

# WORLD SAFETY JOURNAL



- Environmental Impact of Mining
- Manual Handling in Healthcare
- Post-traumatic stress disorder
- Occupational Overuse Syndrome
- Road Safety in Lebanon



Vol. X/ No.1 - 2002  
ISSN 1015-5589  
© copyright 2002, WSO

## WORLD SAFETY ORGANIZATION (WSO)

### Profile

The WSO was founded in 1975 in Manila, The Republic of 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, 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 News Letters and World Safety Journal.
- 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 centres to support these programs.
- Annual awards include the World Safety Person Award, WSO James William Award, WSO Educational Award, WSO Concerned Citizen Award, WSO Concerned Safety Professional, WSO Concerned Company/Corporation Award and the WSO Concerned Organisation 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 National 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, organisation, 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, organisation 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 News letters 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 and assistance when attending safety programs, conferences etc., sponsored by the WSO.

**JOURNAL EDITOR**

Dr. Janis Jansz, F.S.L.A.  
 Director of the WSO  
 National Office for  
 Australia. WSO Board  
 of Director Member.

**JOURNAL EDITORIAL  
 BOARD MEMBERS**

Dr. Robert M. Anderson  
 Mr. John H. Bridges III  
 Mr. E. "Skip" Chandler  
 Mr. David L. Day  
 Dr. James C. Fernando  
 Mr. Brian J. Halliday Ph.D.  
 Dr. Kenneth P. Hill  
 Mr. Edward E. Hogue  
 Dr. Glenn E. Hudson  
 Dr. Janis K. Jansz  
 Mr. Troy Johnson  
 Mr. D. "Pat" Mascioli  
 Mr. Mark Mattheiss  
 Mr. Lon S. McDaniel Ph.D.  
 Dr. Donald E. Rhodes  
 Dr. A.J. Scardino Jr.  
 Dr. Vlado Z. Senkovich  
 Dr. John A. Singley  
 Mr. Roosevelt Smith  
 Mr. Dennis B. Vaughan  
 Mr. Bobby L. Wayne  
 Mr. Frederick F. Weidner  
 Mr. Timothy L. Wells

**Disclaimer**

Opinions expressed by contributors in articles or reproduced articles are the individual opinions of such contributors or the authors and not necessarily those of World Safety Organisation. Reproduction of articles or abstracts contained in this journal is approved providing the source is acknowledged.

**Issue Dates**

March  
 June  
 September  
 December

**CONTENTS**

**News From the WSO's World Management Center**  
 Dr. Lon McDaniel  
 ..... 2

**Article Submission**  
 ..... 3

**WSO National Office and Directors**  
 ..... 4

**WSO Application for Membership**  
 ..... 5

**An evaluation Of Techniques and Approaches Used In Australian Hospitals To Reduce The incidence Of Manual Handling Injuries**  
 Ms. Rosemary Williams  
 ..... 6

**Transport and Road Safety Situation In Lebanon: Proposals For Improvement**  
 Dr. Elias Choueiri, Dr. George Choueiri & Dr. Bernard Choueiri  
 ..... 9

**Occupational Overuse Syndrome**  
 Mr. Joe Collins  
 ..... 13

**Environmental Impact Of Mining & Mineral Processing Operations**  
 Dr. Janis Jansz & Dr. Milos Nedved  
 ..... 17

**Post-Traumatic Stress Disorder**  
 Ms. Jean Mossop  
 ..... 19

**Diary of Events.**  
 ..... 22

**Editorial**

One of the hot topics in Australian occupational safety and health is the introduction of laws for corporate manslaughter for gross negligence related to workplace health or safety practices. There is precedence for this with overseas countries having already introduced this legislation. For example Doctor (2000) states that in the United States of America about 12 corporate officials have been jailed for serious occupational safety or occupational health failures. Examples of corporate failures include the following. Inadequate supervision of one or more employees. Inadequate workplace communication systems. Failure to take preventative action where a corporate officer had knowledge of a dangerous situation and failure to respond to written notice about a dangerous situation when served with an order to correct this situation by an occupational safety and health inspector.



In 1994 in Queensland, Australia a Manager was jailed for requiring an employee to drive a vehicle after the employee had said that the vehicle was not safe to drive. The deficits identified resulted in a fatal accident. It is not only for accidents employers have been jailed. In Turin, Italy two owners of a dye factory were jailed for 6 years after the families of 13 workers who had died of bladder cancer caused by exposure to chemicals at work brought manslaughter charges against the factory owners. In the same town in 1996 the 9 owner managers of an asbestos factory were jailed and ordered to pay \$12 million compensation. The company owners were found guilty of murdering 32 workers and causing occupational disease in another 11 workers who were still alive at the time of the trial.

In Australia workplace managers are being made more accountable for occupational safety and health. As a result of this companies are increasingly using good risk management procedures, policies and training staff in safe work practices. One area that is not being well covered in Australia though is work overload and work related stress. For example, an article by DM (2002) stated that academics in Australia are working more than 55 hours per week. I was interested to read that in Finland there is a conference titled "The future of work. Prevention of overload and stress." People can die from work related stress. I wonder if future occupational safety and health legislation will make work stress related deaths part of corporate manslaughter. What are your thoughts?

**References**

DM. (2002, July, 9). Academics stressed & strained: report. *Campus Review*. 12(25), 1.  
 Doctor, S. (2000, June). Money & Manslaughter. *Australian Safety*. p.4.

by: Dr. Janis Jansz,  
 Journal Editor

# **World Safety Organization, Inc.**

"In Consultative Status, Category II, with the United Nations Economic and Social Council"



**WSO World Management Center**  
**106 W. Young Ave., Suite G**  
**PO Box 518**  
**Warrensburg, MO 64093**  
**(660) 747-3132**  
**(660) 747-2235**  
**Fax: Worldsafes USA**  
**(660) 747-2647**

## **NEWS FROM THE WSO'S WORLD MANAGEMENT CENTER**

Dear Colleagues;

First let me congratulate and thank Dr. Jansz for her hard work in putting the WSO Journal together, she has done a great job. With this issue we are reactivating a world-class publication for the WSO.

Now I would like to brag about the WSO a little. At the Economic and Social Council (United Nations) first 1987 regular session, on May 19, 1987, after a thorough review of the WSO programs, unanimously voted to grant Category II (NGO) Consultative Status with the Council to the World Safety Organization. The WSO is proud to be selected as the only multi discipline international professional safety organization in the world to be granted Consultative Status. The WSO and its members will assist the United Nations wherever and whenever possible. At our annual conferences there is a "WSO Global Safety Roundtable Meeting", that all interested attendees can attend to make recommendations and or suggestions (for example the environment). These minutes are then made available to our UN representatives and when asked by the UN have these suggestions available for discussion. As long as it is kept non political, and non governmental in nature.

Now some of the improvements that have been made in the last year. The WSO is working with the U.S. Department of Transportation in adding additional specialties to our already established WSO-Certified Safety Specialist. They are WSO-CSS (Rail Transit) and WSO-CSS (Buss Transit). We also now have WSO-CSS (Oil Well Drilling and Servicing) {Thanks to the hard work of Mr. Farrell Moughon} and the WSO-CSS (Underground Tunneling/Mining Safety) {thanks to the hard work of Mr. Tony Gilmore}. The World Management Center is now able to do the updates on our web site as they are needed.

I am very proud to be a part of the World Safety Organization and look forward to the growing potential of our organization around the world. If you have any questions, ideas or suggestions, please contact the World Management Center at (660) 747-3132, fax (660) 747-2647 or [wsowmc@socket.net](mailto:wsowmc@socket.net).

Safety Is A Way Of Life.

Lon S. McDaniel, Ph.D.  
WSO Chief Executive Officer

***"Making Safety a Way of Life...Worldwide"***



## 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 and correspondence should be sent to: Editor:

**World Safety Journal**

**Dr Janis Jansz**

**Edith Cowan University. 100 Joondalup Drive,**

**Joondalup, 6027, Western Australia**

**Or Emailed to [j.mussett@ecu.edu.au](mailto:j.mussett@ecu.edu.au)**

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

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

### **Our Issue Deadlines are:**

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

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

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

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

## WSO NATIONAL OFFICE and DIRECTORS

### Australia:

Dr. anis Jansz  
c/o Edith Cowan University. 100 Joondalup Drive,  
Joondalup, 6027, Western Australia  
Email: j.mussett@ecu.edu.au

### Czech Republic:

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

### Ghana:

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

### Lebanon:

Dr. Elias M. Choueiri  
c/o Ministry of Transportation, PO Box 401,  
Hazmieh, Beirut, Lebanon  
Email: e\_choueiri@hotmail.com

### Macedonia:

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

### Malaysia:

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

### Marianas Islands:

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

### Philippines:

Dr. Nicolas Chan  
c/o Ambassador Hotel, 2021 A Mabini Street, 14<sup>th</sup> Floor,  
Malate, Manila Philippines 1004  
Email: info@wso.org.ph

### Poland:

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

### Russia:

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

### Singapore:

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

### Slovakia:

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

### Taiwan:

Dr. Shuh Woei Yu  
c/o Center for Industrial Safety & Health Technology  
Industrial Technology Research Institute, 11F, Bldg 51,  
Sec 4 Chung Hsing Road, Chutung,  
Hsinchu, Taiwan 310  
Email: swyu@itri.org.tw

### Ukraine:

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

-----

**WSO Membership:** There are over 15,000 World Safety Organisation Members. They 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 Organisation is open to all individuals and entities involved in the safety and accident prevention field, regardless of race, colour, 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:** Organisations, corporations, agencies and other entities directly or indirectly involved in safety activities and other related fields.

**World Safety Organization's Application For Membership**

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

Referred for membership by (list name);

WSO Member: \_\_\_\_\_

WSO Chapter: \_\_\_\_\_

WSO Division/Committee: \_\_\_\_\_

Other: \_\_\_\_\_

\*) For eligibility criteria see page 6 in booklet.

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

(Please print or type)

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

-----  
 \*) For Affiliate Members Only:

Only FULL TIME PRACTITIONERS in the safety environment/accident prevention and allied fields are eligible for the WSO Affiliate Membership. Described briefly your present employment or enclose your current resume.

\_\_\_\_\_  
 \_\_\_\_\_

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

- Occupational Safety and Health       Fire Safety/Science
- Environmental Safety and Health       Public Safety/Health
- Safety/Loss Control Science       Construction Safety
- Transportation Safety       Industrial Hygiene
- Product Safety       Risk Management
- Nuclear Safety       Aviation Safety
- Ergonomics       Petroleum
- Product Safety
- Hazardous (Toxic) Materials Management
- Other \_\_\_\_\_

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

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

VISA ( )      Mater Card ( )      Check enclosed ( )

Card number: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

Today's Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Forward Check and application form to :

WSO World Management Center  
 106 W Young Ave., Suite G, PO Box 518  
 Warrensburg MO 64093, U.S.A.

(660) 747-3132, Fax (660) 747-2647  
 wsowmc@socket.net

# AN EVALUATION OF TECHNIQUES AND APPROACHES USED IN AUSTRALIA HOSPITALS TO REDUCE THE INCIDENT OF MANUAL HANDLING INJURIES

By Rosemary Williams Safety Adviser for Norlunga Health Service in South Australia.

## ABSTRACT

Injury statistics demonstrate that nursing staff are the workgroup with the highest incidence of workers compensation claims related to manual handling activities. Nurses have always accepted that lifting is part of their work. However, research shows that there is unacceptably high stress placed on nurses especially during patient transfer. In an attempt to reduce the amount of injuries and subsequent costs, many hospitals/nursing homes have tried to eliminate the number of manual handling through the introduction of a 'no lift' policy. Although many studies have already been completed and documented, further research establishing the most efficient and safe transfer techniques for both the nurse and patient is still of high importance.

A Newspaper article in the Advertiser Newspaper (Decline, 2002) stated that Nurses and personal care assistants were the occupations with the highest total of injury claims for women in South Australia in 2000-2001. The Department of Human Services, South Australia (DHS) workers compensation claims for manual handling injuries at work have accounted for both the highest number and cost of claims for the period 1995 to 1999. The numbers of claims for manual handling injuries currently exceed 1,000 per year, or nearly half of the total number of claims by DHS health units at an annual cost which exceeds \$10 million. These figures were obtained from the DHS specific IDEAS database. The occupational group with the highest number of claims was nursing. Nurses also made the most claims due to body stressing as a result of manual handling. Sprains and strains were the most common type of injury and the most common site of injury was the lower back (Risk Management Services, 2000, p.2).

Low Back Pain (LBP) is the most common health problem among nurses. The incidence of LBP amongst female nurses has been shown to be higher than other female occupational groups. Around three quarters of nurses have suffered back pain associated with the workplace (Leggat, 1996, p. 432). Leggat (1996, p. 433) indicates that surveys, interviews and the observational studies have been used to research nursing injuries. Most of these studies have concluded that transfer lifting or other lifting of patients, possibly

as well as non-patient transfer activities, have contributed or been the trigger for back injuries and back pain. It is believed that the identification of risk factors associated with LBP might be an important key to reducing the prevalence of LBP, as well as costs and disability (Deede & McGovern, 1987, Leggat, 1996, Lagerstrom, Hanson & Hagberg, 1998).

Many epidemiological studies have demonstrated a clear relationship between LBP and manual lifting and transferring of patients (French, Lee, Lui, Luk & Wong, 1997, Hollingdale 1997, Josephson, Vingard & Music-Norrtalje Study Group, 1998, Knibbe & Friele, 1996, Smedley, Eggar, Cooper & Coggin, 1995). Smedley et al (1995) indicated that the risk increased with the frequency of certain lifting or transferring of patients. This included transferring patients between bed and chair or vice versa, moving patients around the bed and lifting patients up from the floor. They suggested that using patient lifting devices might help to reduce the incidence of LBP.

Manual handling of patients is considered to be the highest risk factor for LBP among nurses although many other physiological, psycho social and individual risk factors have been identified. This observation suggests the needs for preventative strategies to control this factor. Cohen-Mansfield, Culpepper & Carter (1996, p. 16) provided some possible strategies to prevent LBP among nurses, which included proper lifting

technique training, education programs, use of mechanical devices, redesign of job environment, ensuring sufficient staffing levels, exercise programs, and reducing staff stress in the facility. Unfortunately, many studies looking at the effectiveness of these prevention programs have not been definitive (Lagerstorm, Hanson & Hagberg 1998, p. 449).

Education and training programs are the most common types of prevention strategies in prevention of back pain and are aimed at both the management team and workers (Kaplansky, Wei & Peecer, 1998, p. 34). They divided these interventions into three categories, which included lifting techniques, back school program and management training. Kaplansky, Wei & Peecer (1998, p. 34) say that there is not however any consensus on the safest lifting technique with respect to the prevention of occupational LBP. Often methods acceptable in one health unit are not considered appropriate to others. While there is intuitive appeal and widespread use of such techniques, efficiency has not been demonstrated in nursing practice (Garg, Bellar & Banaag, 1991, p. 291). Feldstein, Valanis, Vollmer, Stenens & Overton (1993, p. 114) conducted a study for "Back Attack", an injury prevention program among nurses, aides and orderlies. The results of the pilot study suggest that back care programs do change behaviour at least in the short term. They indicated that further study will be necessary to determine if the behaviour change persists and back pain



and injury rates are subsequently reduced. Kaplansky, Wei & Peecer (1998, p. 35) indicate that management training to encourage workers to report all episodes of LBP, early intervention and conservative treatment for the injured workers with appropriate follow-up of the worker's treatment, and enforcement of the safety rules does play an important part in reducing the effect of injury associated with LBP. Kaplansky, Wei & Peecer (1998, p. 36) noted that a study with fire fighters demonstrated that exercise is effective for secondary and tertiary prevention of LBP, including a reduction in symptoms and time lost from work if an injury is sustained. The nursing community appears to have not yet recognised the importance of physical conditioning as a preventative strategy for minimisation of recurrent back injuries.

Garg, Owen, Bellar & Banaag (1991) conducted a laboratory study on a biomechanical and ergonomic evaluation of patient transferring tasks – bed to wheelchair and wheelchair to bed. These patient handling tasks were studied using five manual techniques of moving and three hoist assisted techniques. It was believed that the research could provide a manual handling technique based on pulling rather than lifting and carrying the patient, resulting in substantially lower stresses to the nursing personnel without compromising the safety and comfort of the patient. The results were not conclusive but highlighted that the ease of moving patients is very dependent on patient characteristics, adjustability of beds, staffing levels, nurses' training and workload, and administrative support (Garg, Owen, Bellar & Banaag 1991, p. 310).

Another ergonomic study by Lee and Chiou (1995) also researched postural analysis using a biomechanical approach. The study reached similar conclusions to that of Garg, Owen, Bellar & Banaag (1991). Lee and Chiou (1995, p. 74) also highlighted that their study gave evidence to support the assertion that activities other than patient handling, such as bed making, administering drugs and taking blood pressure all had incidences of high

back stress.

Kaplansky, Wei & Peecer (1998, p. 37) suggest that job design is considered the most effective means of prevention for low back injuries in the workplace. A prospective epidemiological study evaluating nursing assistants in a nursing home noted a 50% drop in the incidence rate for back injuries after a job design program was implemented. The program included mechanical aids and other interventions to reduce the physical demands of the job.

A study by Dixon, Lloyd and Coleman (1996) in England documented the defining and implementing of a 'no lifting' standard in line with the new moving and handling regulations in 1994. The hospital had found that the injuries and back pain associated with everyday work had occurred despite mandatory annual safe lifting training sessions and the provision of equipment on the ward. Staff had perceived that back injury and pain were directly associated with lifting patients. Therefore, the manual handling of patients ceased other than in 'exceptional circumstances'. The main focus was a change of approach from just 'doing', to the assessment of individual patient need and the planned use of alternative handling methods (Dixon, Lloyd & Coleman, 1996, p. 35). The process also included informing the patients and relatives about the 'no lift' standard. Unnecessary lifting ceased, and in the two years following implementation, only two patients have required manual lifting, both as a result of cardiac arrest situations.

Knibbe and Friele (1999) implemented a 'no lift' type policy but in a more experimental setting. They hypothesised that the introduction of hoists would lead to a significant reduction in exposure to manual handling and back pain prevalence. Their results appear to support their hypothesis.

Not all studies of the 'no lift' policy were positive. McGuire, Moody and Hanson (1996) conducted an evaluation of mechanical aids. They concluded that

using mechanical aids may cause additional manual handling problems for staff such as extra handling to position the occupier in the sling or by forcing the operator to adopt awkward postures when moving the mechanical aid. It is important for users to consider the needs of clients, the tasks that the mechanical aid will be used for and the environment in which it will be used before deciding what equipment is appropriate for their needs (McGuire, Moody and Hanson, 1996 p. 38).

Moody, McGuire, Hanson and Tigar (1996) conducted a study of nurses' attitudes towards using mechanical aids. The study demonstrated the nurses' reluctance to use this equipment due to a variety of reasons such as lack of proper training in mechanical aid use; mechanical aids and slings being unavailable or inaccessible; arbitrary use of mechanical aids and spatial constraints to mechanical aid use.

The Australian Nursing Federation (ANF n.d.) adopted a 'no lifting' policy, similar to the study above, in 1998 with the aim of reducing and eliminating the amount of occupational LBP, associated with manual handling of patients, among nurses. The 'no lift' policy means the elimination of patient handling (through better management plans) and the substitution of manual lifting or transferring of patients with mechanical device handling. According to Straker (2000, p. 44), this process should inevitably lead to the reduction of risks for workers.

The majority of the literature researching manual handling types of activities reviewed is from England. With all the research done, there is still not a common technique used within the health care system to deal with manual handling of patients. Most existing research offers suggestions about possible approaches, but there appears to be little conclusive evidence to support a specific best practice strategy. While there seems to be anecdotal evidence of Australian health care units adopting no lift policies, there appears to be little documented reporting of any evaluative studies of this practice

being adopted. There is a strong need for research in this area to identify if this does occur and if it does how effective is the 'no lifting policy in preventing manual handling injuries.

### References

- ANF (SA Branch). (no date). *Guidelines – Implementing a No Lift Policy in the Workplace*. [Brochure] Adelaide, South Australia: author.
- Cohen-Mansfield, J., Culpepper, & W. J., Carter, P. (1996). Nursing Staff Back Injuries-Prevalence and costs in long term care facilities. *American Association of Occupational Health Nurses Journal*, 44(1), 9-17.
- Decline in work injury claims. (2001, March 11). *Advertiser*. P. 62
- Deede, B. A., & McGovern, P. M. (1987). Low Back Problems – Etiology and Prevention. *American Association of Occupational Health Nurses Journal*, 35(8), 341-348.
- Dixon, R., Lloyd, B., & Coleman, S. (1996). Defining and implementing a 'no lifting' standard. *Nursing Standard*, 10(44), 33-36.
- Feldstein, A., Valanis, B., Vollmer, W., Stevens, N., & Overton C. (1993). The Back Injury Prevention Program among Nurses, Aides, and Orderlies. *Journal of Occupational Medicine*, 35(2), 114-120.
- French, P., Lee, F.W.F., Lui, S.P., Luk, K.B., & Wong, H.Y.R. (1997). The prevalence and cause of occupational back pain in Hong Kong registered nurses. *Journal of Advanced Nursing*, 26, 380-388.
- Garg, A., Owen, B., Bellar, D., & Banaag, J. (1991). A biomechanical and ergonomic evaluation of patient transferring tasks: bed to wheelchair and wheelchair to bed. *Ergonomics*, 34(3), 289-312.
- Hollingdale, R. (1997). Back pain in nursing and associated factors: a study. *Nursing Standard*, 11(39), 35-38.
- Josephson, M., Vingard, E., & Music-Norrtalje Study Group. (1998). Workplace factors and care seeking for low-back pain among female nursing personnel. *Scandinavian Journal of Work Environmental Health*, 24(6), 465-472.
- Kaplansky, B.D., Wei, F. Y., & Peecer, M.V. (1998). Prevention strategies for occupational low back pain. *Occupational Medicine*, 13(1), 33-45.
- Knibbe, J. J., & Friele, R. D. (1996). Prevalence of back pain and characteristics of the physical workload of community nurses. *Ergonomics*, 39(2), 186-198.
- Lee, Y. H., & Chiou, W. K. (1995). Ergonomic analysis of working posture in nursing personnel: example of modified Ovako Working Analysis System application. *Research in Nursing and Health*, 18(1), 67-75
- Leggat, P. (1996). The epidemiology of back pain in nurses – A review of lifting as a factor. *The Journal of Occupational Health and Safety – Australia and New Zealand*, 12(4), 431-438.
- Lagerstorm, M., Hanson, T., & Hagberg, M. (1998). Work-related low-back problems in nursing. *Scandinavian Journal of Work Environmental Health*, 24(6), 449-464.
- McGuire, T., Moody, J., & Hanson, M. (1996). An evaluation of mechanical aids used within the NHS. *Nursing Standard*, 11(31), 33-38.
- Moody, J., McGuire, T., Hanson, M., & Tigar, F. (1996). A study of nursed' attitudes towards mechanical aids. *Nursing Standard*, 11(4), 37-42.
- Risk Management Services Department of Human Services. (2000). *Manual Handling Injuries Within the DHS Portfolio*. [Discussion Paper – 25 October 2000] Adelaide, South Australia: Author.
- Smedley, J., Egger, P., Cooper, C., & Coggin, D. (1995). Manual handling activities and risk of low back pain in nurses. *Occupational and Environmental Medicine*, 52, 160-163.
- Straker, L. M. (2000). *Prevention of Musculoskeletal Disorders associated with Manual Handling* [online]. Available: <http://www.curtin.edu.au/curtin/dept/phsio/pt/staff/strak.../1999MIOOIPreventing.htm> [24 August 2001].

-----

## TRANSPORT AND ROAD SAFETY SITUATION IN LEBANON: PROPOSALS FOR IMPROVEMENT

By **Dr. Elias M. Choueiri**, Director-General in the Ministry of Transport, Beirut, Lebanon, WSO Representative to the United Nations and Chairman of WSO's Highway Transport Committee. **Dr. Georges M. Choueiri**, Lecturer, Lebanese University, Beirut, Lebanon and **Dr. Bernard M. Choueiri**, Judge, Court of Appeals, Beirut, Lebanon

### ABSTRACT

The road safety situation in Lebanon is somewhat hazardous. Thus, road safety efforts are needed that are sufficiently coordinated, sustainable, organized and efficient, in order to improve the situation. Vulnerable road users, especially pedestrians and moped riders, constitute a significant share of road accident victims in Lebanon. This paper presents an analysis of the current transport and road safety situation and provides recommendations for improving transport and road safety in Lebanon through policy, institutional and implementation measures.

### 1. Lebanon's Road Network And Public Transport

As a consequence of the civil war (1975-1990), a considerable part of Lebanon's road network suffered from serious deterioration. Thus, during the 1990s and at present, major road construction and rehabilitation works have been carried out. Most recently, the Government of Lebanon has approved a major "Beirut Urban Transport" infrastructure project. This project consists of (i) a traffic management program through the use of ITS technology, (ii) a parking improvement program aimed at increasing capacity and improving access, (iii) a corridor improvement program to smoothen traffic flow at 16 intersections, and (iv) an air quality management program. Additionally, the Government has approved plans to reform the public transport sector, formulate an urban transport strategy, and strengthen the planning and regulation of public services.

### 2. Vehicle Fleet

In a recent road-user charging study carried out for the Ministry of Public Works and Transport, the following figures and statistics were noted:

- The estimated number of vehicles circulating in Lebanon was 783,215 in 1997. Since then, the vehicle fleet has been growing steadily at 2.5% per year. Today, the figure is close to 920,000 registered vehicles (It is important to

note that this number does not include all Governmental, police and military vehicles, as well as illegal cars. The total number of vehicles circulating may thus be about 30% higher than the official figures mentioned).

- Traffic growth was 4.5% (50% of traffic being inter-urban) in 1997.

In 1994, there were about 1.5 million motorized vehicle trips per day in Greater Beirut, 880,000 of which were carried out by residents of the Greater Beirut area. There were about 0.76 motorized trips per person per day, 55% of which were work-related. Automobiles dominate the transport system with 69% of trips attributed to private passenger cars. With a ratio of around 3 persons per car, the car ownership rate in Lebanon is one of the highest in the world. Vehicle use in Lebanon is causing serious local air pollution problems, especially in major cities and around areas of recurring traffic congestion.

### 3. Vehicles In Use And Traffic Congestion

The development of Lebanon's road network has not been able to keep pace with the rapid increase in the number of registered motor vehicles. Traffic congestion is a daily occurrence in the suburbs and at the main points of entry to Beirut (the traffic is smoother in the city center), which is due to:

- The widespread reliance on the use of own private vehicles.
- The fact that the responsibilities for the various aspects of transport are being shared by different ministries and authorities, thus making the decisions and coordination of traffic issues cumbersome.
- A lack of coordinated urban planning.

### 4. Driver Behavior

The existing road network requires major rehabilitation and maintenance, and is not environmentally friendly. Coupled with unsafe vehicles on the road, lack of knowledge about traffic rules and regulations, lack of proper enforcement thereof, etc., these factors have had an adverse effect on the behavior of drivers, and a subsequent negative impact on road safety in Lebanon. This in turn could well explain the inconsiderate driving behavior that can often be observed on the roads of Lebanon today.

### 5. Traffic Accidents

The table below shows the number of traffic accidents, fatalities and injuries for the years 1997 to 2001, revealing that there are more than 300 fatalities per year. Deaths that occur in hospitals as a result of injuries sustained in traffic accidents are not accounted for in the statistics because of a lack of proper follow-up after an accident takes place.

	1997	1998	1999	2000	2001
<b>Number of Accidents:</b>	2452	2333	2417	2336	2499
<b>Fatalities:</b>	377	343	357	313	323
<b>injuries:</b>	3463	3424	3529	3582	3865

*Table 1. Road Safety Data*

Fatality rates per 100,000 inhabitants and per 100,000 vehicles (see Table 2) reveal that Lebanon's safety record is not bad. The reason for such low statistics, however, stems from the fact that the largest volume of Lebanon's traffic occurs in congested areas, especially in the capital Beirut.

Country	<i>Deaths/100,000 inhabitants</i>	<i>Deaths/100,000 vehicles</i>
Sweden	6.1	13.4
Great Britain	6.3	13.0
Canada	10.1	18.2
Germany	10.4	19.5
<b>Lebanon</b>	<b>11.9</b>	<b>29.8</b>
Spain	14.3	30.2
France	14.4	27.0
USA	15.7	20.9
Greece	21	61.5
Portugal	29	69.2

*Table 2: International road safety statistics, 1997*

With respect to road-safety related issues, statistics compiled by private organizations in Lebanon reveal the following:

- 11% of drivers use a seat belt while driving.
- 6.7% of persons sitting next to the driver use a seat belt.
- 1 per thousand of taxi and jitney drivers use a seat belt.
- 18% of children requiring a child seat are seated in one.
- 41% of drivers use indicators to signal a turning movement at intersections.
- 15% of motor-bikers wear helmets.
- 47% of people crossing a highway use pedestrian overpasses.
- 53% of pedestrians walk on the sidewalks when available.
- 50% of drivers carry driving licenses without having passed a legal exam.
- A good portion of Lebanese drivers have yet to learn the meaning of traffic signs and traffic signals.
- Only about 25% of cars are insured.

The above statistics should tell a great deal about the road safety situation in Lebanon.

#### 6. Entities Involved In Transport and

#### Road Safety In Lebanon

Government institutions, agencies and organizations that are involved with transport and road safety in Lebanon include:

- The Ministry of Public Works and Transport (MOPW&T), which is responsible for defining policies, and enforcing regulations and standards for all modes of transport. In addition, the MOPW&T has tutelage authority over the Railways and Public Transport Authority and the various autonomous port authorities. It also administers the air transport sector through a Directorate General of Civil Aviation. Further, it is responsible for road planning and development, for routine and periodic maintenance, and for managing the road network outside urban areas; Municipalities handle roads inside urban areas.
- The Ministry of Interior is responsible for managing vehicle registration and inspection. It is also responsible for driver licensing, driving tests and, of course, traffic law enforcement.
- The Ministry of Municipal and Rural Affairs is the supervising and controlling body over municipal

councils which, in turn, are responsible for local roads within municipal borders.

- The Ministry of Environment. Since various kinds of fuel impact the environment, the Ministry of Environment sets the emissions standards that are to be met by all vehicles.
- The Council for Development and Reconstruction (CDR), which acts as a central planning coordinating office. It is directly related to the office of the Prime Minister and, therefore, its job is to formulate, secure financing for, and supervise the implementation of road reconstruction projects.

#### 7. Problems With The Present Organization Of Transport Systems

- Jurisdiction over the transport sector is quite fragmented.
- Boundaries of authority and responsibility are not always clear.
- Lack of coordination between the key players results in system imbalances, congestion, poor safety levels, poor environmental and health conditions, etc.
- Lack of priority-setting policies,

exacerbated by a lack of clear overview of problems and needs.

- There is no transport management system.

### 8. Observations Concerning Transport-Related Issues In Lebanon

Observations relating to the major land transport issues in Lebanon can be grouped under three headings: Policy, Institutional and Implementation.

#### Policy Observations

1. Lebanon continues its attempts to resolve transport and traffic problems in urban areas, which are expected to increase because of latent demand.
2. Transport infrastructure and services continue to be considered "public goods" with no mechanism to prioritize their use, either through regulations or pricing, to sustain their utility.
3. Road safety continues to be a serious hazard to society, with its major contributors being a lack of education, a lack of vehicle safety standards, poor road conditions and an inadequate enforcement of traffic rules and regulations. Of significant concern is the lack of a universal minimum insurance requirement to cover injuries resulting from road accidents.
4. Hazardous emissions caused by leaded gasoline, malfunctioning vehicle engines and other sources continue to be another serious issue for society, with effects ranging from severe health hazards to a degraded quality of life.

#### Institutional Observations

5. There exists a lack of clear responsibility for setting transport policy in Lebanon. Specifically, mission statements and jurisdictions of various ministries and government bodies concerned with transport create both functional and process gaps in some areas, as well as redundancies in others.
6. While the responsibilities for the physical infrastructure of the transport system are reasonably clear from the mission statements of ministries and government bodies, there are serious gaps in defining the jurisdiction and responsibilities for both the strategic

planning that should precede infrastructure construction, as well as the operation and maintenance activities that follow construction.

#### Implementation Observations

7. There is a considerable laxity in enforcing existing laws, including the protection of public right-of-ways, control of access onto expressways, and traffic codes and ordinances.
8. Recent studies regarding urban passenger transport constitute a significant step towards continuous transport planning and network development. Nonetheless, there remains a clear need for:
  - National multi-modal transport studies;
  - Freight transport studies;
  - Rural passenger transport studies;
  - Land use planning studies;
  - Studies investigating existing regulations;
  - Economic feasibility, environmental, cultural heritage protection, and social impact assessments prior to the approval of projects;
  - A public involvement process in the planning procedures; and
  - A continuous data collection mechanism to support long-range planning studies.
9. A mechanism for adopting recommendations of transport studies does not exist, which introduces uncertainty in the staged implementation of such plans. Furthermore, difficulties are often encountered during the implementation phase of construction projects according to their design specifications.

#### 9. Recommendations

Based on the above observations, the following measures are deemed necessary:

##### 9.1 Policy Recommendations

1. While it is important to sustain the momentum associated with the road reconstruction effort of the past few years, it is now timely to consider a strategic reorientation of the transport policy.
2. A vision for the transport system, based on its role in the national economy and society, and its impact on Lebanon's

regional competitiveness, should be defined, prioritizing the use of the existing system and adopting policies to direct future undertakings in supporting this vision.

3. Efficient and safe transport of persons and goods should override the objective of accommodating the growth in car travel demand.
4. In order to accommodate and prioritize trip demand within the real constraints of road capacity, a policy should be established to diversify the transport modal choices available to users, and to provide an integrated, multi-modal transport system. This includes non-motorized modes (walking and cycling) as well as mass transit, thereby satisfying economic, financial, environmental, and social sustainability considerations.
5. The traditional role of the government as both the regulator and provider of transport needs to be redefined. It is recommended that the private sector be allowed to play a more significant role in the production and financing of transport, while the government retains the role of planner and regulator focussed on the environmental, social and economic interests.
6. Issues of environmental sustainability should be seriously incorporated in the decision-making processes concerning transport infrastructure and services.
7. Practical steps should be taken towards implementing available legal authorities or proposing legislative reform in the following areas (where it is urgently needed):
  - Urban planning laws.
  - Right-of-way expropriation laws.
  - Traffic impact requirements.
  - Insurance requirements.
  - Standards and codes for safety, environmental protection and other issues.
  - Parking regulations.
  - Leaded fuel regulations.
  - A legal framework for public-private participation in the provision of transport infrastructure and services.
- 9.2 Institutional Recommendations
8. It is important to strengthen the technical capacity of the Ministry of



Public Works and Transport to carry out its mission statement as defined by law. The Ministry should then exercise its mandate (while coordinating with stakeholders) and be responsible for proposing consistent policies aimed at developing an integrated, sustainable and efficient transport system in Lebanon. Furthermore, the Ministry should be responsible for the task of ensuring that various transport plans and projects to be implemented are consistent with the adopted policies.

9. There is a need to define which transport management functions should be allocated to local governments and municipalities, and which to the national government and its agencies.
10. There is a need to strengthen the administrative capacity for continual and ongoing management of the transport system.

### 9.3 Implementation Recommendations

11. Transport Master plans, consistent with adopted policies, should be implemented in order to expedite staged implementation while still respecting the important dependencies among its various components.
12. In order to ensure that investments are

made consistent with social, economic and environmental priorities rather than the availability of financial resources, the discipline of project feasibility testing and capital budgeting should be imposed on all transport projects.

13. There is a need to relieve the burden of traffic law enforcement, especially that of enforcing on-street parking regulations, by decriminalizing such offences and transferring the responsibility of their enforcement to municipal police or civilian employees.
14. There is a need for an education campaign, followed by an enforcement campaign, in areas such as road safety, highway access, weight limitations, etc.

### 9.4 Implementation Mechanism

Following is a proposed mechanism of implementation:

1. The Ministry of Public Works and Transport needs to take immediate actions to create the appropriate technical capacity to support its emerging role.
2. The Ministry of Public Works and Transport should embark on a public participation and outreach campaign in order to validate and prioritize the policy recommendations.

### Conclusion

Land-use planning and infrastructure programs aimed at developing a well-integrated, safe and environmentally-friendly transport system require a good coordination of policies concerning transport, environment and health issues. The Government of Lebanon recognizes this need, and is actively working towards improving transport and road safety in Lebanon through coordinated policy, institutional and implementation measures.

### References

Choueiri, EM, Choueiri, GM, and Choueiri, B.D.: "Human Factors in Highway Design: A Case Study on Traffic Safety in Lebanon", Conference Proceedings, 2nd International Symposium on Highway Geometric Design, Mainz, Germany, June 14-17, 2000.

The Workshop on Land Transport Policy for Lebanon, United Nations House, Beirut, Lebanon, July 6-8, 1999.

-----

## OCCUPATIONAL OVERUSE SYNDROME

By Joe Collins. Safety Adviser for Australia Post, Western Australian Division.

### ABSTRACT

Occupational overuse syndrome (O'S), formerly known as repetitive strain injury (RSI) is a significant health problem in Australia and throughout other parts of the world. The extent of the problem reached epidemic proportions in Australia in the early eighties and beyond. The size and complexity of the problem and the diversity of interests has lead to many different interpretations and definitions regarding the existence or otherwise of the condition itself and the work-relatedness of the actual symptoms and injuries.

Occupational overuse syndrome disorders generally affect the back, neck and upper limbs although lower limbs may also be involved. Some of the factors that are known to contribute towards the development of occupational overuse syndrome are repetitive and forceful movements, awkward postures, the maintenance of static muscle loads and other occupational and non-occupational hazards. Occupational overuse syndrome it is neither a new or unusual occurrence, with a strong body of evidence indicating that it has been a around for many centuries even though many people still consider it to be a recent phenomenon.

Occupational overuse syndrome (O'S) is universally accepted as a major occupational health and safety issue and as such, is recognised as one of the most significant and common causes of worker impairment and disabilities across a wide range of industries and occupations throughout the world. The extent of the problem reached epidemic proportions in Australia in the early eighties and subsequently resulted in a dramatic increase in workers seeking compensation for O'S related injuries. An example of this is provided by Bohle & Conlon (2000), when describing circumstances at the Commonwealth Bank in which the total number of workers compensation cases for O'S rose from 6 in 1980 to 184 in 1984. Similar increases of 77 in 1981 to 414 in 1984 were also recorded at Telecom Australia (Hocking, 1993).

Further evidence as to size and complexity of the problem is highlighted by the following information:

- Occupational overuse syndrome accounted for almost half of all manual handling injury costs (\$38 million) within the four manual handling groups in the Australian Public Sector between 1992 and 1995 (Compare, 1997).
- The average cost of an O'S claim in the Australian Public Service in 1994/95 was \$14,539. In comparison, the average cost of *all* claims was \$10,321 (Compare, 1996).

- In NSW, compensation claims for O'S rose from 815 to 1815 between 1978-79 and 1980-81 and accounted for almost one-third of all cases for which workers' compensation was paid in NSW in 1983-84 (Bohle & Conlon, 2000).
- Lost wages as a direct result of O'S claims within the Australian Public Service between March 1985 and December 1986 totalled \$10.4 million (Commonwealth of Australia, 1987).
- Erdil & Dickerson (1997), gives details on the cases of cumulative trauma disorder in the United States and confirms that the annual cost to employers and workers in medical expenses and lost wages is estimated to be \$27 billion (US). Despite the magnitude of this estimate of direct cost, this figure does not include indirect costs such as lost productivity, replacement of workers, retraining and other associated costs. According to Violate, Armstrong & Kilbom (2000), these indirect costs alone would amount to approximately \$60 billion (US).
- Estimates of the annual costs associated with occupational Musculoskeletal disorders in the Nordic countries and the Netherlands has been calculated at between 0.5% and 2% of the GNP (Violate, Armstrong & Kilbom, 2000).
- Upper extremity disorders amongst workers in the United States tripled between 1986 and 1993 (Yassi, 1997).

- An annual survey conducted by the US Bureau of Labor Statistics in 1994 indicated that approximately 705,800 cases of injury and illness (32% of total injuries and illness) emerged from overexertion or repetitive motion, with repetitive motion injuries on their own accounting for 332,000 of these cases (Mayer, Gatchel & Polatin, 2000).

The dramatic surge in workers' compensation claims in Australia during the 1980s promoted the widespread belief that O'S was an epidemic that was confined exclusively to Australia. Yet, it is clear from the evidence above that the symptoms associated with O'S have not been restricted to Australian workers.

In recent times, pain and discomfort of the neck, shoulders, arms, wrists and hands arising from repetitive movement or the maintenance of static muscle loads have been reported in many countries including Germany, Finland, Sweden, Switzerland, the Netherlands, Canada, the USA, Britain and New Zealand (Carson, 1999; Bammer & Bignault, 1988; Aortal & Dickerson, 1997; Mayer, Gatchel & Polatin, 2000; Yassi, 1997; Hadler, 1999). The problem also received particular attention in Japan, where the outbreak of cervicobrachial disorder between 1960 and 1980 recorded a high incidence of O'S type injuries (Yassi, 1997; Mayer, Gatchel & Polatin, 2000).

Despite the recent and dramatic rise in

OOS, it is neither a new or unusual occurrence. Evidence of this is presented by Parker & Imbus (1992), when describing the early history of OOS, and the fact that overuse syndrome was first described by Hippocrates around the year 400 B.C. when he warned athletes about the risk of sustained maximum performance. Further evidence supporting the position that OOS is not a recent condition is demonstrated by Arndt (1986), Brennan (1985) & Matthews (1993), when describing the work carried out by Bernardino Ramazzini more than two centuries ago. Ramazzini was the first person to study medical disorders as they related to a person's occupation and in 1713 wrote about *diseases of scribes and notaries*:

"Incessant driving of the pen over paper causes intense fatigue of the hand and the whole arm because of the continuous and almost tonic strain on the muscles and tendons, which in course of time results in failure of power in the right hand. An acquaintance of mine, a notary by profession, still living, used to spend his whole life continually engaged in writing, and he made a good deal of money by it; first he began to complain of intense fatigue in the whole arm, but no remedy could relieve this, and finally the whole arm became completely paralysed. In order to offset this infirmity he began to train himself to write with the left hand, but it was not very long before it too was attacked by the same malady." (Arndt, 1986).

More recently, Violante, Armstrong & Kilbom (2000), reveals that overuse injuries in musicians during the 1800s and early 1900s were often referred to as musician's cramp and that other forms of OOS were categorised in a similar way, including writer's cramp and pianist's cramp. The historical evidence is convincing enough to have led a prominent occupational physician, Professor David Ferguson, to conclude in 1984 that, despite dramatic increases in the reporting of OOS in Australia in the 1980s, the injury was probably a longstanding endemic rather an epidemic (Bohle & Quinlan, 2000).

One of the factors that has made it difficult to accurately compare the severity and prevalence of overuse injuries in different countries has been the inconsistency in terminology and the variety of names that are used from country to country and even the variety of names used within a single country. Mayer, Gatchel & Polatin (2000), maintains that this lack of clarity has caused much confusion, which in turn has had a dramatic and negative impact on the understanding, reporting and treatment of conditions associated with occupational overuse.

In discussing this problem, Mayer, Gatchel & Polatin (2000), points out, that in an effort to avoid confusion in the United States and to separate the emotional link, terms like repetitive strain injury (RSI), repetitive motion disorder (RMD), occupational cervicobrachial disease (OCD) and the term that is commonly used in the United States "cumulative trauma disorder" (CTD), has been replaced for a new term known as "musculoskeletal disorder" (MSD). Mayer, Gatchel & Polatin, 2000; suggests that MSD is intended to describe all of these previous conditions and refers to any condition that involves the nerves, tendons, muscles and supporting structures of the body.

Mayer, Gatchel & Polatin (2000), also indicates that this expanded definition allows for additional terms, *occupational MSD* and *nonoccupational MSD* to be used even though the separation is subjective and only represents an additional modification to the term rather than a medical diagnosis. This information presented by Mayer, Gatchel & Polatin (2000), suggests that the terms CTD and MSD are more similar than different and can be interchanged; it is therefore possible that this will only add to the confusion that already exists.

In Australia, the condition is identified as occupational overuse syndrome (OOS), even though it was previously known as repetitive strain injury (RSI) (National Occupational Health and Safety

Commission, 1994; National Occupational Health and Safety Commission, 1996). Although OOS is recognised as the favoured terminology amongst a variety of medical and safety professionals, the majority of employees and possibly the wider population in Australia are still more familiar and comfortable with the term RSI. OOS is also the term that is recommended by the National Occupational Health and Safety Commission and as such is used as the preferred term throughout this review.

Terminology that has been used to describe OOS in other countries includes repetitive strain injury (RSI) in Canada and the United Kingdom, occupational cervicobrachial disease (OCD) in Japan, Germany and Scandinavia as well as the USA preferred terms of cumulative trauma disorder (CTD) and musculoskeletal disorder" (MSD) (Yassi, 1997). A view put forward by Ridley & Channing (1999), suggests that RSI is a sensationalist term that is often used by the media and that in the United Kingdom *work related upper limb disorder* (WRULD) is often used as a collective term to describe a broad range of RSI type conditions.

It is clear from the information above that there are numerous names for what essentially is the same problem and that there has been no consensus on what to call it, one reason for this is that it is still not clearly understood. In addition to the lack of uniformity and agreement on specific terminology to describe the condition, a major source of conflict and debate also exists about how it is described/defined and what are the causes. According to Bohle & Conlon (2000), the dominant view reflected in the definition adopted by Browne (1984, p.73), is as follows:

"musculotendinous injuries of the upper limbs, shoulder girdles, and neck caused by overload of particular muscles groups from repeated use, or by the maintenance of constrained posture, which result in pain, fatigue, and a decline in work performance".

Bohle & Conlon (2000), confirms that

similar definitions were adopted in two prominent Australian reports generated by the National Occupational Health and Safety Commission in 1985. Perhaps the most widely accepted description in Australia as acknowledged in National Occupational Health and Safety Commission (1994, p. 4), describes O'S as:

"... A collective term for a range of conditions characterised by discomfort or persistent pain in muscles, tendons and other soft tissues, with or without physical manifestations". It is usually associated with tasks, which involve:

- a) Repetitive or forceful movements
- b) Maintenance of constrained or awkward postures

National Occupational Health and Safety Commission (1996), expands upon this definition further by specifying that occupational overuse syndrome is usually caused or aggravated by work and can potentially effect workers in any occupation. These National Occupational Health and Safety Commission definitions imply that O'S is primarily caused by various types of work in various occupational settings where an overload is placed on a variety of soft tissues such as muscles and tendons. Whilst there is no doubt that occupational circumstances and conditions are likely to be contributing factors towards the onset of O'S symptoms and injuries, it is also reasonable to suggest that there is likely to be many external factors that also need to be considered prior to making a judgment on a particular case.

This position is supported by CCH (2000), when describing that the type of work performed as well as the nature of recreational or domestic activities are often causation factors in many cases. CCH (2000), also points out that some individuals may be predisposed to this condition although this theory has not yet been proven. Bammer & Blignault (1988), also raises the issue of causation, and explains that the degree of disability associated with O'S is often influenced by non-occupational activities.

Sanders & McCormick (1993), also

emphasises how it is often difficult or impossible to identify the cause of Musculoskeletal conditions diagnosed in working individuals because of the high risk factors that are frequently performed by individuals at home who are involved in normal day-to-day activities, sporting activities and hobbies.

There has been much speculation and debate about the reasons for the growth in numbers of cases of O'S, with several explanations being given for this increase. One of these reasons involves the impact of the industrial revolution and changes in technology that have ultimately lead to the automation of jobs. In discussing the increase in the number of O'S cases, Yassi (1997), indicates that the impact of modern technology is partly attributed to an increased trend in job simplification and a tendency for work to be more segmented and therefore more repetitious. Additional characteristics that have emerged as contributory factors towards increases in the amount of O'S cases, includes expectations of increased worker productivity, the changing nature of the workforce and increased employment in the service and information sectors (Yassi, 1997; Aortal & Dicker son, 1997).

Another reason given for growth in the number of cases of O'S as reported by Smolander & Louhevaara (1998), involves a dramatic shift in the types of work and the impact that this has on the body. Smolander & Louhevaara (1998), points out that the number of conventional heavy physical jobs involving dynamic muscular work has significantly decreased. These jobs are being replaced with jobs that are more static and stationary.

Static work increases the pressure inside the muscle, which together with the physical compression restricts blood circulation either partially or totally. This in turn inhibits the delivery of nutrients and oxygen to the muscle and the removal of waste products such as lactic acid (Mayer, Gatchel & Polatin, 2000). For a short burst, this only has a minor effect, however, over an extended period of time the build up of waste products can cause

discomfort and pain. Therefore, in static work, muscles become fatigued more easily than in dynamic work.

Overuse injury is considered to be the result of repeatedly pushing a muscle to the point of discomfort and not allowing enough time for recovery. This can result in severe muscle strain in the forearm, upper arm, shoulders and neck can develop alone or in combination with pain in the hands (Smolander & Louhevaara, 1998; Mayer, Gatchel & Polatin, 2000).

This review has demonstrated that there is a substantial body of evidence that exists, confirming that OOS is a significant problem with respect to ill health and associated costs within the workplace and that it is likely that extent of the problem may increase because workers are becoming more exposed to risk factors for O'S disorders. The review also shows that the lack of uniformity and standardised assessment criteria makes comparisons of data and subsequent preventative measures difficult, which has lead to a situation whereby the true extent of ill health and associated costs within the workplace is difficult to assess and control.

#### References

- Arndt, P. (1986). *RSI explained*. Melbourne: Hudson Publishing Services.
- Bammer, G., & Blignault, I. (1988). More than a pain in the arms: a review of the consequences of developing occupational overuse syndrome (O'S). *Journal of Occupational Health and Safety - Australia and New Zealand*, 4(5), 389-397.
- Bohle, P., & Quinlan, M. (2000). *Managing occupational health and safety* (2nd ed.). South Yarra, NSW: McMillan Publishers Australia Pty Ltd.
- Brennan, P. (1985). *RSI explorer's guide: repetitive strain injuries*. Sydney: Primavera Press.
- Carson, R. (1999). Reducing cumulative trauma disorder: use of proper workplace design. *AAOHN*, 42(6), 270-276.
- CCH Australia Limited. (2000). *Planning occupational health & safety*

(5th ed.). Sydney: CCH Australia Limited.

Comcare. (1996). *Note printing Australia: a case study*. Canberra: Commonwealth of Australia.

Comcare. (1997). *Taking control of occupational overuse syndrome: a pilot prevention program*. Canberra: Commonwealth of Australia.

Commonwealth of Australia. (1987). *RSI strategies: report of the group implementing recommendations of the task force on repetition strain injuries in the Australian public service*. Canberra: Australian Government Publishing Service.

Erdil, M., & Dickerson, B. (Eds.). (1997). *Cumulative trauma disorders: prevention, evaluation and treatment*. New York: Van Nostrand Reinhold.

Hadler, N. M. (1999). *Occupational musculoskeletal disorders* (2nd ed.). Philadelphia: Lippincott Williams & Wilkins.

Hocking, B. (1993). The aftermath of RSI in Telecom Australia. *Journal of*

*Occupational Health and Safety - Australia and New Zealand*, 9(2), 131-135.

Matthews, J. (1993). *Health and safety at work: Australian trade union safety representatives handbook* (2nd ed.). Sydney: Pluto Press Australia.

Mayer, T. G., Gatchel, R. J., & Polatin, P. B. (Eds.). (2000). *Occupational musculoskeletal disorders: functions, outcomes & evidence*. Philadelphia: Lippincott Williams & Wilkins.

National Occupational Health and Safety Commission. (1994). *National code of practice for the prevention of occupational overuse syndrome [NOHSC:2013(1994)]*. Canberra: Australian Government Publishing Service.

National Occupational Health and Safety Commission. (1996). *Guidance note for the prevention of occupational overuse syndrome in the manufacturing industry [NOHSC:3015(1996)]*. Canberra: Australian Government Publishing Service.

Parker, K. G., & Imbus, H. R. (1992). *Cumulative trauma disorders: current issues and ergonomic solutions: a systems approach*. London: Lewis Publishers.

Ridley, J., & Channing, J. (1999). *Safety at work* (5th ed.). Oxford: Butterworth-Heinemann.

Sanders, M. S., & McCormick, E. J. (1993). *Human factors in engineering and design* (7th ed.). Singapore: McGraw-Hill Incorporated.

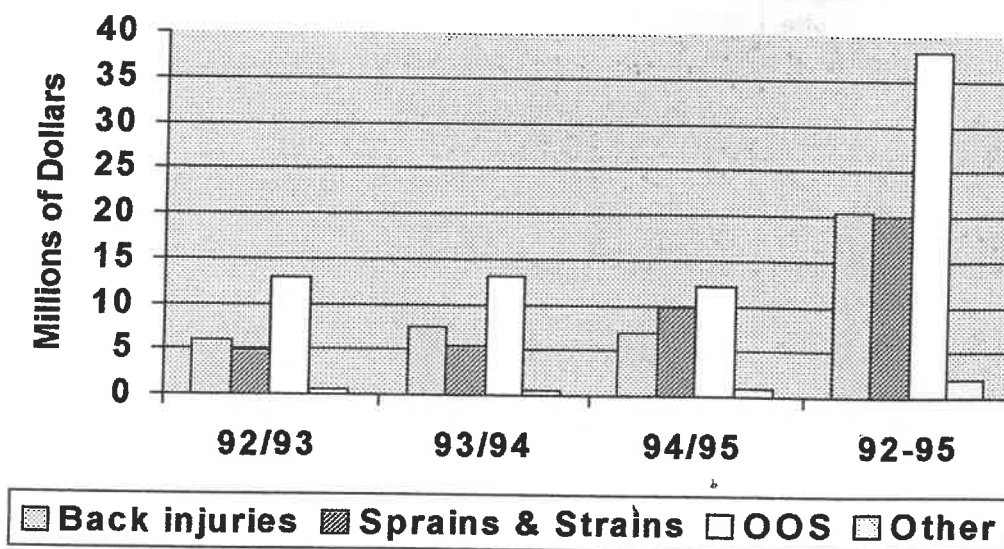
Smolander, J., & Louhevaara, V. (1998). Ergonomics: muscular work. *Encyclopedia of Occupational Health and Safety*, 1, 29.21-29.101.

Violante, F., Armstrong, T., & Kilbom, A. (Eds.). (2000). *Occupational ergonomics: work related musculoskeletal disorders of the upper limb and back*. London: Taylor & Francis.

Yassi, A. (1997). Repetitive strain injuries. *The Lancet*, 349(9056), 943-947.

#### APPENDIX

### Australian Public Sector total liability of manual handling injury claims by injury group (1992/93, 1993/94, 1994/95)



Note: "sprains and strains" are those injuries where a sprain or strain has occurred to joints and adjacent muscles, excluding the vertebral column. (Data source: Comcare, 1997)



## ENVIRONMENTAL IMPACT OF MINING AND MINERAL PROCESSING OPERATIONS

**Dr. Janis Jansz, Ph. D., F.S.I.A.,** Director, World Safety Organization National Office for Australia **Assoc. Prof. Milos Nedved, Ph.D., F.S.I.A.,** Assistant Director, World Safety Organization National Office for Australia, both of Edith Cowan University, Perth, Western Australia.

### ABSTRACT

This paper reviews the most frequently occurring environmental problems accompanying mining and mineral processing operations in Australia and world wide. It summarises current technologies for minimizing negative environmental impact, in particular the impact of waste waters.

#### Introduction

ECU mining safety research team, in cooperation with the Department of Mining and Mineral Engineering, the University of Leeds, UK, aims to evaluate the current strategies for the minimisation of negative environmental impact of mining and mineral processing operations. In the subsequent stage of the research, the benchmark strategies will be formulated and offered to the mining and mineral processing industries in Australia and the UK.

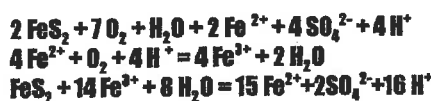
#### Waste Water From Mining Operations

Mining operations, both in coal mining and in the metal ore mining, interfere with natural circulation of water. In the mines, ground waters are accumulating and must be pumped out to prevent flooding of the mines. Simultaneously, seepage of surface waters is being intensified. The composition and temperature of such mine effluent depends on the geological composition of soils, the depth in which mining operations take place and on the ore being mined.

Most frequently two categories of mine effluent are in existence:

1. Effluents from deep mines are neutral or mildly alkaline. Such effluents need to be systematically segregated according to their salt contents. Effluents with a low salt contents could be utilised for various purposes as industrial water. Effluents with a high salt contents should be accumulated separately and disposed of in a orderly planned manner.
2. Effluent from open cut operations. Very frequently the sulphur is present

in the form of pyrites. During leaching and extraction, the following chemical reactions are taking place:



The reaction velocity of the oxidation process depends on pH, concentration of oxygen, concentration of  $\text{FeS}_2$  and on the presence of chemoautotrophic micro-organisms oxidizing  $\text{Fe}^{2+}$  to  $\text{Fe}^{3+}$ .

Typical concentration of ions in mine effluent is: (in gram per liter)

Deep mining effluents	Open cut mining effluents
Fe <sup>2+</sup>	0.5 – 10
Al <sup>3+</sup>	0 – 2
SO <sub>4</sub> <sup>2-</sup>	1 – 20
Total soluble substances	
1 - 50	5 - 50
pH 7.5 – 10	2 – 4.5

The volumes of acidic mine effluents can be minimized by preventative measures, such as by directing rain water into drainage and beyond the mine area, or by the segregation of ground and surface waters. The chemical composition of acidic mine effluent can be controlled by shortening the contact with the oxidized sulphur substances, by permanently pumping out the seepage water and by early closedown of the exhausted sections of the mines.

Before disposing of into the water courses, concentrated acidic mine effluents need to be treated to adjust pH, to remove iron and heavy metals and to reduce the  $\text{SO}_4^{2-}$  contents. Most frequently such effluent are neutralized by calcium hydroxide, or in a combined

neutralization process by limestone and then by calcium hydroxide (slaked lime).

The process of neutralization is very fast and therefore the reaction time in the neutralization reactor is usually 1-2 minutes. During the process of neutralization, a substantial proportion of heavy metal ions are precipitated. It is beneficial to supplement this process by aerating the mixture for 15-30 minutes in the vessel between the neutralization reactor and the sedimentation tank, so that  $\text{Fe}^{2+}$  would be oxidised to  $\text{Fe}^{3+}$  that will be precipitated in the form of a hydrated oxide. The contents of the  $\text{SO}_4^{2-}$  ions will be reduced during the neutralization with calcium compounds to the concentration that is equal to the solubility of  $\text{Ca SO}_4$ .

Neutralization process using solely ground limestone can be used only for the effluent with a low  $\text{SO}_4^{2-}$  content, but even then it is necessary to prevent the passivation of limestone grains by employing the fluidisation process. The contents of  $\text{Fe}^{2+}$  in these circumstances needs to be lower than 100mg per liter.

Desalination of mine effluents would be considered only in these areas, where there is a shortage of other sources of water. Depending on the composition of the effluents, availability of relevant technologies and of the power, ion exchange or membrane separation procedures are employed, in particular reverse osmosis and electro dialysis.

#### Waste Water From Mineral Processing Operations

According to the chemical composition, metal ores are:

- ores with an elementary metal (Eg.

silver, gold and platinum)  
- metaloxide ores (most frequently occurring)

- pyrite ores (metal ion in a compound with sulphur, frequently also arsenic and antimony are present)

Waste rock contains as the main components predominantly silicates,  $Al_2O_3$ ,  $Ca CO_3$  and  $Fe_2 O_3$ .

In order to obtain the metal concentrate, the ore is separated from waste rock by comminution, gravity or magnetic separation and by flotation. These processes are carried out in the water, the consumption of which is typically between 3-15 cubic metres per one metric tonne of the ore. If water separation (recirculation) methods are used, the consumption of water can be less than 1 cubic meter per metric tonne of the ore. Waste waters from the ore processing plants are contaminated with:

- insoluble substances, predominantly waste sludge (finely ground waste rock).

The concentrations of these solids are usually within the range between 20-300 grams per liter.

- soluble substances, which were extracted out of the ore (heavy metals, sulphates)

- chemicals used in the flotation process

Froth flotation agents of phenolic composition used earlier caused substantial contamination of recirculated water; therefore they were replaced by their agents on the basis of polyalcyglycols. Current froth flotation processes use ethylxanthogenates, which are quite toxic, but are subject to

hydrolytic decomposition whilst standing in the tailing dam. Other chemicals used in the froth flotation processes are cyanides, salts of heavy metals, slacked lime and sulphuric acid. Basic strategy for treating waste waters from mineral processing are tailing dams, where tailings are separated by sedimentation.

Waste water treatment after mineral processing employing froth flotation uses also precipitation, oxidation and hydrolytic reactions, which enable to significantly reduce the concentration of contaminations in the water. The velocity of this chemical reaction will determine the rate at which the water circulates in the process.

Metal ores are further subjected to various metallurgical processes, which can be classified as:

-pyrometallurgy (at high temperatures)

-hydro metallurgy (processes in the aqueous media)

Hydro metallurgy is being used more and more frequently, since it enables metal winning from even low-grade ores, or from the polymetallic ores. The main stages of hydro metallurgy processes are leaching (extraction), separation of leach liquors, their purification and finally metal winning.

Leaching (extraction) processes use various solvents (water, acids, alkalis, salts, organic solvents or extractants). Metal winning processes use electrolysis, reduction by hydrogen or another reduction agent or by precipitation. Compared with pyrometallurgical processes, hydro metallurgy is much more

environmentally friendly. The volume of gaseous pollutants is only a fraction of what would be generated by a pyrometallurgical process, and emission of solid particles is non-existent.

Since hydro metallurgical processes are carried out in the aqueous media (or aqueous phase), there is greater potential for the contamination of large volumes of water. Waste waters contain soluble metal compounds, and chelating compounds and organic solvents.

The main principle in waste water treatment should be the maximum possible recirculation of water in all circuits. This can be supplemented by all usual technologies suitable for the removal of metal ions, such as precipitation, ion exchange, electrochemical processes or solvent extraction.

#### Bibliography

Berthouex, M., Rudd, D. (1997). *Strategy of pollution control*. New York, NY: J. Wiley and Sons.

Jorgensen, S. (1999). *Industrial waste water management*. New York, NY: Elsevier.

Meinck, F., Stoof, H., Kohlschutter, H. (1998). *Industrie-abwasser*. Stuttgart: Fischer Verlag.

*Water treatment Handbook (8<sup>th</sup> ed.)*. (1995). New York, NY: J. Wiley and Sons.

-----

# POST-TRAUMATIC STRESS DISORDER

By Jean Mossop

## ABSTRACT

Signs and symptoms of Post-traumatic stress disorder (PTSD) have been around for many years and has been know under various titles. Earliest writing are as far back as early Greek and Roman times. The Vietnam War was a key catalyst for further research and world recognition. PTSD is triggered by a traumatic event or incident and has very specific signs and symptoms. Emergency workers are particularly prone to PTSD through the very nature of their employ. There are steps which can be initiated to prevent and to lessen the effects of PTSD. St John Ambulance in Western Australia is used as an example.

### History

Post traumatic stress disorder (PTSD) has been around for many years though not necessarily with the same title. Shakespeare himself wrote several good examples in his works about people who after some trauma had problems sleeping or would often relive events in their heads. Early descriptions of PTSD-like symptoms can also be found in early Greek and Roman writings. Recently, it has also been called such names as battle fatigue/combat fatigue, shell shock, rape trauma syndrome and so on.

PTSD can affect anyone independent of age, gender or culture (Creamer, Forbes & Devilly: 2000). Yehuda and McFarlane (1995) mentions that PTSD had originated before it had even been recognized in the nosologic classification systems. Beall (1997) mentions that Sigmund Freud and Pierre Janet conducted research in the late 1800's on hysteria, in particular the questions raised by Freud and Janet in regards to any possibility of hysteria being precipitated by environmental events. Volpe (1996) mentions that there is evidence regarding writing about post traumatic reactions dating back to the Sixth Century BC. Volpe (1996) cites from Dale (1983) that back in 1666, Samuel Pepys wrote about people's reactions to the Great Fire of London.

Writings that are more recent are about the effects of war on soldiers, especially the Vietnam War. "The psychological problems experienced by veterans of the Vietnam War provided a key catalyst for the inclusion of PTSD in the

*nomenclature of the DSM-III* (Beall: 1997). Raphael and Meldrum (1996) state that the commonest stressor for males is combat and, for females, assault.

### What is stress?

Stress is the body's reaction to demands and pressure of life. Stress is not necessarily negative, it can provide us with challenges, motivation and a sense of worth (Worksafe Western Australia: n.d.). Regardless of where the stress comes from our bodies responded to one of our more primitive instincts 'fight or flight'. We make a decision to either fight the source of stress (or danger) or try to flee from it. When we were actually fighting for survival many years ago these responses were suitable but nowadays we maybe unable to 'fight' our stressor (which may be our boss) so we have to manage our stress in other ways. Our bodies react physiologically to stress – adrenal floods nerve endings; blood pressure increases; sugar is pumped to fuel muscles; cholesterol and fats are mobilized into the bloodstream. These physiological changes are made to prepare the body for the fight/flight instinct and should dissipate after the crisis is over. However, if these changes continue after the crisis is over they then become counter-productive (distress) (Tunnelcliffe: 1995, p21-22).

What is a traumatic event? According to Raphael and Meldrum (1996):

*A psychologically traumatic event is a very serious and very stressful event which affects an individual or those very close to them. It may be a very serious accident; the death of someone, especially a child; violent deaths, such*

*as a murder or a suicide; many deaths at one time; rape; personal disasters such as vehicle or air crashes; disasters such as fire or floods; shooting and community violence; being robbed, mugged or assaulted; and many other such episodes.*

Post traumatic stress disorder/syndrome is the body's normal emotional and physical reaction to an event which is abnormal and may be deeply shocking. It tends to occur within three months of the event but can be delayed the symptoms are the same.

### Present diagnostic criteria for PTSD are:

1. Exposure/experience of an event where both of the following were present:
  - 1.1 The person was involved, saw or was confronted by an event/s that involved real or threatened injury or death, or a threat to the physical integrity of themselves or others, and
  - 1.2 That person responded with fear, helplessness or horror. In children, this may be displayed as agitated behavior.
2. The event is re-experienced often in one or nay of the following ways:
  - 2.1 Images, thoughts and recollections of the event that are intrusive and recurrent. In children, their play may consistently re-enact some part of the event.
  - 2.2 Frequent distressing dreams of or about the event. In children, their dreams may be frightening without any recognizable content.
  - 2.3 Actions or feelings that seem as if the traumatic event were recurring

eg hallucinations, sense of reliving the event, illusions and/or dissociative flashbacks.

- 2.4 Extreme psychological distress when exposed to either internal or external cue that somehow represents or resemble part of the traumatic event eg similar noises, clothing and so on.
- 2.5 Physical reactivity on these cues.
3. Continued avoidance of stimuli connected with the traumatic event and numbing of general responsiveness (not present before the event) indicated by at least three of the following:
  - 3.1 Tries to avoid any thoughts, feelings or talk associated with the event.
  - 3.2 Tries to avoid any activities, people or places that may arouse memories of the event.
  - 3.3 Cannot recollect an important aspect of the event.
  - 3.4 Noticeable drop in interest or 'joining in' in significant activities.
  - 3.5 Feelings of detachment or estrangement from other people.
  - 3.6 Limited range of affect (no longer able to show loving with feeling)
  - 3.7 Sense of doom or lack of future (eg appears to not expect to have a career, family, normal life span etc).
4. Continued symptoms of increased arousal (not evident before the event) as indicated by at least two of the following:
  - 4.1 Sleep disturbances and/or trouble getting to sleep;
  - 4.2 Irrational anger outburst or irritability;
  - 4.3 Difficulty in concentrating
  - 4.4 Hyper-vigilance - cautious, watchful,
  - 4.5 Exaggerated startle response.
5. Duration of disturbance (2, 3 & 4) lasting for more than one month.
6. These disturbances cause clinically, significant distress or disabilities in social intercourse.

This condition is considered acute if the

symptoms last less than three months, chronic if the symptoms last more than three months. Delayed onset is considered when the symptoms have started to occur after six months after the traumatic event/s. (American Psychiatric Assoc. (1994) in Raphael & Meldrum: 1996)

PTSD tends to result from a traumatic event, though there is now evidence that it can also be triggered by an accumulation of events. Accumulative event PTSD is known as Complex PTSD, but it has not yet been officially recognized in the DSM-IV. It is often referred to in terms of "rolling PTSD", Prolonged Duress Stress Disorder (PDS), and "cumulative stress" (Field: 2002).

#### Complex PTSD

Complex PTSD may arise from event such as:

- Repeated exposure to accidents where people may be mutilated burnt, disfigured or injured -- members of the emergency service are exposed to this -- Police, Firefighters, Ambulance and Rescue Services.
- Repeated exposure or involvement in serious crimes ie murder, domestic violence
- Frequently having to break bad news to others ie bereavement, injury or assault.
- Facing of abuse repeatedly - verbal, physical, sexual or emotional.
- Frequent intrusion and/or violation which may be physical or psychological ie bullying which can occur at school, home or in the workplace; harassment, stalking and so on.

Where children are involved, the stress seems particularly high. Fire fighters, police and ambulance personnel have reported higher stress level when children are hurt (Tunnelcliffe: 1995, p11). Reactions to traumatic events are individual and normal though the actual event may be abnormal. Emergency workers because of the nature of their work must have support structures in place to provide them with help when normal coping mechanisms fail. Tunnelcliffe (1995) describes three

dimensions of a critical incident stress reaction where emergency personnel view the world it related to the past, present and future.

PAST----- PRESENT ----- FUTURE  
(Guilt) (Stress) (Fear & worry)

Guilt - tends to occur because Western society is conditioned to believe everything happens for a reason. The emergency workers can blame themselves in an effort to understand what went wrong (ie injury or death of person/s). This is further acerbated when others also question 'what went wrong?' Feelings of guilt increase individual stress reactions, though what needs to be understood is that guilt will not change the situation, hindsight is always a wonderful thing and those who were not directly involved in the incident cannot necessarily grasp the feelings, thoughts and actions of the people directly involved.

Stress - reactions are both emotional and physical. Physical reactions can include mood swings, sleeping difficulties, muscle tension (shown in headaches, sore neck, and inability to relax), and loss of appetite and so on. Emotional reactions are concerned with thought processes ie flashbacks, consistent ruminating about the event (what ifs). The mental stress may be prolonged with ongoing media hype, investigations or work discussions.

Fear - is the tendency to be wary of attending similar jobs with possible similar outcomes. Emergency workers feel afraid when their personal security or well-being is at risk. Because so many other people depend on emergency workers in a crisis, the emergency worker themselves, tend to have a personal image of being able to handle anything. When this image is shattered, their safety and mortality is questioned. Tunnelcliffe (1996) goes on to explain these feelings are normal and we all react strongly to situations that are not under our control.

The American National Institute of Mental Health (2000) state that people who have suffered abuse as a child or has had other previous traumatic experiences

are more prone to develop PTSD, though research is continuing to discover other factors. Present American research has found that a number of physical changes to the brain occur in the person with PTSD, these are –

- Hippocampus (part of the brain responsible for emotion) appears different in people with PTSD. This may be responsible for the flashbacks or intrusive thoughts and images.
- Abnormal levels of key hormones, which play a part in stress response. Cortisone levels may be lower than normal and epinephrine and norepinephrine are higher than normal.
- Natural opiates are produced when a person is in danger, a person with PTSD continues to produce these at a high level even when the danger has reduced or ceases to exist. (National Institute of Mental Health, USA: 2000).

Emergency Service workers need to be aware of PTSD, so that they can recognise signs and symptoms in themselves and their peers and get the support they need to deal with it. Remembering that after a traumatic event, it is normal to have some of the following signs and symptoms, but they should be for a self-limiting time (1-30 days).

#### Signs & Symptoms

- Flashbacks or re-experiencing the event including feelings, which were present at the time.
- Uncontrollable crying or crying at inappropriate times.
- Self-inflicted isolation – from spouse, family, friends and peers
- Loss of feelings of control over everyday activities, or little interest in normal everyday activities including hobbies.
- Increase in the use of alcohol or drugs
- Mood swings (not present before the event), especially irritability, anger, suspicion, or fear.
- Sleep problems, either falling asleep or waking frequently with or without 'bad' dreams.
- Feelings of guilt – may be about surviving or about not being able to change the outcome, or prevent the event from happening in the first place.

- Feelings of no future, pointless, fearful or even suicidal. May not be able to see an end to present feelings of doom. (American Counseling Association: 2000; Tunnelcliffe: 1996; Creamer, Forbes & Devilly: 2000)

Many people turn to alcohol and drugs in an attempt to cope with unpleasant symptoms, this can further escalate and lead to deterioration to person, family and work relationships. Creamer, Forbes and Grant (1996), suggest various strategies to either eliminate or reduce the effects of PTSD. These strategies include – eating healthy regular meals (even if you don't feel like it); regular exercise which raises the aerobic rate of the cardiovascular system; regular rest/sleep; and a regular routine (gives a sense of control); setting of goals (short, initially); allowing a set time per day for reflection (ie permission to think about the traumatic event); allow other people to be there to support you; educate yourself on PTSD and associated problems ie depression; be honest with yourself and those close to you. Cures or coping mechanisms are for anyone who suffers or who has the potential for PTSD, emergency workers are no different (though they do have a higher risk of experiencing a traumatic event). With all research that has been done about PTSD after the Vietnam War, emergency service organizations are better prepared and equipped for dealing with PTSD.

St John Ambulance, Australia has several strategies in place for employees who may or may not be affected by PTSD. Their first strategy is to teach all new potential employees about PTSD, and how they may be affected. This is carried out before the employee is actually out on the road. All other employees will have had training provided them the same information. An employee has various people they can call on for any work-related issues, but specifically for PTSD, there is specialized help. The first step tends to be to talk to peers, those people that were directly involved in the incident, this maybe other paramedics, clinical supervisors, communications and/or other emergency personnel

involved (police, fire, SES, Rescue workers). Talks or discussion may take the form of formal or informal debrief. Psychological debriefing is normally held quite soon after the event and provides an avenue for discussion where management of the event can be discussed and a 'big picture' gained. It is not an avenue for blame but rather for understanding and clarification.

A debrief is used to assist those involved in the incident to recognize and manage emotions and thoughts which have been triggered by the incident (Tunnelcliffe: 1996, p8). Ambulance officer/paramedics tend to discuss jobs/incidents quite frequently thereby initiating their own debriefing session without outside personnel being involved. St John Ambulance Western Australia also has a Chaplain on call 24 hours a day for officers that may need further support. The present Chaplain will be called by the communications department if a traumatic incident has occurred and the Chaplain will often meet crew/s at the hospital or depot to ask how they are feeling; he will often also telephone personnel at home the following day for the same reason.

All St John Ambulance Western Australian personnel also have over avenues open to them. Several officers are specially trained in basic counseling skills. These people wear a badge (MAPS) identifying themselves. Their names and telephone numbers are distributed throughout the service. MAPS (Maintaining Awareness and Providing Support) are available to all staff, irrespective of which area of the organization they work in. The peer support team has undertaken to provide support, a friendly ear and empathy when required, but they are not counselors or psychologists. All discussions are confidential and the MAPS representative can arrange for further counseling outside the organization for which St John Ambulance Western Australia will pay for (six visits). Staff members can opt to see an outside counselor or psychologist without seeing the Chaplain or peer supporter if they so wish (St John



Ambulance: 2001).

### Conclusion

Post traumatic stress disorder is a disorder which can and does impact on a person's everyday life and relationships. It is the result of being exposed to a traumatic event where people are either hurt, threatened or killed and there does not seem to have been a logical reason for it to have occurred. The effects on the body are both physical and emotional and can be short or long term. Recognition for this disorder has increased especially after the Vietnam War where many soldiers from the same suffered or are still suffering PTSD. Emergency workers are more likely than the general public to be exposed to traumatic incidents because that is the nature of their employment. With recognition, understanding and support the emergency service worker is less likely to suffer from long term PTSD.

### References

American Psychiatric Association (1994). The Diagnostic & Statistical Manual (DSM). In Raphael & Meldrum (1996) in

Post-traumatic Stress Syndrome. In *The Science of first aid*. Forrest: Sty John Ambulance Australia.

American Counseling Association (22/01/2000). Crisis fact sheet: *10 ways to recognize Post-traumatic stress disorder*. Available WWW: [http://www.counseling.org/consumers\\_media/facts\\_ptsd10ways.htm](http://www.counseling.org/consumers_media/facts_ptsd10ways.htm) [2002, June, 30]

Beal, L.S. (1997). *Post-traumatic stress disorder: A bibliography essay*. Alabama, USA: Auburn University Libraries.

Creamer, M., Forbes, D. & Devilly, G. (2000). *Post-traumatic stress disorder (PTSD) and war-related stress*. Canberra: Veteran Affairs

Field, T. (09/04/2002). *Stress injury to health trauma, PTSD*. Available [www.successunlimited.co.uk/stress/ptsd.htm](http://www.successunlimited.co.uk/stress/ptsd.htm) [2002, June, 30]

National Institute of Mental Health USA (2000). Available WWW: <http://www.nimh.nih.gov/research/ptsd.htm>

htm [2002, June, 30]

Raphael, B. & Meldrum, L. (1996). Post-traumatic Stress Syndrome. In *The Science of first aid*. Forrest: St John Ambulance Australia.

Tunnelcliffe, M. (1995). *How to manage the stress of traumatic incidents: a guide for police, ambulance, fire, rescue and emergency medical personnel*. Palmyra: Bayside books.

Volpe, J.S. (1996). *Traumatic stress: An overview: Trauma response*. New York: the American Academy of Experts in Traumatic Stress.

WorkSafe Western Australia (n.d.) *A guide to work-related stress*. WorkSafe publications.

Yehuda, R. & McFarlane, A. (1995). *Conflict between current knowledge about post-traumatic stress disorder and its original conceptual basis*. Oregon: David Baldwins Trauma information pages.

## DIARY OF EVENTS

### World Safety Organization

**Title:** 16<sup>th</sup> International Environmental Safety & Health Conference & Expo

**Venue:** Rivera Hotel & Casino, Las Vegas, Nevada, USA.

**Dates:** 16 - 18 September, 2002

**Contact:** World Management Center, telephone: (660) 747-3132 fax: (660) 747 2647 or [wsowmc@socket.net](mailto:wsowmc@socket.net)

**Title:** The future of work. Prevention of overload & stress

**Venue:** Sunborn Yacht Hotel, Nantail, Finland

**Date:** 1-6 September, 2002

**Contact:** Pirjo Turtiainen

[Pirjo.turtiainen@occuphealth.fi](mailto:Pirjo.turtiainen@occuphealth.fi) [www.niva.org](http://www.niva.org)

**Title:** Effective Safety Management

**Venue:** Cambridge, United Kingdom

**Date:** 16-19 September, 2002

**Contact:** [cust.serv@informa.com](mailto:cust.serv@informa.com)

### International Commission on Occupational Health (ICOH)

**Title:** Best Practice in Occupational Safety & Health, Education, Training & Communication

**Venue:** Wyndham Baltimore Inner Harbour Hotel. 110 W Fayette Street, Baltimore, Maryland, 21201, USA.

**Date:** 27-30 October, 2002

**Cost:** \$250 (U.S. funds)

**Contact:** [oshercww@sph.unc.edu](mailto:oshercww@sph.unc.edu)

### World Safety Organization

**Title:** 17<sup>th</sup> International Safety & Health Conference & Expo

**Venue:** Sheraton Atlantic City Convention Center Hotel

**Date:** September 8-10, 2003

**Contact:** World Management Center, telephone: (660) 747-3132, fax: (660) 747-2647 or [wsowmc@socket.net](mailto:wsowmc@socket.net)

## WSO Code of Ethics

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

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

Published by the:

WSO World Management Center  
PO Box 518, 106 W Young Suite G  
Warrensburg MO 64093 U.S.A.  
Tel. (660) 747-3132, Fax (660) 747-2647  
[www.worldsafety.org](http://www.worldsafety.org)  
[wsowme@socket.net](mailto:wsowme@socket.net)

2002, U.S. \$5.00



ممنوع التجاوز



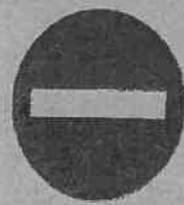
الأفضلية للسيارات  
باتجاه محدد



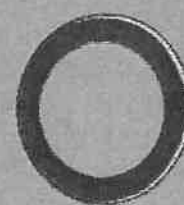
ممنوع الالتفاف



ممنوع الإلتجاه  
للليسار



ممنوع الدخول



ممنوع المرور



ممنوع المرور  
للشاحنات التي يزيد  
وزنها على ٧ طن



ممنوع المرور  
للشاحنات



ممنوع المرور  
لكافة المركبات



ممنوع المرور  
للدراجات



ممنوع المرور  
للسيارات



ممنوع التجاوز  
للشاحنات



ممنوع الوقوف



مسموح الوقوف



تحدد السرعة  
حسب نوع  
السيارة



السرعة القصوة  
٨٠ كلم



ممنوع المرور  
للشاحنات التي يزيد  
ارتفاعها عن ٣.٥ م



ممنوع المرور  
للشاحنات التي يزيد  
عرضها عن ٢.٤٠ م



تهيؤ للوقوف



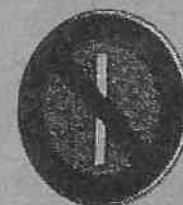
وقوف إلزامي



قف



مسموح الوقوف  
على جانب واحد



مسموح الوقوف  
على جانبي الطريق



ممنوع الوقوف  
إلا في الحالات  
الإستثنائية



ممنوع مرور  
المركبات



ممنوع تسيير  
الحيوانات



ممنوع مرور  
العربات



ممنوع التزمير



ممنوع مرور  
المشاة



ممنوع مرور  
الدراجات