sure to keep communications between themselves and employees open and honest at all times.
- Employers should make counselling available as part of an Employee Assistance Program.
- Stress management and prevention strategies must be developed, implemented and enforced. Prevention strategies may include:
 - Team building exercises.
 - Effective conflict resolution procedures.
 - Clear job descriptions and responsibilities.
 - Planning jobs to ensure that sufficient time is allowed for their completion.
 - Training of supervisors in the early detection of stressed employees.

- Providing education sessions for employees on how to recognize stress and then deal with it effectively, at an early stage.
- Child care facilities may need to be considered as well as maternity/paternity leave arrangements.
- Employers need to accept stress as a real threat to their financial status and provide resources to implement necessary strategies, hence guaranteeing no future losses from stress claims.
- Employers need to have an excellent Human Resources Department who are sympathetic to the needs of the companies' staff and identify where an employee is best placed to avoid constant transfer and change.
- Environmental factors such as noise and temperature need to be controlled and maintained at comfortable levels.
- Management needs to be supportive of their subordinates and provide direction and advice. Employees should be acknowledged for their effort and encouraged in every way. Negative comments should be avoided.
- Information regarding upcoming changes within the company should be relayed to employee to prevent the surprise element causing stress. As much as possible employees should be involved in making decisions about changes which will affect their work. Employers must be open and honest about the security of their employees' jobs.
- Administrative controls such as job rotation, regular breaks and exercise should be implemented to ensure postures are not maintained for extended periods and that the work does not result in extensive static muscle loading.
- Computer workstations, as well as workstations in general, should be ergonomically designed.

Conclusions

Good management can prevent the majority of workplace stress claims. Employers that do not see the need for prevention strategies to be implemented will

inevitably suffer the consequences.

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The Effects Of Organizational Safety And Health Culture On Female Employee Retention In The Rail Industry

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Abstract

This article defines what culture is, how it is influenced and how having a culture of caring helps to promote employee retention for the rail industry. It reports on the good aspects of employment in the railways and other industries and identifies areas that can be improved to help retain more female employees in the rail industry.

Introduction

In 1819 Porter (p444) defined culture as "the concepts, habits and skills of a given people in a given period." A few years later Weldon (1991, p227) described culture as "the sum total ways of living built up by a group of human beings, which is transmitted from one generation to another." "Culture is the values, beliefs, and behaviors that we share with other members of groups. Culture binds us together as a group. Culture provides clues on how to behave in normal and novel situations" (Helmeirch, 2005, p 2). An organizational culture is the way that people in an organization work and act towards each other in the workplace.

An organizational culture is influenced by what top management set as the standards of work and behaviour. This is usually achieved by top management's actions, rewards provided for these actions, organizational policies and procedures. Organizational culture is influenced by workplace managers; what they praise and what they discipline. The culture is influenced by employees' actions and who they reward with their friendship. People have a need to belong and to be cared about. This is why it is important to care for employees' social and mental health at work as well as their physical health. The opposite to an organization having a mission and a culture of care is for an organization to have a culture of bullying and victimization. A culture is not documented. It is lived.

Occupational safety is freedom from work related hazards causing harm to people at the work place and to employees who are working for their employer while they are at work. In Australia the occupational safety and health legislation is driven by the Robens philosophy (Robens, 1972) which is that everyone at the workplace, including the employer, employees,

manufacturers, suppliers of products and service, has a "general duty of care" to make and keep the workplace, work processes and work management safe. The rest of this article describes how a culture is lived and how culture assists with the recruitment and retention of employees.

How culture assists in employee retention

A model often used for quality management is Plan → Do → Check → Act (Health and Safety Executive, 1998). This model can be used to manage employees with Plan being the employee selection criteria. It is important to make sure that employees hired really want the employment position, are qualified for working in this employment position and that they have the physical and mental ability to be able to safely do the work that they are being employed to do.

Do is employing the people. Employment means providing employees with a good orientation to the organization, the procedures that they will use in their work and the policies that will affect their work. For new employees it is useful to buddy them up to be rostered to work with friendly more experienced employees for their work so that they have a friend to ask questions to if they are unsure about any aspect of their work. The work area manager needs to communicate to everyone in their area of responsibility that if they needed any help, or have any concerns, to please come to see the manager to talk so that the manager can act on any concerns as appropriate.

Once employed the managers should check on how employees are going. In most work positions the manager should talk to the employees each day. Checking could be informally, such as conversations when having morning tea or a meal break together. Checking can be through observation while working, in meeting

discussions and formally when employees have their annual performance appraisal. If employees have any problems that would affect their work, if it is possible to do something to eliminate, or to minimize the potential for harm from the problem the manager should organized that actions are taken as appropriate to ensure that the work processes and workplace are safe.

Acting is ensuring that employees have all of the required resources to be able to do their work safely and effectively. A very important resource is ensuring that employees have enough time to do their work safely. The manager must also show genuinely care for all the employees that the manager works with and care for their occupational safety and health as much as possible.

In 2001 research was conducted by Mussett to identify the aspects of organizational management and culture that produced the highest level of patient care in Western Australian hospitals. Nine healthcare organizations took part in this research. The research findings showed that what managers need to do was the following.

- Show strong leadership in promoting care, consideration, health and safety for employees, customers and potential customers.
- Provide adequate human and material resources and good workplace conditions.
- Be team orientated.
- Provide and facilitate employee education and training.
- Plan, set and implement standards and provide clear methods on how to perform tasks.
- Provide competent supervision.
- Regularly evaluate organizational activities, provide feedback and implement follow up action as necessary.

- Communicate effectively.

Employees should:

- Have a culture of caring for everyone on the premises.
- Be provided with enough time to complete work tasks.
- Work together as a team.
- Be educated and trained in work related tasks.
- Be empowered to make decisions that affect their work.
- Be consulted and participate in the planning, implementing and evaluation of services and change.
- Have security of continuing employment.
- Communicate effectively.

This research by Mussett (2001) also showed that suppliers of goods and services needed to be made partners in the organization's quality and safety activities. Research needed to be conducted to improve the quality and safety of service. The research findings then should be publicised through out the organization and used to improve organizational services as it is no good conducting research if the relevant people do not know and have the opportunity to use the results. The most important factor found for a high standard of cost effective service delivery, minimal employee occupational injuries and sick leave, for employee commitment to the organization and for retaining employees was to *have a mission and a culture of caring for everyone* who came on to the business premises.

The best hospital in this research study was a private hospital. In this hospital the owner genuinely cared about all of his staff. For example, every staff member received a basket of gifts and a card for their birthday and a large ham as a Christmas present. The hospital manager, and all staff managers below her, showed care to all of the employees and to everyone who came onto the work premises, whether the person was a patient, visitor, contractor or employee. All employees showed care to each other, and to everyone who came onto the work premises. The hospital was clean, modern and had all of the resources needed to provide a high standard of care. All of the patients spoken to said that this was the

best hospital that they had ever been cared for in. Staff employed at this hospital did a lot for each other, and their organization. If the hospital was quiet they took holidays. If the hospital was very busy they worked over time and took extra rostered hours of work to ensure a high standard of patient care. One of the theatre nurses said that when her daughter had an asthma attack she brought her daughter to work and the hospital staff cared for her daughter while she worked in theatre. Staff in this organisation did not even need to take sick leave to care for sick children. This hospital had staff with a wide variety of ages that varied from new graduate nurses to staff who had worked at the hospital for more than 30 years. One thing that the staff all had in common was that they all wanted to stay working at this hospital because they felt part of a family and were well cared for. The hospital did not have a fancy strategic plan, but it did have a mission and a culture of caring that was lived by the staff.

The hospital with the second highest score had an interesting management structure. At the bottom of the organizational structure were the Hospital Board Members. Above them was the hospital Chief Executive Officer. It was the Board Members' role to support the Chief Executive Officer. Above the Chief Executive Officer were the hospital management employees who received support from the Chief Executive Officer. Above the managers were the employees who provided hands on care to the patients, while above these employees on the organizational chart were their external customers. External customers were not only the patients, but included everyone who came on to the hospital premises. Imagine the Railway Organizational Chart with the Minister at the bottom to support the Railway Executive who would in turn support management staff. On the organizational chart the management staff would be below the employees who provided external customer care would have the role of supporting these employees.

Both of the above examples were very profitable private hospitals. In contrast the hospital with the lowest score for quality of patient care had during the past few years

a very difficult Chief Executive Officer who had not taken care of the occupational safety and health of the staff very well. This government hospital had a documented strategic plan and business plans for each area of work. There was a problem with staff having to deal with customer violence at times in the emergency department and in the hospital wards. On paper the hospital management looked excellent. At the time of the research the hospital had a care taker manager and was advertising for a new manager. The hospital had an inadequate amount of equipment, staff and facilities for some of the patient care areas. The hospital had a high level of sick leave due to staff suffering manual handling and other injuries. Employees did not help each other very much with tasks or work together as a team. For example nurses made patient beds on their own instead of working with a partner. This hospital was short of employees as there was a high turn over of staff because they felt that they had been bullied by their management, or because they felt that their conditions of work were poor. In this research study staff demonstrated that if they did not feel cared for they did not stay working for the organization.

The findings of this research are applicable to staff retention for most industries, including the rail industry.

Retention in the rail industry

In 2005 research was completed that examined factors related to the occupational safety and health of women who worked in the transport industry (Jansz, 2005). Three of the employees included in this research study worked in the railway industry in Western Australia. One was a Rail Transit Guard, another was a Transit Guard Team Leader and the third was a Driver Coordinator. Each of these three women was asked what attracted them to work in the rail industry.

The Transit Guard had left high school and had been working for the rail industry for 2½ years. Her answer as to why she joined the railways and stayed working there was as follows.

I want to work in the police force. I took this job as a stepping stone for getting into the police force. As a transit guard I gain experience in

applying the law. I saw this job advertised in the paper. I am getting married and building a house. I have stayed in this job because the money is good.

What retained this young woman in the rail industry was the pay.

The Transit Guard Team Leader gave the following as the reasons that she stayed working in the rail industry.

The best part of this job, and I guess it's the reason I am still here after 7 years, is the mate ship that you get here. We are a very tight unit; almost like a big family. We joke that we spend more time with each other than we get to with our own families. Most of my work mates are now my best mates. They understand the stress and the hours and we can call each other whenever, however and talk. That is important as they call you after a bad incident just to check if you are ok.

If you have any major issues you talk about it with each other. Management has provided our own support group who have been trained in peer support. This has been a great idea because sometimes you don't feel like talking about bad experiences to a stranger from Prime (an employee assistance organization), so you can chat to one of your mates, whom you trust, and who has probably experienced the same thing.

I go out with a couple of the guys. We have standard concert dates where we each get a turn to pick which concert we would like to see and then we go see it. Our group started out with 3 of us now it's 5 and growing.

This Team Leader stayed in the rail industry because of peer support and friendship. For her the co-workers were like family. Occupational safety and health is more than just having a safe work environment and work processes, it is also about having mental and social needs met.

When asked what factors attracted her to work in the rail industry the Driver Coordinator, who had also worked in the rail industry for 7 years, replied as follows.

I completed a psychology degree at university and wanted to be a criminal

profiler. To become a criminal profiler you had to have experience as a police officer. I did not want to become a police officer. When I was a student I caught trains and busses. I noticed that railway guards did similar work to police, but it was less serious as the guards did not have to carry and use guns. I applied for a job as a railway guard and fell in love with working in the rail industry.

The rail industry has a real sense of history; tradition. It is a family. It is like having brothers and sisters. You don't have the back up of the police when in violent situations. All you have to rely on is each other. We provide a real community service to the public. We contribute to so many people's life in enabling them to go where they need to go.

I love having a moving office. When I reach Fremantle my office overlooks the sea. When I reach Midland my office has a view of the hills. The scenery is always changing. With the passengers I see a lot of good and bad things. You see a whole lot of women getting on the train for a hen's night. I watch them dance with joy around the pole in the train carriage. I could tell endless stories about the cutest things. As a train driver you see all of the people on the platform and then hear all of the conversations in the train carriage behind you. It is like being a fly on the wall. You see and hear everything. After listening to teenagers talk about their sex life there is not much that I have left to learn about this topic.

You also have to deal with nasty situations, like people trying to beat you up. For example, one day I arrested a guy who was throwing beer bottles at people. He was with a group of 20 mates. There were 2 of us and 20 of them. They smashed the windows and tried to climb in the office where we took their mate. When you are dealing with violence directed to you it is not too bad as you are doing something to fight back. I found it harder to deal with violence when I had a riot on the train while I was driving and passengers were beating

up the Transit Guard. In the driver's cabin I could hear what was happening, but as I was driving I could not do anything about it. It is horrible when someone is in danger and you are not able to do anything to help.

For me, working in the railways is an addictive life style. At times it is scary; it is good; it is life. I would not leave. When you are on a train you have the whole world and their life on the train. You have passengers who were born in many different countries, who have many different religions; and many other differences. I think that if people with all of these differences travel peacefully together on a train and survive, there is hope for the world.

As a university student the Driver Coordinator traveled on trains. This identifies that a good place to sell the benefits of working in the rail industry is to advertise employment opportunities in the rail industry on trains, where the passengers are a captive audience. The things that kept this Driver Coordinator working in the rail industry were the opportunities that she was given for promotion, the support that she received from management and other employees and the fact that she really enjoys working in the rail industry. Again, even though her work processes were not always safe (as she had to deal with drunk and difficult people at times on the trains) it was the fact that her social and mental health needs were met that made her work so enjoyable. The following are her comments when asked why she continued to work in the rail industry.

If I left I would miss out on all of the gossip!

I was the first female to ever be a Driver Trainer. I am now the first female to be a Driver Coordinator. I like my job very much as I get to contribute to decision making and have a say. The PTA (Public Transit Authority) is talking about helping me to be able to do a Masters of Business. We have an aging group of managers. It has been identified that someone is needed in management who has a university degree and lots of solid experience. As I have a psychology

- Communicate effectively.

Employees should:

- Have a culture of caring for everyone on the premises.
- Be provided with enough time to complete work tasks.
- Work together as a team.
- Be educated and trained in work related tasks.
- Be empowered to make decisions that affect their work.
- Be consulted and participate in the planning, implementing and evaluation of services and change.
- Have security of continuing employment.
- Communicate effectively.

This research by Mussett (2001) also showed that suppliers of goods and services needed to be made partners in the organization's quality and safety activities. Research needed to be conducted to improve the quality and safety of service. The research findings then should be publicised through out the organization and used to improve organizational services as it is no good conducting research if the relevant people do not know and have the opportunity to use the results. The most important factor found for a high standard of cost effective service delivery, minimal employee occupational injuries and sick leave, for employee commitment to the organization and for retaining employees was to *have a mission and a culture of caring for everyone* who came on to the business premises.

The best hospital in this research study was a private hospital. In this hospital the owner genuinely cared about all of his staff. For example, every staff member received a basket of gifts and a card for their birthday and a large ham as a Christmas present. The hospital manager, and all staff managers below her, showed care to all of the employees and to everyone who came onto the work premises, whether the person was a patient, visitor, contractor or employee. All employees showed care to each other, and to everyone who came onto the work premises. The hospital was clean, modern and had all of the resources needed to provide a high standard of care. All of the patients spoken to said that this was the

best hospital that they had ever been cared for in. Staff employed at this hospital did a lot for each other, and their organization. If the hospital was quiet they took holidays. If the hospital was very busy they worked over time and took extra rostered hours of work to ensure a high standard of patient care. One of the theatre nurses said that when her daughter had an asthma attack she brought her daughter to work and the hospital staff cared for her daughter while she worked in theatre. Staff in this organisation did not even need to take sick leave to care for sick children. This hospital had staff with a wide variety of ages that varied from new graduate nurses to staff who had worked at the hospital for more than 30 years. One thing that the staff all had in common was that they all wanted to stay working at this hospital because they felt part of a family and were well cared for. The hospital did not have a fancy strategic plan, but it did have a mission and a culture of caring that was lived by the staff.

The hospital with the second highest score had an interesting management structure. At the bottom of the organizational structure were the Hospital Board Members. Above them was the hospital Chief Executive Officer. It was the Board Members' role to support the Chief Executive Officer. Above the Chief Executive Officer were the hospital management employees who received support from the Chief Executive Officer. Above the managers were the employees who provided hands on care to the patients, while above these employees on the organizational chart were their external customers. External customers were not only the patients, but included everyone who came on to the hospital premises. Imagine the Railway Organizational Chart with the Minister at the bottom to support the Railway Executive who would in turn support management staff. On the organizational chart the management staff would be below the employees who provided external customer care would have the role of supporting these employees.

Both of the above examples were very profitable private hospitals. In contrast the hospital with the lowest score for quality of patient care had during the past few years

a very difficult Chief Executive Officer who had not taken care of the occupational safety and health of the staff very well. This government hospital had a documented strategic plan and business plans for each area of work. There was a problem with staff having to deal with customer violence at times in the emergency department and in the hospital wards. On paper the hospital management looked excellent. At the time of the research the hospital had a care taker manager and was advertising for a new manager. The hospital had an inadequate amount of equipment, staff and facilities for some of the patient care areas. The hospital had a high level of sick leave due to staff suffering manual handling and other injuries. Employees did not help each other very much with tasks or work together as a team. For example nurses made patient beds on their own instead of working with a partner. This hospital was short of employees as there was a high turn over of staff because they felt that they had been bullied by their management, or because they felt that their conditions of work were poor. In this research study staff demonstrated that if they did not feel cared for they did not stay working for the organization.

The findings of this research are applicable to staff retention for most industries, including the rail industry.

Retention in the rail industry

In 2005 research was completed that examined factors related to the occupational safety and health of women who worked in the transport industry (Jansz, 2005). Three of the employees included in this research study worked in the railway industry in Western Australia. One was a Rail Transit Guard, another was a Transit Guard Team Leader and the third was a Driver Coordinator. Each of these three women was asked what attracted them to work in the rail industry.

The Transit Guard had left high school and had been working for the rail industry for 2½ years. Her answer as to why she joined the railways and stayed working there was as follows.

I want to work in the police force. I took this job as a stepping stone for getting into the police force. As a transit guard I gain experience in

employees feel valued by their organization, and each other, they are more likely to stay working for the organization. Culture is influenced by organizational and personal factors. Providing for employees' mental and social health is a very important employee retention strategy for any industry.

Reason (2005) stated that the rail industry has a culture of 'on time train running' and 'rules'. He said that this culture developed because many of the early rail industry employees came to work in this industry straight from school and it was cheaper to give these young people lots of rules to follow, rather than providing training in working safely. Listening to the comments of the Driver Coordinator the rail industry is gradually changing and now has a very well run 20 weeks training course for train drivers. Transit Guards reported being well trained in dealing with difficult people, verbal aggression and physical violence. The culture of 'on time train running' has not changed (Jansz, 2005), but there are many opportunities in the rail industry to further develop a mission and a culture of care for everyone who comes onto the rail industry premises.

A Government Minister has the highest level of responsibility for the railways. Development of a culture starts at the top of the organization and is influenced by visible and active employee support and strong leadership. Culture is influenced by the Minister's commitment to developing a culture of care, not only for external (paying) customers, but also of care for employees, contract workers and everyone who comes on to the railway premises.

Culture is also developed from the bottom of the organization by the way that employees treat everyone who comes onto the work premises. When hiring managers, or any other employees, it is important to hire people who have the physical and mental capabilities to be able to do the work. Each job needs to be matched to the individual. To ensure that people are not overloaded there should not be a mismatch between the job and individual capabilities.

Physical matching includes how the workplace and working environment are designed (Health and Safety Executive,

1998). Mental matching includes taking into account the individual's information and decision making requirements. Personal attributes that need to be considered when hiring an employee for the rail industry are the person's strengths and weaknesses in relation to the demands of the work tasks and the person's mental attributes such as habits, attitudes, skills and personality. Retention of employees needs to start with the hiring of the right employees. It is also good to hire employees of a wide variety of ages so that they do not all retire at the same time, particularly if they stay with the same organization for their working life.

Summary of rail industry research findings and conclusions.

To retain employees to work in the rail industry the most important thing to do is for the rail industry to have a mission and a culture of caring. An organizational culture is the way that people in an organization work and act towards each other in the workplace. An organizational culture is not documented. It is lived by the people in the work place. If employees feel cared about they will usually enjoy their work and stay working for the company.

Recent research concerning the occupational safety and health of women who work in the rail industry in Western Australia (Jansz 2005) identified that actions the Public Transit Authority had done to provide a culture of care was to have trained Peer Support co-workers for employees to call on, particularly after a stressful incident. Professional counseling was available for employees after they had experienced a stressful incident. An employee assistance program available for employees and their immediate family to use as required. Excellent injury management procedures and follow up support and care was provided. There was very good co-worker support for employees that often came from friendship groups formed at work. There was an Equity Officer to deal with any equity problems. Team Recognition was provided for excellent work. A high standard of education was provided to employees to enable them to perform their work tasks well. Women's network meetings were held to identify ways to improve working conditions for rail

industry employees.

Areas for improvement identified by research participants to assist with retaining employees to work in the rail industry were to improve Transit Guard security by having double manning on trains as these employees frequently had to deal with verbal and physical aggression. Rostering for hours of work needed to be improved. One research participant summed up the situation as follows.

With the shift work roster at times it becomes extremely stressful, and tiring as you working early morning and then straight on to late night shifts. We have had at least 5-8 different rosters within the last 2 years and still facing a new one at the end of March. Management can't seem to settle for a working roster. They don't seem concerned that we are feeling the stress of the horrid rosters, but they are bound by the Ministers election promise to have a Guard on every train.

The research (Jansz, 2005) also identified that women working in the rail industry needed to have more frequent breaks than 4 to 5 hourly at certain times of the month to be able to go to the toilet as required. They also needed to be supplied with female clothing, as male clothing did not fit very well in some anatomical places.

In summary, all of the women interviewed, although they identified areas for improvement in their work, liked their job and intended to stay working for the Public Transit Authority. In the words of one employee:

"For me, working in the railways is an addictive life style. I love it."

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