

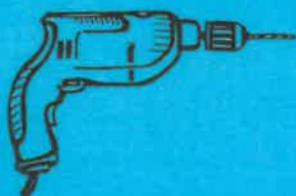
WORLD SAFETY JOURNAL

ESP - Enhanced Safety Principles



ISSN 1015-5589
Vol. XIX No.2, 2010
© copyright 2010, WSO

- Knowledge Sharing and Organizational Enabling Conditions
- Best Practice for Health & Safety Management
- Safety Management Success: Directives of Management
- Emergency Management in Western Australia



WORLD SAFETY ORGANIZATION (WSO)

Profile

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

World Safety Organization Activities

The World Safety Organization:

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

Membership Benefits

The World Safety Organization:

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

Journal Editor

Dr. Janis Jansz, F.S.I.A.
Director of the WSO International
Office for Australia, and Member
of the WSO Board of Directors

WSO Board of Directors:

Mr. Perry L. Ballard
Dr. Elias M. Choueiri
Mr. Gary D. Cudworth
Eng. Alfredo De La Rosa Jr.
Mr. Richard G. Ellis
Mr. Herb "Safety" Everette
Mr. Wayne Harris
Ms. Debra Hilmerson
Mr. Edward E. Hogue
Mr. James "Perry" Huckabay
Dr. Janis K. Jansz
Mr. Lon S. McDaniel
Mr. Tony D. Ploughe
Dr. James R. Reese
Dr. Donald E. Rhodes
Mr. David H. Roberson
Mr. Eric S. Roberts
Dr. Vlado Z. Senkovich
Mr. Teh-Sheng Su
Dr. Michael L. Thomas
Mr. Kenton W. Thompson
Mr. Dennis B. Vaughan
Ms. Brenda J. Williams

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 the World Safety Organization. Reproduction of articles or abstracts contained in this journal is approved providing the source is acknowledged.

Advertising in the Journal:

1/4 page Advertisement \$35 (USD)
1/2 page Advertisement \$65 (USD)
Full page Advertisement \$100 (USD)

Advertising in the Journal benefits your business because people world wide are able to read about what you offer. This benefits our Journal Readers because they learn about your products and/or Services.

Table of Contents

	Page #
Knowledge Sharing and Organizational Enabling Conditions <i>by: Khaled Chiri, Jane Klobas</i>	1
Best Practice for Health & Safety Management <i>by: Simon Hill</i>	10
Safety Management Success: Directives of Management <i>by: Michelle Hyland</i>	14
Emergency Management in Western Australia <i>by: Tracy Mizen, Dr. Janis Jansz</i>	17

ARTICLE SUBMISSION

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

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

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

References.

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

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

Articles are referenced as follows.

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

Internet information.

Name of author. (Year of publication). *Name of article*. [on-line]. Available WWW;http:// and the rest of the internet path address. [Access date].

Submissions should be sent to:

Debbie Burgess

World Safety Organization

106 W Young Avenue, Suite F, PO Box 518

Warrensburg Missouri, 64093, United States of America

Or Emailed to editorialstaff@worldsafety.org

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

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

WSO International Office's and Directors

Australia:

Dr. Janis Jansz
c/o School of Public Health, Curtin University of Technology,
Perth 6845
Western Australia,
Phone: (61 8) 9266 3006 Fax: (61 8) 9266 2358
email: j.jansz@curtin.edu.au

Czech Republic:

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

Ghana:

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

Lebanon:

Dr. Elias M. Choueiri
c/o Ministry of Transportation
PO Box 401
Hazmich, Lebanon
email: eliasch@inco.com.lb

Macedonia:

Mr. Milan Petkovski
c/o Macedonian Occupational Safety Association
Makedosnko Zdruzenie Za Zastita Pri Rabota, U1
"Nevena Georgieva Dunja", Br. 13 Lokal 1
1000 Skopje Macedonia
email: kontakt@mzzpr.org.mk www.mzzpr.org.mk

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 CNME, Inc., Middle Road, H.K.
Pangelianna Bldg., Chalan Lulan
PO Box 7724 SVRB
Saipan MP 96950

Republic of the Philippines:

Eng. Alfredo A. De La Rosa, Jr.
2nd Floor, Xanland Place Building, 323 Katipunan Avenue
1108 Quezon City, Philippines
email: info@wsophil.org

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, Province of the Republic of China:

Dr. Shuh Woei Yu
c/o Safety and Health Technology Center / SAHTECH
Rm. 413, Bldg 52, No. 195, Sec 4, Chung Hsing Road
Chutung, Hsinchu 31040 Taiwan ROC 310
email: swyu@sahtech.org

Ukraine:

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

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

Journal Editor

Dr. Janis Jansz, F.S.I.A.
Director of the WSO International
Office for Australia, and Member
of the WSO Board of Directors

WSO Board of Directors:

Mr. Perry L. Ballard
Dr. Elias M. Choueiri
Mr. Gary D. Cudworth
Eng. Alfredo De La Rosa Jr.
Mr. Richard G. Ellis
Mr. Herb "Safety" Everette
Mr. Wayne Harris
Ms. Debra Hilmerson
Mr. Edward E. Hogue
Mr. James "Perry" Huckabay
Dr. Janis K. Jansz
Mr. Lon S. McDaniel
Mr. Tony D. Ploughe
Dr. James R. Reese
Dr. Donald E. Rhodes
Mr. David H. Roberson
Mr. Eric S. Roberts
Dr. Vlado Z. Senkovich
Mr. Teh-Sheng Su
Dr. Michael L. Thomas
Mr. Kenton W. Thompson
Mr. Dennis B. Vaughan
Ms. Brenda J. Williams

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 the World Safety Organization. Reproduction of articles or abstracts contained in this journal is approved providing the source is acknowledged.

Advertising in the Journal:

1/4 page Advertisement \$35 (USD)
1/2 page Advertisement \$65 (USD)
Full page Advertisement \$100 (USD)

Advertising in the Journal benefits your business because people world wide are able to read about what you offer. This benefits our Journal Readers because they learn about your products and/or Services.

Table of Contents

	Page #
Knowledge Sharing and Organizational Enabling Conditions <i>by: Khaled Chiri, Jane Klobas</i>	1
Best Practice for Health & Safety Management <i>by: Simon Hill</i>	10
Safety Management Success: Directives of Management <i>by: Michelle Hyland</i>	14
Emergency Management in Western Australia <i>by: Tracy Mizen, Dr. Janis Jansz</i>	17

ARTICLE SUBMISSION

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

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

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

References.

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

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

Articles are referenced as follows.

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

Internet information.

Name of author. (Year of publication). *Name of article*. [on-line]. Available WWW:http:// and the rest of the internet path address. [Access date].

Submissions should be sent to:

Debbie Burgess

World Safety Organization

106 W Young Avenue, Suite F, PO Box 518

Warrensburg Missouri, 64093, United States of America

Or Emailed to editorialstaff@worldsafety.org

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

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

WSO International Office's and Directors

Australia:

Dr. Janis Jansz
c/o School of Public Health, Curtin University of Technology,
Perth 6845
Western Australia,
Phone: (61 8) 9266 3006 Fax: (61 8) 9266 2358
email: j.jansz@curtin.edu.au

Czech Republic:

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

Ghana:

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

Lebanon:

Dr. Elias M. Choueiri
c/o Ministry of Transportation
PO Box 401
Hazmieh, Lebanon
email: eliasch@inco.com.lb

Macedonia:

Mr. Milan Petkovski
c/o Macedonian Occupational Safety Association
Makedosnko Zdruzenie Za Zastita Pri Rabota, U1
"Nevena Georgieva Dunja", Br. 13 Lokal 1
1000 Skopje Macedonia
email: kontakt@mzzpr.org.mk www.mzzpr.org.mk

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 CNME, Inc., Middle Road, H.K.
Pangelianna Bldg., Chalan Lulan
PO Box 7724 SVRB
Saipan MP 96950

RePublic of the Philippines:

Eng. Alfredo A. De La Rosa, Jr.
2nd Floor, Xanland Place Building, 323 Katipunan Avenue
1108 Quezon City, Philippines
email: info@wsoPhil.org

Russia:

Prof. Dr. Edouard Petrossians
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, Province of the RePublic of China:

Dr. Shuh Woei Yu
c/o Safety and Health Technology Center / SAHTECH
Rm. 413, Bldg 52, No. 195, Sec 4, Chung Hsing Road
Chutung, Hsinchu 31040 Taiwan ROC 310
email: swyu@sahtech.org

Ukraine:

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

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

Knowledge Sharing and Organizational Enabling Conditions

Khaled Chiri, Jane Klobas

The University of Western Australia, Perth, Australia

kchiri@iinet.net.au jane.klobas@uwa.edu.au

Abstract

Whilst a large and important part of knowledge in an organization is tacit, there is growing evidence to suggest that organizations spend most of their time focusing on codifying and managing explicit knowledge and neglecting tacit knowledge. This paper looks at the organizational enabling conditions that enhance tacit knowledge sharing. It argues that whilst organizations cannot force their employees to share their tacit knowledge without the willingness of the individuals to take part, it is possible, to foster the means that encourage the willingness of employees to share their knowledge with others in the workplace.

The paper identifies a number of factors that influence the intentions of employees to share their knowledge within an organization. Factors such as organizational commitment, rewards and incentives, trust and learning orientation are believed to affect the intention of employees to share their knowledge with others in the workplace. These factors are combined with new variables introduced from a social cognitive perspective of intention to engage in knowledge sharing behavior. This study uses Ajzen's theory of planned behavior. (TPB) to develop and test a research model to assess factors that influence knowledge sharing intentions. Briefly, at the initial level, employees' knowledge sharing behavior is determined by their intentions. At the next level, the intentions are themselves explained by three conceptually independent antecedents: 1) attitudes towards knowledge sharing, 2) perceived social influence on knowledge sharing, and 3) personal control for knowledge sharing.

Understanding factors necessary to enhance knowledge sharing intentions and perhaps knowledge sharing behaviors in the workplace represent significant progress towards leveraging the vast collective knowledge that exists within an organization. This paper provides evidence of the importance of perceived social influence and personal control and gives reasons why employees may or may not be willing to engage in knowledge sharing activities even when their attitude to knowledge sharing is positive. The paper suggests that, sharing knowledge is governed by the strength of perceived social influence and supported by personal control in the form of adequate skills and capability rather than from having positive attitudes toward knowledge sharing. It also shows that employees who feel the organization continues to reward them, who are confident in their ability to share, who can trust their work colleagues and management, and who have high aspirations for acquiring and developing new skills, are more willing to engage in knowledge sharing activities.

Key words: Knowledge management, knowledge sharing, organizational conditions, intention to share, behavior change, social influence.

1. The problem of knowledge sharing within an organization

Knowledge has been considered by many researchers as the most strategically significant resource of the firm, the most stable source of competitive advantage and normally applicable to meeting organizational performance goals (Bixler, 2005). Notwithstanding the potential benefits of knowledge sharing to the success of an organization (Drucker, 1993; Nonaka & Konno, 1998) it is recognized that there are many challenges associated with its implementation in the workplace. The difficulty with knowledge sharing seems to stem from the fact that the bulk of knowledge in most organizations is tacit. Sharing tacit knowledge is a difficult activity, and its long-term success depends upon the willingness of individuals to share their knowledge with others in the workplace. Knowledge sharing at the individual level is therefore critical to the success of any knowledge sharing effort in the workplace and, without sharing, the benefit of any knowledge management (KM) effort will be limited (Law & Ngai, 2008). Yang (2008) argues, however, that knowledge sharing appears to be unnatural and from the employees' perspective, that the new 'KM' ways of working can become another source of confusion by establishing new requirements and practices that can potentially conflict with human nature and long held beliefs. Therefore, it is reasonable to suggest that the success of any knowledge sharing initiative is dependent on those factors that encourage or inhibit the willingness of employees to share their knowledge with others in the workplace. This paper investigates how several organizational enabling conditions act to encourage or inhibit such willingness.

2. Knowledge Sharing

Knowledge encompasses human qualities that add value to information, such as the experience, judgment and instinct of people, and it is intimately tied to human actions and interactions with reality for its continued development and management (Davenport & Prusak, 1998; Gupta, Sharma, & Hsu, 2004; Nonaka & Takeuchi, 1995).

2.1 Tacit v. explicit knowledge

In contrast to explicit knowledge, which can be documented, stored and readily shared between individuals within an organization without the need for direct interactions between people ((Awad & Ghaziri, 2004; Lehaney, Clarke, Coakes, & Jack, 2004; Nonaka & Takeuchi, 1995), tacit knowledge is highly personal and hard to codify as it is normally embodied in the expertise and experience of individuals. Because it is mainly stored in people's heads, it is more difficult to express in formalized ways (Nonaka & Takeuchi, 1995). As Polanyi (1967, p.4) noted, "We know more than we can tell" and therefore by inference, we know more than we can possibly express in writing. Thus, unlike explicit knowledge, tacit knowledge is shared mainly through direct interaction between the knowledge sharers and knowledge seekers (Davenport & Prusak, 1998; 2004; Nonaka & Konno, 1998).

2.2 Definition of knowledge sharing

According to Boer, Van Baalen, & Kumar (2002a), what makes it difficult to study knowledge sharing as an empirical phenomenon is the problem of defining it. For example, while Hooff and Ridder (2004), defined knowledge sharing as the process in which individuals mutually share their tacit and explicit organizational knowledge, Awad and Ghaziri (2004, p.28) defined it as "a process of transferring human knowledge about a process or a procedure to others in the organization". In this paper knowledge sharing is defined as

individuals sharing organizationally relevant knowledge with others in the workplace (Bartol & Srivastava, 2002). The knowledge shared is both explicit and tacit.

2.3 Success of knowledge sharing initiatives

For KM programs to be successful employees must be willing to share their knowledge and expertise with one another in the workplace (Storey and Quintas, 2001), yet as Nonaka and Takeuchi (1995) asserted, organizations cannot *order* their employees to share their knowledge without the willingness of the individuals to take part. Davenport and Prusak (1998) warned organizations not to focus their KM effort solely on developing technologies to manage knowledge, but rather to focus on developing the *conditions* that enable knowledge sharing to take place, using technical tools where appropriate

2.4 Fostering knowledge sharing

Organizational conditions such as organizational commitment, rewards and incentives, and trust are likely to affect the intention of employees to share their knowledge with others in the workplace. Organizational commitment is the degree of one's attachment to, identification with and involvement within the organization (Mowday, Steers, & Porter, 1979). Both Hislop (2003), and Hooff and Ridder (2004) found a relationship between commitment to the organization and employees' intentions to share their knowledge. Similarly, Carter & Scarbrough (2001) and Bartol & Srivastava (2002) found expected rewards and incentives to play a role in organizational knowledge sharing behavior. Employees can be expected to be more willing to share knowledge if they trust that knowledge sharing will not bring them harm (Politis, 2003). Trust affects workplace attitudes toward knowledge sharing (Renzl, 2008) while lack of trust is a barrier to knowledge sharing (Rosen, Furst, & Blackburn, 2007).

Irrespective of organizational conditions, some employees may involve themselves in knowledge sharing activities because of their intrinsic drive for learning (Oliver & Kandadi, 2006). Matzler et al. (2008) found learning orientation (the degree to which individuals have a desire to learn) to be a strong predictor of knowledge sharing and proposed that this is because openness to learning is a reflection of a person's curiosity and originality, which in turn are predictors of seeking other people's knowledge and insights.

3. Theoretical perspective

Most research fails to consider that knowledge sharing is a fundamentally social process and rather than focusing on whether people *can* share knowledge, the emphasis should be on whether they *want* to share their knowledge (Boer, Van Baalen, & Kumar, 2002b). Thus, recognizing that knowledge sharing in an organization is a function of human agency and social interaction, any theory proposed for knowledge sharing must include some recognition that individual motivation and cognitions exist in a social context.

Our research uses the Theory of Planned Behavior (TPB) (I Ajzen, 1987, 1991) one of the most comprehensive recent theories of human attitudes and behavior. The TPB has been used extensively to predict and explain intention and behavior in a number of professional settings. Both Lin and Lee (2004) and Ryu et al. (2003) found the TPB appropriate to assess factors that influence knowledge sharing.

According to the TPB, behaviors (such as knowledge sharing) reflect intentions. Thus, explaining how people develop intentions to share knowledge will help explain why they do

or do not share their knowledge with others. Intentions are influenced by attitudes, subjective norms and perceived behavioral control each of which is discussed below in the context of knowledge sharing.

3.1 Attitude towards knowledge sharing

Attitude is an important factor, motivating people to engage in knowledge sharing activities. Bock and colleagues (2005) define attitudes toward knowledge sharing as the degree of one's positive feelings about sharing one's knowledge with others in the workplace. Thus, it can be argued that individuals who have positive attitudes toward knowledge sharing are more likely to intend to share their knowledge with others in an organization and subsequently to act on that intention.

3.2 Subjective norm (Perceived social influence)

Subjective norms refer to a person's beliefs that important others (other people who are important to them) want them to perform the behavior (I Ajzen, 1991, p. 188). Nonaka et al. (2000) argued that the promotion of social norms among employees is one of the most important conditions for knowledge sharing in organizations. They asserted that the culture (articulated in the form of social norms) of an organization has the potential to allow individuals to regulate their own behavior, including when to share and cooperate with others. Therefore, it can be argued that the strength of the employees' intention to share their knowledge is increased by the perceived strength of the social norms toward knowledge sharing. Subjective norms are referred to in this paper as perceived social influence.

3.3 Perceived behavioral control (Personal literacy)

Perceived behavioral control (PBC) refers to "the extent to which people believe that they are capable of, or have control over, performing a given behavior" (Fishbein & Ajzen, 2010, p. 155). PBC can be considered from two points of view: 1) controllability: how much control a person has over the behavior (e.g., does he or she have the resources and opportunities to successfully perform the behavior?); and 2) self-efficacy (Bandura, 1997): how confident a person feels about being able to perform or not perform the behavior (e.g., does he or she have the necessary skills and capabilities to perform the behavior?). Thus, employees who have the resources and opportunities and are confident in their ability to share their knowledge with others are more likely to form a strong intention to engage in knowledge sharing activities in the workplace.

3.4. Background factors and the TPB

Whilst the three immediate antecedents of intentions in the TPB model provide a general model of what might influence one's intention and behavior, there is the potential for a multitude of variables, referred to by Ajzen (2005) as background factors, to influence these antecedents in various ways and degrees. We propose that the organizational conditions identified in earlier research, and the individual's learning orientation, act as background factors, influence knowledge sharing by influencing the antecedents of intention to share knowledge. The sequence of proposed influences is shown in Figure 1 and expressed in the hypotheses that follow. In addition to the relationships shown here, the three immediate antecedents of intention (attitude, perceived social influence and personal control) were left free to correlate, but no hypotheses were tested, since the relationship between these variables is well established in the literature.

- H1: The more favorable are attitudes toward knowledge sharing, the greater will be intention to share knowledge.
- H2: The higher the perceived strength of social influence on knowledge sharing, the stronger will be intention to share knowledge.
- H3: The stronger is personal control for knowledge sharing, the stronger will be intention to share knowledge.
- H4: The greater is organizational commitment, the stronger will be the attitudes toward knowledge sharing.
- H5: The greater is organizational commitment, the stronger will be perceived social influence on knowledge sharing.
- H6: The greater is organizational commitment, the stronger will be personal control for knowledge sharing.
- H7: The more positive is the expectation of rewards and incentives, the stronger will be attitudes toward knowledge sharing.
- H8: The more positive is the expectation of rewards and incentives, the stronger will be perceived social influence on knowledge sharing.

- H9: The more positive is the expectation of rewards and incentives, the stronger will be personal control for knowledge sharing.
- H10: The greater is the level of trust in management and work colleagues, the stronger will be attitudes toward knowledge sharing.
- H11: The greater is the level of trust in management and work colleagues, the stronger will be perceived social influence on knowledge sharing.
- H12: The greater is the level of trust in management and work colleagues, the stronger will be personal control for knowledge sharing.
- H13: The stronger is learning orientation, the stronger will be attitudes toward knowledge sharing.
- H14: The stronger is learning orientation, the stronger will be perceived social influence on knowledge sharing.
- H15: The stronger is learning orientation, the stronger will be personal control for knowledge sharing.

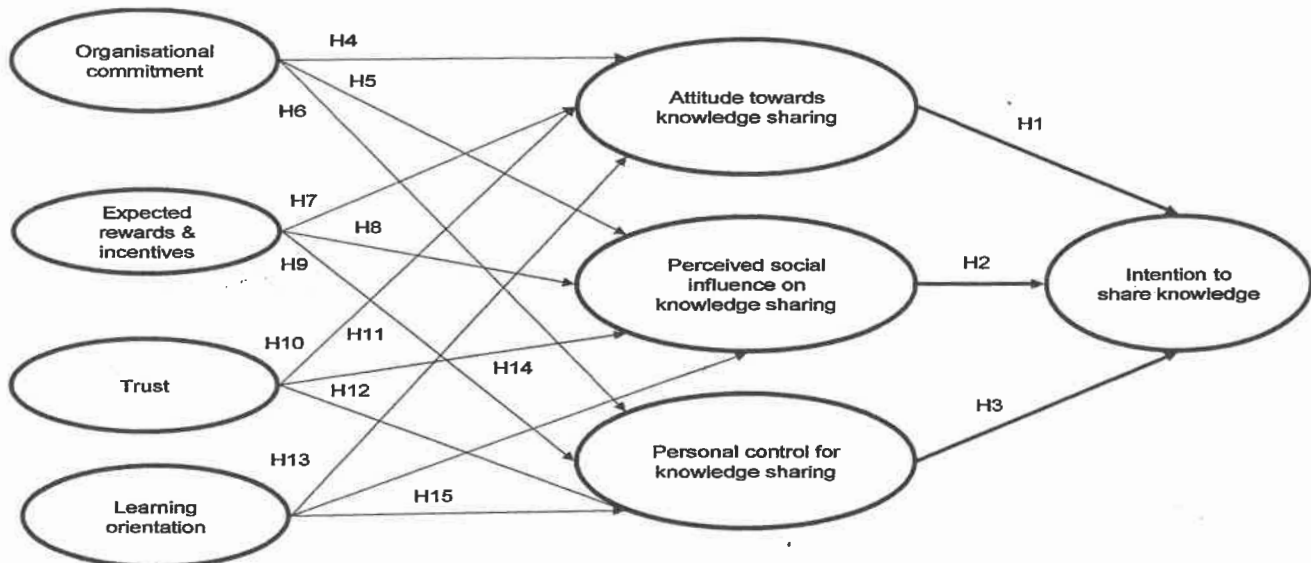


Figure 1: The research model with hypotheses to be tested

4. Method

A questionnaire survey was undertaken within a single organization. Questionnaires were distributed across the geographical locations and work groups of the organization, selected to maximize variation in work and knowledge sharing conditions. Structural equation modeling with AMOS was used to estimate the measurement models for each construct of interest and test the hypotheses.

4.1 Sample

Of the 500 questionnaires distributed, 287 (57%) were returned and 268 were useable. Of the 268 participants in the study, 67% were males and 33% female (188 males, 88 females). Eighty three percent (83%) were 20 to 50 years old with nearly 50% of participants aged between 36 and 50. Only 16% of respondents were aged over 50. The total years at the company ranged from less than 2 years to more than

16 years, with about two thirds (60%) of respondents having been less than 5 years with the company. A surprising 34% of respondents had been less than 2 years with the company. With respect to the education level of respondents, 83% held a bachelor's degree or higher.

4.2 Measurement

Where possible the items used in the survey came from previously validated instruments, minor changes in wording were necessary to make them relevant to this study. Bootstrapping was used to take account of non-normal data and measurement models were evaluated using standard criteria (Hair, Black, Babin, Anderson, & Tatham, 2006). Of the 53 survey items, 29 were retained. All remaining items loaded significantly on their constructs ($p \leq 0.01$) as shown in table 1.

Table 1: Summary of the model constructs

Model construct	Standardized weight*	factor
Organizational commitment: OC1 I feel deeply dedicated to [the organization]. OC3 I find that my values are very similar to those of [the organization]. OC4 I talk about [the organization] to my friends as a great organization to work in. OC5 [The organization] really inspires the best for my job performance.	0.72 0.64 0.82 0.80	
Expected rewards & incentives: ER1 I will be recognized for my action if I share my knowledge with other colleagues in [the organization]. ER2 I will be rewarded for my action if I share my knowledge with other colleagues in [the organization]. ER3 My career opportunities will improve if I share my knowledge with other colleagues in [the organization].	0.84 0.83 0.68	
Trust: TR2 I know my colleagues in [the organization] will acknowledge my contribution before taking credit for knowledge shared by me. TR3 I can ask for knowledge (advice or opinion) from other colleagues in [the organization] without any negative impact on me (e.g., being considered unknowledgeable). TR4 I consider [the organization] to be a supportive environment in which to ask for information. TR5 I consider [the organization] to be a supportive environment in which to share information.	0.56 0.65 0.87 0.77	
Learning orientation: LO1 Sharing my knowledge with other colleagues in [the organization] helps me to stay up to date with technological advances in my field. LO2 Sharing my knowledge with other colleagues in [the organization] helps me fill gaps in my own knowledge. LO3 Sharing my knowledge with other colleagues in [the organization] helps me to accomplish lifelong learning.	0.83 0.93 0.78	
Attitudes toward knowledge sharing: AT2 For me to share knowledge with other colleagues in [the organization] is: (fully anchored response scale ranging from 1 - extremely rewarding to 7 - extremely thankless). AT3 For me to share knowledge with other colleagues in [the organization] is: (fully anchored response scale ranging from 1 - extremely harmful to 7 - extremely beneficial). AT4 Sharing knowledge opens up my lines of communication with other colleagues in [the organization]: (ranging from 1 - strongly disagree to 7 - strongly agree). AT5 Sharing my knowledge with other colleagues in [the organization] helps improve the company business performance (ranging from 1 - strongly disagree to 7 - strongly agree).	0.66 0.65 0.73 0.58	
Perceived social influence on knowledge sharing: SI1 My immediate supervisor would be pleased if I share my knowledge on a regular basis with other colleagues in [the organization]. SI2 Members of my immediate work group would be pleased if I share my knowledge on a regular basis with other colleagues in [the organization]. SI4 Sharing my knowledge with other colleagues in [the organization] would please people in [the organization] who are important to me.	0.91 0.56 0.62	
Personal control for knowledge sharing: PC1 For me to share knowledge with other colleagues in [the organization] is easy. PC2 I have the resources I need to share my knowledge with other colleagues in [the organization]. PC5 I am confident that I could share my knowledge with other colleagues in [the organization] if I wanted to. PC7 In general, I know how to share my knowledge with other colleagues in [the organization].	0.83 0.86 0.77 0.73	

Intention to share knowledge:

IN1 I intend to share knowledge from work experience with other colleagues in [the organization] in the next 3-6 months.	0.88
IN2 I intend to share knowledge from education and training with other colleagues in [the organization] in the next 3-6 months.	0.68
IN3 I intend to share business knowledge obtained informally (such as news, stories and gossip) with other colleagues in [the organization] in the next 3-6 months.	0.56
IN5 Generally, I intend to share what I know with other colleagues in [the organization] in the next 3-6 months.	0.79

* = all items significant with $p \leq 0.001$

All constructs had satisfactory Cronbach alpha and construct reliability. All constructs met the guidelines for average variance extracted (AVE) greater than 0.50, with the exception of attitude (AVE=0.44). This value is considered acceptable for exploratory research (Hair et al. 2006) and the scale was therefore included in further testing. Details are shown in Table 2.

Table 2: Summary of scales including reliability for retained variables

Variables	Cronbach alpha	Construct reliability	Average variance extracted	Number of items retained	Number of items dropped
Attitudes toward knowledge sharing	0.76	0.83	0.44	4	1
Perceived social influence on knowledge sharing	0.77	0.75	0.56	3	1
Personal control for knowledge sharing	0.83	0.80	0.55	4	3
Intention to share knowledge	0.80	0.79	0.54	4	1
Organizational commitment	0.84	0.78	0.563	4	3
Expected rewards & incentives	0.82	0.75	0.62	3	3
Trust	0.79	0.80	0.60	4	1
Learning orientation	0.88	0.75	0.72	3	1
Total items:				29	14

Table 3 provides the final construct inter-correlations and the square root of AVE for each construct (in bold on the diagonal). In all cases the square root of AVE exceeds the corresponding construct inter-correlations, thereby demonstrating discriminant validity.

Table 3: Correlation matrix and discriminant validity

Variables	AVE	Correlations							
		IN	AT	SI	PC	TR	ER	OC	LO
Intention to share knowledge (IN)	0.54	0.73							
Attitude towards knowledge sharing (AT)	0.44	0.27	0.66						
Perceived social influence on knowledge sharing (SI)	0.56	0.36	0.35	0.75					
Personal control for knowledge sharing (PC)	0.55	0.29	0.39	0.21	0.74				
Trust (TR)	0.52	0.13	0.56	0.23	0.49	0.72			
Expected rewards & incentives (ER)	0.62	0.18	0.55	0.49	0.28	0.51	0.79		
Organizational commitment (OC)	0.56	0.29	0.49	0.34	0.25	0.47	0.56	0.79	
Learning orientation (LO)	0.72	0.15	0.45	0.22	0.31	0.25	0.30	0.25	0.85

Note: Diagonal is square root of AVE.

4.3 Hypothesis testing

Once the measurement models were satisfactory, the characteristics of the structural model were evaluated. The results are summarized in the next section

5. Results

Figure 1 shows the standardized estimated model coefficients along with the variance explained (R^2) in the

dependent variables for all statistically significant hypothesized paths while Table 4 shows the fit indices for this model. Although χ^2 were statistically significant, in large samples, a significant χ^2 might be found simply because of the sample size. All the other fit statistics indicate that the model is an acceptable reflection of the data.

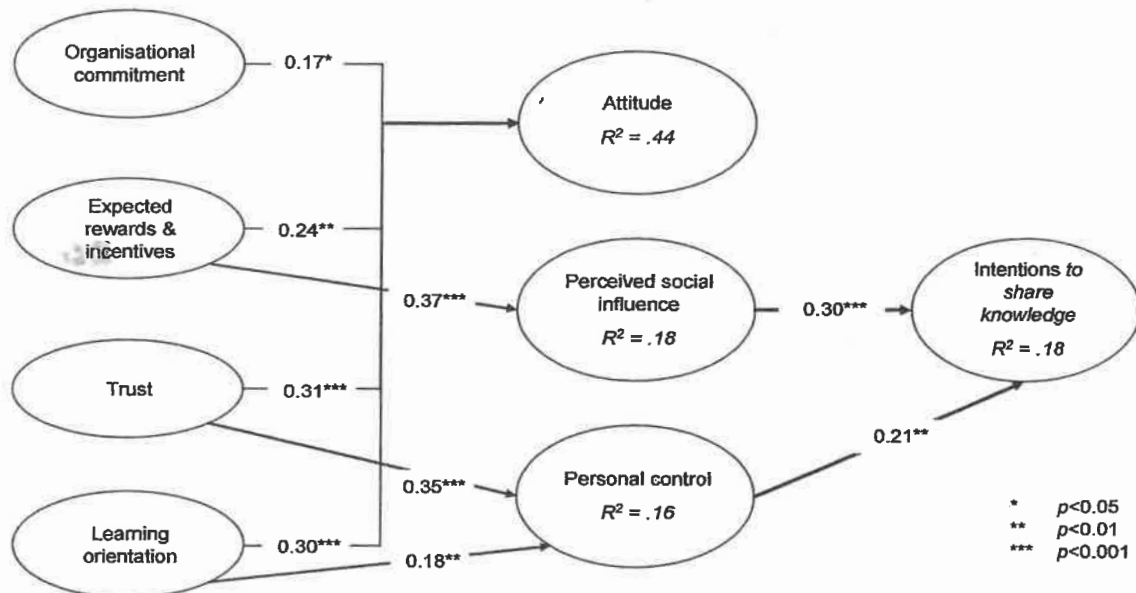


Figure 1: Structural coefficients

Table 4: Overall Model fit indices

Goodness of fit measures	Scores	Recommended cut-off value
Chi-square (χ^2)	657.13	
Degree of Freedom (df)	361	
Probability (p)	0.001	
χ^2/df	1.82**	$\leq 2^{**}; \leq 5^*$
Goodness-of-fit index (GFI)	0.86*	$\geq 0.90^{**}; \geq 0.80^*$
Root mean square error of approximation (RMSEA)	0.05**	$\leq 0.08^{**}; \leq 0.10^*$
Tucker-Lewis index (TLI)	0.90**	$\geq 0.90^{**};$
Adjusted goodness of fit index (AGFI)	0.83*	$\geq 0.90^{**}; \geq 0.80^*$
Acceptability:	** acceptable	* marginal

5.1 Results of hypothesis tests

Table 5 summarizes the results of hypothesis testing of the structural relationships among the variables presented in Figure 1.

Table 5: Summary of hypothesis test results

Description	Hypothesis	Standardized path coefficient	Results
Attitude → Intention to share knowledge	H1	0.10 ^{NS}	Not supported
Perceived social influence → Intention to share knowledge	H2	0.30***	Supported
Personal control → Intention to share knowledge	H3	0.21**	Supported
Organizational commitment → Attitude	H4	0.17*	Supported
Organizational commitment → Perceived social influence	H5	0.12 ^{NS}	Not supported
Organizational commitment → Personal control	H6	0.007 ^{NS}	Not supported
Expected rewards & incentives → Attitude	H7	0.24**	Supported
Expected rewards & incentives → Perceived social influence	H8	0.37***	Supported
Expected rewards & incentives → Personal control	H9	0.006 ^{NS}	Not supported
Trust → Attitude	H10	0.31***	Supported
Trust → Perceived social influence	H11	-0.06 ^{NS}	Not supported
Trust → Personal control	H12	0.35***	Supported
Learning orientation → Attitude	H13	0.30***	Supported
Learning orientation → Perceived social influence	H14	0.06 ^{NS}	Not supported
Learning orientation → Personal control	H15	0.18**	Supported
* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$ NS = Not Significant			

5.2 Direct, indirect and total effects on knowledge sharing

The direct, indirect effects and total effects of the independent variables on intention to share knowledge are shown in table 6. Of the external variables, expected rewards and incentives had the strongest effect on intention, followed by trust and learning orientation.

Table 6: Direct, indirect and total effects of standardized significant model constructs

Construct	Perceived social influence		Personal control		Intention		
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Total
Attitudes	-	-	-	-	0.10 ^{NS}	-	-

Perceived social influence	-	-	-	-	0.30***	0.30***
Personal control	-	-	-	-	0.21**	0.21**
Organizational commitment	-	-	-	-	-	0.05 ^{NS}
Expected rewards & incentives	0.37***	-	-	-	-	0.13*
Trust	-	-	0.35***	-	-	0.09*
Learning orientation	-	-	0.18*	-	-	0.08*
* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$ NS = Not significant						

5.3 Direct influences on knowledge sharing

Perceived social influence had the strongest direct influence on knowledge sharing in this study, followed by personal control for knowledge sharing. Organization members who feel some social pressure to share and who find it easy to share, have the resources they need to share and feel confident about their ability to share are more motivated to engage in knowledge sharing activities. Contrary to common belief, attitudes toward knowledge sharing had no significant effect on intention to share knowledge. Even if a great majority of employees hold positive attitudes toward knowledge sharing, there is no guarantee that they will actually share their knowledge with others.

5.4 The effect of organizational enabling conditions and learning orientation

Whilst organizational commitment positively influenced attitudes toward knowledge sharing, it had no significant effect on perceived social influence or personal control and thus had no influence on intention to share knowledge. On the other hand, expected rewards and incentives both affected knowledge sharing intentions indirectly through perceived social influence and trust indirectly affected intentions through personal control. Learning orientation also operated indirectly through personal control.

These findings suggest that those who feel the organization continues to reward them for knowledge sharing also feel there is a strong social incentive to share their knowledge with others in the workplace. In addition, trust (in colleagues and in the work environment) influences knowledge sharing intentions through personal control. Similarly, the stronger a person's learning orientation, the stronger their personal control for organizational knowledge sharing – but individual learning orientation is not the only reason an employee might share knowledge. Creating the conditions where people feel acknowledged by the organization and their colleagues for their knowledge sharing contribution, together with a supportive environment to seek and share knowledge, further enhances the perception people have of their ability and also the confidence to share their knowledge.

6. Discussion

A key insight gained from this research is that positive attitudes toward knowledge sharing do not necessarily mean

that an organization member will voluntarily engage in knowledge sharing activities. Sharing knowledge is not just a matter of having a positive or negative attitude, but rather governed by the strength of perceived social influence and supported by personal control in the form of adequate skills and capability.

The research described in this paper represents significant progress towards understanding some of the enabling factors necessary to enhance knowledge sharing intentions and behaviors in the workplace. The importance to employees of expected rewards and incentives and the level of trust, in addition to employees' own learning orientation, have been found to affect perceived social influence and personal control and in turn affect knowledge sharing intentions in a positive way. Nonetheless, the study was conducted within a single organization, so caution should be taken in generalizing to other organizations without further research. It would also be useful for future research to incorporate factors such as leadership, communication climate, group identity, time constraints and others frequently discussed in the knowledge management literature, which may contribute to explaining more variance in knowledge sharing intentions.

On the question of what makes people share their knowledge and what is special about those who do, the results of this study suggest that there are at least three possible explanations. First, employees who feel the organization continues to reward them also feel there is a strong social incentive (social influence) to share their knowledge with others in the workplace. Second, employees who know how to share their knowledge with others (personal control) also feel they can trust their work colleagues with that shared knowledge. Third, employees who know how to share their knowledge with others (personal control) also have high aspirations for acquiring and developing new skills.

These results have several implications for knowledge managers who, as Von Krogh, Ichijo, & Nonaka (2000, p. 44) argue, need "guidelines [that] help maintain a productive equilibrium between chaos and order". Knowing that (important) others have a significant influence on employees' intentions to engage in knowledge sharing activities, knowledge managers can encourage influential members of the organization to play their role in promoting and supporting knowledge sharing activities and to model

the behavior that supports knowledge sharing intentions. 'Walking the talk', through visible involvement of important others in knowledge sharing activities sends a strong message that knowledge sharing is standard organizational practice. Similarly, by knowing that rewards and incentives and the level of trust among people in an organization indirectly affect knowledge sharing intentions, knowledge managers can promote knowledge sharing by making certain enhancements in performance appraisals, incentive strategies and other practices for long term career progression or advancement within the organization. Those who actively share their knowledge should be acknowledged.

References

- Ajzen, I. (1987). Attitudes, traits, and actions: Dispositional prediction of behavior in personality and social psychology. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 20, pp. 1-63). San Diego: Academic Press, Inc.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ajzen, I. (2005). *Attitudes, personality and behavior*. 2nd ed, Maidenhead: Open University Press.
- Awad, E. M., & Ghaziri, H. M. (2004). *Knowledge management*. New Jersey: Pearson Education Inc.
- Bandura, A. (1997). *Self-efficacy. The exercise of control*. New York: W.H. Freeman and Company.
- Bartol, K. M., & Srivastava, A. (2002). Encouraging knowledge sharing: The role of organizational reward systems. *Journal of leadership & organizational studies*, 9(1), 64-76.
- Bixler, C. H. (2005). Developing a foundation for a successful knowledge management system. In M. Stankosky (Ed.), *Creating the discipline of knowledge management: The latest in university research* (pp. 51-65). Oxford: Elsevier Butterworth-Heinemann.
- Bock, G.-W., Zmud, R. W., Kim, Y.-G., & Lee, J.-N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate. *MIS quarterly*, 29(1), 87-111.
- Boer, N.-I., Van Baalen, P. J., & Kumar, K. (2002a). *An activity theory approach for studying the situatedness of knowledge sharing*. Paper presented at the 35th Hawaii International Conference on System Sciences, Hawaii.
- Boer, N.-I., Van Baalen, P. J., & Kumar, K. (2002b). Relational dimension of knowledge sharing. In J. H. E. Andriessen, M. Soekijad & H. J. Keasberry (Eds.), *Support for knowledge sharing in communities* (pp. 11-34). Netherland: Delft University Press.
- Carter, C., & Scarbrough, H. (2001). Towards a second generation of KM? The people management challenge. *Education & Training*, 43(4), 215-224.
- Davenport, T., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston: Harvard Business School Press.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior*. New York: Psychology Press.
- Gupta, J. N. D., Sharma, S. K., & Hsu, J. (2004). An overview of knowledge management. In J. N. D. Gupta & S. K. Sharma (Eds.), *Creating knowledge based organizations* (pp. 1-28). Hershey PA: Idea Group Publishing.
- Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). New Jersey: Pearson Prentice Hall.
- Hislop, D. (2003). Linking human resource management and knowledge management via commitment. *Employee Relations*, 25(2), 182-202.
- Hooff, B. v. d., & Ridder, J. A. d. (2004). Knowledge sharing in context: The influence of organizational commitment, communication climate and CMC use on knowledge sharing. *Journal of Knowledge Management*, 8(6), 117-130.
- Lehaney, B., Clarke, S., Coakes, E., & Jack, G. (2004). *Beyond knowledge management*. Pennsylvania: Idea Group Publishing.
- Lin, H.-F., & Lee, G.-G. (2004). Perceptions of senior managers toward knowledge-sharing behaviour. *Management Decision*, 42(1/2), 108-125.
- Matzler, K., Renzl, B., Muller, J., Herting, S., & Mooradian, T. A. (2008). Personality traits and knowledge sharing. *Journal of Economic Psychology*, 29(3), 301-313.
- Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The measurement of organizational commitment. *Journal of Vocational Behavior*, 14(1), 224-247.
- Nonaka, I., & Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. *California Management Review*, 40(3), 40-54.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.
- Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, ba and leadership: A unified model of dynamic knowledge creation. *Long Range Planning*, 33(1), 5-34.
- Oliver, S., & Kandadi, K. R. (2006). How to develop knowledge culture in organizations? A multiple case study of large distributed organizations. *Journal of Knowledge Management*, 10(4), 6-24.
- Polanyi, M. (1967). *The tacit dimension*. New York: Doubleday.
- Politis, J. D. (2003). The connection between trust and knowledge management: What are its implications for team performance. *Journal of Knowledge Management*, 7(5), 55-66.

- Renzl, B. (2008). Trust in management and knowledge sharing: The mediating effects of fear and knowledge documentation. *Omega*, 36(2), 206-220.
- Rosen, B., Furst, S., & Blackburn, R. (2007). Overcoming barriers to knowledge sharing in virtual teams. *Organizational Dynamics*, 36(3), 259-273.
- Ryu, S., Ho, S. H., & Han, I. (2003). Knowledge sharing behavior of physicians in hospitals. *Expert Systems with Applications*, 25(1), 113-122.

Von Krogh, G., Ichijo, K., & Nonaka, I. (2000). *Enabling knowledge creation: How to unlock the mystery of tacit knowledge and release the power of innovation*. Oxford: Oxford University Press.

Yang, J. T. (2008). Individual attitudes and organisational knowledge sharing. *Tourism Management*, 29(1), 345-353.

Best Practice for Health & Safety Management

By: Simon Hill Curtin University BSc (Health & Safety) student
Email: simon.hill@student.curtin.edu.au

Abstract

Managing Safety is more than just zero accidents; it is also looking after the health and well-being of the employees within the workplace. This includes job satisfaction through the company of fellow peers, obtaining respect, open communication and challenging objectives. To be successful in managing health and safety an organization must develop a proactive rather than reactive attitude. The most effective way to develop this attitude is to manage health and safety with the best possible methods. This means not just reaching set standards but going beyond them. Not just prevention but also promotion. This literature review aims to summaries how an organization's management system ought to be designed to demonstrate best practices in order to achieve the optimum outcome through effective health and safety management.

Keywords: Occupational, Health, Safety, Management, System, Best Practice, Policy, Plan.

Introduction

Over the years companies and entire industries have had, and still do have, a view point of occupational health and safety being defined as "activities preventing injuries or illness, or reducing injuries and illness within the workplace" (Archer 2009, 5). While from a certain point of view this is indeed true, this defines only a portion of the science that is health and safety. For example, a company may exist that goes by this definition and it may have the lowest incidence rates for accidents and illnesses within the industry in which it works. It may even have set the record for the greatest number of man-hours achieved without an incident. However, having these ticks to the Company's name does not mean it is a good company to work for. Incidents may not occur because the company is so regulated you wouldn't be able to sneeze without attracting disciplinary action. The workers may follow safety procedures to the letter, not out of knowledge but out of fear. These workers may be safe but they are not healthy.

It can be said that a company such as this has a negative view towards health. While it can be argued that it is still better than having no view of health and safety, it is by no way ideal. As the study of Health and Safety has evolved it has branched out into a much larger perspective to incorporate not just the protection of workers but the fulfillment of their needs. Needs such as enjoying the company of fellow peers, obtaining respect, open communication and challenging objectives to achieve all contribute to improving mental health and job satisfaction.

A collaborative effort by the International Labour Organization (ILO) and the World Health Organization (WHO) has developed the following definition:

"Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations; the prevention amongst workers of departures from health

caused by their working conditions; the protection of workers in the employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation to man and of each man to his job." (Archer 2009, 4)

This definition suggests that the centre of attention should no longer be simply preventing accidents and diseases within the workplace but to have a more positive outlook and focus on *"the promotion, and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations"* and the author believes it is this shift in direction that defines the difference between good practices and best practices when managing occupational safety and health.

In the author's opinion, the difference between good practices and best practices is that "good practices" is meeting the required standards that have been set by the relevant governing bodies. In this case the standards are the aggregate of the National Employment Standards (NES) set by Fair Work Australia (FWA 2009, 96-97); those laid out in the Occupational Safety and Health Act 1984 (WA OSH Act) (Occupational Safety and Health Act 1984, Sect 19) and Occupational Safety and Health Regulations 1995 (WA OSH Reg) (Occupational Safety and Health Regulations 1995, Reg 3.1); and those set within the Mines Safety and Inspection Act 1994 (WA Mines Act) (Mines Safety and Inspection Act 1994, Sect 87) and Mines Safety and Inspection Regulations 1996 (WA Mines Reg) (Mines Safety and Inspection Regulations 1996, Sub Div D). "Best Practices," in my opinion, is not only achieving those standards but going beyond them and strive to continuously adapt and improve.

The best practice for managing health and safety is to be proactive rather than reactive, to design and implement an effective management system that ensures the correct safe

methods are applied from the start rather than correcting the mistakes as they arise.

This article covers the structure for successful health and safety management and what it is that needs to be done to ensure that when forming a management plan for health and safety within the workplace, four key points are ticked off as an indication that best practices are being followed, not just by management, but by all.

Research Methodology

A review of literature relating to Best Practices for occupational safety and health was conducted using a combination of books and peer reviewed information published on both web pages and in journal databases. Searches including the key words "Health, Safety, Management, Best Practice" were performed on five different databases. These were:

1. Health and Safety Science Abstracts;
2. Health and Society;
3. OCCUP-HEALTHandSAFETYnetBASE;
4. OSH Update; and
5. Safety Science and Risk Abstracts

Key Websites included Health and Safety Executive (www.hse.co.uk), Safe Work Australia (www.safeworkaustralia.gov.au), Standards Australia (www.standards.org.au) and the Australasian Legal Information Institute (www.austlii.edu.au). A total of 19 documents were identified and deemed relevant to be reviewed, including journal articles and legislation. Of those nineteen documents, 10 were cited within this literature review. There were 2 books referred to within this literature review:

1. *Successful Health and Safety Management* by Health and Safety Executive (2008); and
2. *OH&S: A Management Guide* by Archer et al (2009).

Both of these two textbooks have a comprehensive portrayal of how a management system should be designed in order to be most successful at demonstrating best practices.

Designing a System that Demonstrates Best Practice

The key elements to an effective safety management system are as follows:

1. Developing Policy.
2. Organizing a management structure for policy to be delivered.
3. The management structure must then plan an approach in which to implement the health and safety policy.
4. Measuring Performance.
5. Undergo independent auditing and a systematic review process, apply lessons learned and strive for continuous improvement. (HSE 2008, 2-4)

To determine best practice, the constructed health and safety management system must be defined as the following:

"A program, process, strategy or activity that:

1. Has been shown effective in the prevention of workplace illness or injury;
2. Has been implemented, maintained and evaluated;
3. Is based on current information; and
4. Is transferrable and of value to other organizations." (Canadian Centre for Occupational Health & Safety 2005, 2)

Each of the five key elements in an effective mentioned above is explained in further detail below:

Developing Policy

The first step in designing an effective management system is to develop effective health and safety policy. Policy initiates the direction the organization intends to travel. This is done by identifying objectives and defining what needs to be done to achieve these objectives. Therefore it is absolutely crucial that the policy is based on current and relevant information. Such information includes following the correct standards. Different standards must be adhered to in different countries and furthermore, such as in Australia, in different States and Territories. What's more, standards are amended over time thus policies must be adjusted also to keep up to date.

Effective health and safety policies are not only current but contain the following key messages:

1. They recognize the importance of people to an organization by supporting human resource development;
2. They minimize the financial losses which arise from avoidable unplanned events by implementing the total loss approach;
3. They recognize that the prime responsibilities for preventing accidents, incidents and disease within the workplace are with management and are not necessarily the fault of individual employees;
4. They recognize that developing a culture of supportive health and safety is essential to achieve an adequate control over the risks;
5. They ensure the approach to identifying risks and allocating the resources to control them is systematic; and
6. They support quality initiatives aimed at continuous improvement. (HSE 2008, 6-9)

Organizing a Management Structure for Policy to be delivered

A policy defines what to do and provides direction but the management structure is the engine which initiates the momentum to move in that direction and that engine needs to be built. This will require the creation of a safety management plan that involves identifying and delegating a large number of roles and responsibilities such as:

1. Designing safe working procedures e.g. a Permit to Work system;
2. Establishing appropriate training and competency programs;
3. Electing safety representatives from within the workers;
4. Forming safety committees with members from both the working group and management;
5. Developing a safety culture. (Archer 2009, 71-76)

All employees working within the Organization must be competent and clearly understand their roles and responsibilities within the Safety Management Plan. Just like all management plans, the roles, responsibilities and delegations should be outlined clearly in the duty statements and accountability must be reflected within performance appraisals. The structural framework that the Safety Management Plan will weave should be able to capitalize on the contribution of all individuals and team members as this will maximize effectiveness of the plan as a whole (first

bullet point in defining whether a system is demonstrating best practice).

Planning an Approach and Implementing the Health and Safety Policy

There are a number of key tasks that must be carried out when making a planned approach to implementing the organization's health and safety policy. They are:

1. Producing detailed plans to achieve the corporate health and safety objectives that are laid out by policy;
2. Establishing management arrangements such as regular safety meetings and formalities for when an incident occurs;
3. Establishing risk control measures such as hazard identification workshops (HAZIDS) and Hazard and Effects (H&E) Registers which records all identified hazards, their threats, foreseen consequences, controls and risk ratings both before controls are implemented (inherent risk) and after the controls have been implemented and are working effectively (residual risk);
4. Establishing workplace precautions such as setting up zoning where safety precautions like hearing or eye protection must be administered associated with performance standards such as having to complete a Job Hazard Analysis (JHS) before commencing work;
5. Seeking professional advice from health and safety specialists, safety engineers, architects and doctors to ensure implementation will achieve maximum effectiveness.
6. Encouraging and ensuring the participation and involvement of all employees and their representatives not because they have to but because they want to (Organizational safety culture).
7. Keeping up to date with changes in health and safety legislation, standards and best practices as well as modernizing methods to incorporate new and improved safety technologies. (HSE 2001, 11-12)

Similar to Policies, there are legal standards that must be complied with when developing a safety management plan. For example in Australia's Oil and Gas industry, a safety management plan must be developed in the form of what is known as a Safety Case (Safety Case Assessment Standards, 1-5). This complies with a number of standards including Australian Standards 4801:2001 and 4804:2001 (Powell 2009, 1-3). Having a Safety Case is enforced by the Regulator as a legal requirement because it has been shown to be effective in preventing accidents and illness by identifying the risks of any known hazards causing harm, documenting risk control measures and the safety managements system used by the company with the risk control measures. This Safety Case must be approved by the Regulator before the company can operate in the Australian oil and gas industry. A Safety Case creates risk awareness and risk control which satisfies two of the elements mentioned earlier that define best practices.

There are three key elements that initiate an effective planning process. They are:

1. Accurate information about the current situation.

2. Suitable benchmarks against which to make comparisons.
3. Competent people to carry out the analysis and make judgments (HSE 2008, 39).

It is essential the planning process maintains a systematic approach for the plan to be most effective and there are three crucial questions that need to be answered:

1. Where are we now?
2. Where do we want to be?
3. How do we get there? (HSE 2008, 39)

These 3 questions must be answered at all levels of the organization from the top level of directors with their long term business aims through to the working floor with their day-to-day tasks. Once the organization has its three elements and it has answered the three crucial questions in its systematic process, the final result will be a safety management plan designed to maintain and improve itself that can be implemented.

For effective implementation, the system must be supported with a reliable two-way stream of communications that can freely move upwards, downwards and outwards through the various levels of the organization. Information must be able to be made readily available to allow constant adaptation and allow all legal requirements to be met. Adequate resources as well as training and development will need to be provided to satisfy whatever demands the policies commands in order to reach objectives and performance criteria (Powell 2009).

Measuring Performance

Effective performance is self - monitored and measured to standards such as AS/NZS 4801:2001 to identify weaknesses and reveal where improvements are needed. While achieving these standards is all that is required, best practices, simply by the term itself, would suggest going beyond those standards to the level where no further improvements can be made at that particular point in time. After all, it cannot be the best practice if it can be done better.

In terms of what to look for when measuring performance the following questions should be sought:

- Where are we now relative to our overall health and safety aims and objectives?
- Where are we now in controlling hazards and risks?
- How do we compare with others?
- Why are we where we are?
- Are we getting better or worse over time?
- Is our management of health and safety effective (doing the right things)?
- Is our management of health and safety reliable (doing things right consistently)?
- Is our management of health and safety proportionate to our hazards and risks?
- Is our management of health and safety efficient?
- Is an effective health and safety management system in place across all parts of the organization (deployment)?
- Is our culture supportive of health and safety, particularly in the face of competing demands? (HSE 2001, 8)

HSE (2008) suggests using these questions as a guide will increase the overall effectiveness of the measuring

performance system. This in turn increases the effectiveness of the safety Management Plan as a whole and in turn corresponds to the first key point in defining whether a SMP demonstrates best practice.

Undergo independent auditing and a systematic review process, apply lessons learned and strive for continuous improvement

From time to time, the entire management system should be audited to ensure that it is effectively audited and maintained. The benefit to this is it brings in an external resource of expertise and an added viewpoint of someone from the outside looking in. This enables weak spots to be identified that only those that specialize in Health and Safety Management Systems would detect and otherwise would go unforeseen by the self monitoring systems. Auditing keeps the Management system disciplined, halts any deterioration and keeps it current by highlighting any elements of the system that may have become obsolete due to change. Periodic auditing is essential for any health and safety management system, especially if it aims to be efficient at evolving and continuously improving. However auditing is not a substitute for measuring performance on an internal level. An effective safety management system is required to manage health and safety on a daily basis and this cannot be achieved by a periodic audit only.

Auditing aims to establish the following:

- Appropriate management systems are in place;
- Adequate risk control systems exist, are implemented and consistent with the hazard profile of the organization;
- Appropriate workplace precautions are in place. (HSE 2008, 39)

Essentially the external audit is needed to get the confirmation the organization needs to say that they are indeed demonstrating best practice and if not, recommendations will be suggested to point the organization in the right direction.

Reviewing performance allows all matters within the health and safety management system that need attention to be communicated and initiates the call for corrective action in response. To put it simply, performance reviews are the moments where all levels of management get together and say: "Based on the results from performance monitoring and audits, here are all the issues of concern and suggested recommendations. It needs to be considered what to correct, how to correct it and when it needs to be corrected."

Such matters can be discovered on any level of the organization and can include:

- Remedies to improve sub standard performances identified by the self monitoring systems;
- Recommendations set by the audit results;
- Site Managers and/or Supervisors may initiate the process to control failures in workplace precautions which may have been observed during the course of routine activities;
- Assessing plans at an individual, departmental, site, group or organizational level.

Conclusion

In summary, to demonstrate best practice, a Safety Management Plan must hold up to the following definition:

"A program, process, strategy or activity that:

1. Has been shown effective in the prevention of workplace illness or injury;
2. Has been implemented, maintained and evaluated;
3. Is based on current information; and
4. Is transferrable and of value to other organizations." (Canadian Centre for Occupational Health & Safety 2005, 2)

Throughout this article each key element of an effective safety management system has been explained as to what is needed to be performed in order to hold up to this definition.

- Developing policy must be based upon current information and satisfy required national and/or international standards in order to be effective in preventing injury or illness;
- When organizing a management structure for policy to be delivered, roles, responsibilities and accountability must be outlined clearly and all personnel must be deemed competent in accordance with standards. This maximizes the effectiveness of the Safety Management System and adds consistency which credits it as transferrable and of value to other organizations.
- Likewise with planning and implementing, certain formats apply i.e. Safety Case which included risk identification and risk control.
- Performance monitoring is crucial to keeping the system effective and it demonstrates that the plan has been implemented, maintained and evaluated.
- Finally, periodic audits and performance reviews are evidence that the organization strives for continuous performance. The best practice organization will maintain the entire system by keeping it current with relevant updates and amendments as well as introduce an added point of view for evaluation.

Each key component satisfies a part of the given definition of best practice thus as a whole all parts of the definition are accounted for. By ensuring the key elements of the Safety Management System are taken seriously and worked on thoroughly, it can be just about guaranteed that the Organization is adopting best practices for dealing with Health and Safety.

References

- Archer, R., K. Bothwick, and S. Tepe. 2009. *OH&S: A Management Guide*. South Melbourne, Victoria: Cengage Learning Australia.
- Canadian Centre for Occupational Health and Safety. 2005. *Workplace Health and Safety Best Practices Inventory*. 2. http://employment.alberta.ca/documents/WH/WH_S-PUB_bp-inventory.pdf (accessed September 3, 2010).
- Health and Safety Executive (HSE). 2001. *A Guide to Measuring Health and Safety Performance*. 2001. <http://www.hse.gov.uk/opsunit/perfmeas.pdf> (accessed September 3, 2010).
- Health & Safety Executive (HSE). 2008. *Successful Health and Safety Management*. London, UK: HSE Books.
- Powell, R. 2009. *Setting up OSH systems in your workplace*. WorkSafe. www.commerce.wa.gov.au/WorkSafe/PDF/Forums

Safety Management Success: Directives of Management

By: Michelle Hyland BSc (Health and Safety) Student, Curtin University of Technology, Western Australia Email: michelle.hyland@student.curtin.edu.au

Abstract

This article focuses on management, a primary stakeholder in establishing and maintaining a successful safety management system in the workplace. It describes managements' roles in a successful safety management system that includes commitment to health and safety, establishing and supporting health and safety committees and representatives, integrating safety management into the management system, employing competent health and safety advisers, being open to new ideas and welcoming participation from employees in health and safety matters.

Key words

Safety management. Occupational safety. Success factors. Management.

Introduction

Bhopal, Flixborough, and Piper Alpha; three of a number of industrial disasters identified as lacking an acceptable safety management system [SMS], have served as the impetus globally for organizations to improve safety management in all workplaces (Hudson 2000; Vinodkumar and Bhasi 2010). The push towards improvement of systematic safety management around the world has seen regulations and standards developed in various countries. For example, health, safety and environment internal control was made compulsory for Sweden and Norway in 1991 and 1992 respectively. AS/NZS 4804:2001 *Occupational health and safety management systems – general guidelines on principles, systems and supporting techniques* was released originally in 1997 for implementation in Australia and New Zealand, and is paired with AS/NZS 4801:2001 *Occupational health and safety management systems – specification*. Tools such as WorkSafe WA's 'The WorkSafe Plan' and 'The First Step', and Victoria's 'SafetyMap' are some of the state government initiatives developed in Australia to assist in implementing SMSs (Bluff 2000; Toohey, Borthwick & Archer 2005).

Under the umbrella of total organizational management is the tier 'safety management' encompassing implementation and assigned responsibilities which are included in the SMS.

Safety management is therefore much more important than a collection of written policies and procedures (Mearns, Whitaker & Flin 2003; Vinodkumar & Bhasi 2010). Dolan and Pollock (2003) made note of the current implementation problems of safety management despite the developments over the years and expertise in health and safety [H&S] programs.

What is the answer? One solution may be "that all of the safety programs in the world won't work unless those responsible for a particular task or risk control procedure do what they are supposed to do" (Dolan & Pollock 2003, p99).

What are they supposed to do? This paper aims to provide clarity on the roles of management, a primary stakeholder, so as to create and maintain a successful SMS in the workplace.

Superior safety management will reduce and manage hazard risks to workers in order to provide for quality production and service that is safely achieved (*Code of practice: Occupational safety and health in the Western Australian*

public sector, 2007). However, the impact of SMSs goes beyond maintaining a safe working environment. The advantages of good SMSs include enhancing communication, work practices, training, competencies and staff morale, whilst decreasing the number of accidents and injuries, staff turnover and workers' compensation premiums. In addition to that, a good SMS ensures compliance with the law provides more competitive tendering and creates a reputable profile (Curran & Mahon 2000). So it's easy to see why research continues to show where companies are more safety-conscious, they are also more cost-effective (Hudson 2000).

Definitions of the key concepts

Safety is defined as "a state in which the risk of harm (to persons) or damage is limited to an acceptable level" (AS/NZS 4801:2001, p5). Management is the act, art or practice of using manpower to accomplish a task. It includes organizing, handling, supervising and coordinating. A system is an orderly arrangement of elements into a whole according to some rational principle (Fitzhenry & Whiteside Limited 1989). The product, 'safety management system', used interchangeably with 'occupational health and safety management system' [OHSMS] has been defined by various sources.

AS/NZS 4801:2001 (p 4) defines *Occupational Health and Safety Management System* as "that part of the overall management system which includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the OHS policy, and so managing the risks associated with the business of the organization."

Toohey, Borthwick and Archer (2005, p 59) states "an OHSMS is a system of linked management activities designed to continuously improve OHS and comply with the law." Vinodkumar and Bhasi (2010, p 2083) explain "safety management systems are mechanisms that are integrated in the organization and designed to control the hazards that can affect workers' health and safety."

The Commission for Occupational Safety and Health (2007, p 11) define an occupational safety and health [OSH] management system as "a documented and verifiable set of plans, actions and procedures that can assist both employees to clearly identify their OSH responsibilities and manage them in an organized manner."

It is important to also define success for the purposes of this article, as success in the context of safety can be somewhat unclear as the measures of success are not as definitive as crossing a line, or as tangible as building a house. Safety

success is commonly measured as a reduction in the number of accidents and injuries, however therein lies the problem of determining whether there is an actual success. Accident and injury data ordinarily fluctuate due to all sorts of reasons; therefore a causative link cannot be made. At most there is a correlation. This article will not endeavor to illuminate auditing processes for determining whether or not a safety management system is in fact 'successful'. Rather, it will highlight what research has identified as roles of internal stakeholders that have shown results which can be described as creating 'a successful safety management system' (Mathis 2008).

Research methodology

A literature review of journal articles, standards, conference papers and books related to successful safety management systems and the roles of management was conducted during August 2010. Journal articles were sourced using two search engines Proquest and Science Direct through the Curtin University Library database. To enable related articles to be sourced, the search terms used included "safety management system", "success", "role" and "health and safety adviser". The search parameters selected were of scholarly, peer-reviewed journal articles, published after the 1st January 1999 for a window of about 10 years, to gain recent, quality articles. In total, approximately 1000 articles were found when using different combinations of the search terms, of which approximately 50 were reviewed for relevant content, and 6 were referenced. Australian standards (AS/NZS 4804:2001 and AS/NZS 4801:2001) were sourced in SAI Global, also through the Curtin University Library database. The *Occupational Safety and Health Act 1984 (WA)* was sourced using Austlii. Papers presented at the First National Conference on Occupational Health and Safety Management Systems, held in New South Wales, were reviewed for this paper. There were 20 presentations in total, 5 had relevant information for this paper and were referenced. Five books were also used to provide referenced materials. These were sourced from the Curtin University Library and WorkSafe Western Australia Library.

Management roles in Safety Management Systems

A successful SMS relies on the contributions from several groups. This includes government, management, occupational safety and health representatives and committees, and employees. This article focuses on management and touches on H&S advisers who typically operate at companies within the management level. Management administers the company's overall planning, execution and operation, and are motivated to, among other things, reach organizational goals, maximize revenue and meet legislative compliance (Toohey, Borthwick & Archer, 2005). It is therefore important to integrate H&S into strategic planning to ensure H&S is given a strong focus, that adequate H&S logistical and human resources are accommodated for and prioritization of safety issues is undertaken (CCH Australia Limited 2004). The ultimate responsibility, authority and accountability in H&S matters lie with management, even though the authority may be delegated down the line (Taylor, Easter & Hegney 2003). For a successful SMS, management must fulfill various roles, starting with leading by example and with a positive attitude. Acting in the mannerism and via the practices prescribed in the company's H&S values, objectives and policies builds and sustains the credibility of management

and the management system. It motivates employees to apply the H&S practices, rather than becoming skeptical of the system and the intent behind it. Management needs to be committed to H&S, give it a high priority and the highest standard across the board of all employees. This can be communicated verbally or written in policies, and achieved through implementing those policies into strategic planning and reviews, as well as participating in H&S initiatives such as inspections, meetings and drills. Activities undertaken should be reported on and disclosed to employees with special reference to H&S, promoting an active H&S environment and taking it beyond the 'paper system' (CCH Australia Limited 2004; Toohey, Borthwick & Archer 2005).

Research has shown a link between commitment of management, from senior positions down through the line, and good performance (Dawson, Poynter and Stevens 1983). In complying with legislative requirements, management is obligated to establish an H&S committee (*Occupational Safety and Health Act 1984 (WA)* – section 38) and H&S representatives when given notice by an employee (*Occupational Safety and Health Act 1984 (WA)* – section 29). Management must also comply with the prescribed support function, however, they should go beyond minimum requirements providing adequate financial, administrative and logistical support, promoting the committees projects, and vigilantly materializing agreed arrangements. Safety management should be amalgamated into the SMS, into individual work practices and activities. Doing so will allow "safety performance" (Taylor, Easter & Hegney 2003, p 418) to become a fundamental part of the operational system.

Management relationship with Health and Safety Advisers

Management introduces H&S advisers into the company. H&S advisers must have adequate training and experience to fulfill their roles and expectations. Thus management must ensure their choice of adviser is competent and the Adviser must ensure they obtain and maintain the critical skills to be competent (CCH Australia Limited 2004; Health & Safety Executive [HSE] 1997). Appropriate authority must be delegated to the H&S Advisers, whereby they can provide independent counsel and consultation on various aspects of the company. This will include designing H&S policies and company H&S strategic and tactical objectives, as well as preventative initiatives. They undertake enabling, constant monitoring and review of policies and procedures to ensure proper establishment and operation. Also, they undertake ranking all H&S concerns, and implementing systems of auditing on safety performance and the SMS. They should also be advocates towards a safety-focused culture (Brun & Loiselle 2002; HSE 1997).

It is critical that management be open and welcome participation from employees in H&S matters and the development and execution of H&S procedures. But recalling on Taylor, Easter and Hegney's (2003) point, the ultimate responsibility, authority and accountability in H&S matters lies with management. Management will judge the paper system and can determine if a practice will stay on the page or be activated (Vinodkumar & Bhasi 2010).

The following table has been taken from a paper presented by Costello and Merrett (2000), titled *Building your own OH&S management system – WorkCover's D-I-Y kit*. The

a disaster. This includes the process for disaster recovery and the involvement of the community and other stakeholders.

2. Regulatory and physical disaster risk control measures

The State of Western Australia has extensive mineral and energy resources with some 270 operating mines that span the state. Industrial areas are dotted around the Western Australian coast line to facilitate the export of products with specialized industrial development zones located in Kwinana (South of Perth), Kemmerton (North of Bunbury), Oakagee (North of Geraldton) and a Pilbara location.

With any industrial development comes the risk of industrial disasters and the need to ensure that as a State, appropriate emergency measures are implemented to mitigate the risks associated with industrial accidents. These risk countermeasures include the implementation of regulatory control agencies, the development of appropriate policies, emergency management plans and the development of physical measures to protect the community.

2.1 Regional factors

The Western Australian state government dedicated an Industrial Area in the early 1950's in the Kwinana District 35 km south of Perth. This industrial precinct contains a combination of Chemical facilities; CSBP, Coogee Chemicals, Summit Fertilizers, Chemeq & Wesfarmers, Resource refineries; BHP Billiton Nickel West, BP Refinery, Alcoa and Energy resources, Verve Energy, BOC Gases, Water Corporation, Tyco Water (Kwinana Industries Council 2010). Two key factors must be considered when addressing Emergency Management and the control and mitigation of an industrial crisis- the regulatory requirements and the physical environment.

2.2 Regulatory requirements

The Emergency Management Act 2005 (WA) provides the basis for regulatory control within Western Australian jurisdiction. The Emergency Management Act 2005 (WA) also establishes the State Emergency Management Committee (SEM) (s.13). This committee consists of representatives from Local Government and other groups as deemed appropriate with regards to emergency management. The functions of the SEM committee are outlined in the Emergency Management Act 2005 (WA) s. 14,s.17 & s.18. Where a State of Emergency is declared the State Disaster Council will be established that includes the Premier (as Chairperson), State Emergency Coordinator and appropriate members of various utilities and government departments required to manage information and coordination.

Other regulatory controls for the management and prevention of industrial incidents include the following Western Australian legislation:

- a) Dangerous Goods Safety Act 2004
- b) Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007.
- c) Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007.
- d) Dangerous Goods Safety (Road and Rail Transport of Non-Explosives) Regulations 2007.
- e) Dangerous Goods Safety (Explosives) Regulations 2007.
- f) Dangerous Goods Safety (Security Risk Substances) Regulations 2007.

- g) Dangerous Goods Safety (Goods in Ports) Regulations 2007.
- h) Dangerous Goods Safety (General) Regulations 2007 (Department of Minerals and Petroleum 2010).
- i) Environmental Protection Act 1986.
- j) Environmental Protection (Controlled Waste).
- k) Environmental Protection Regulations 2004.

2.3 Physical requirements

This diverse combination of inter-connected industries presents its own challenges and the businesses established the Kwinana Industries Council (KIC) in 1991. The role of KIC includes:

- a) The establishment of the Kwinana Industries Public Safety Committee (KIPS).
- b) The establishment of the Kwinana Industry Mutual Aid (KIMA) group who maintain and test industries emergency management strategies.
- c) The preservation of the buffer reserve between industry and the community.
- d) Scientific studies to quantify the risks emanating for industries in the unlikely event where things go wrong.
- e) Emergency Management drills and exercises are conducted between member businesses and government agencies.
- f) Financial sponsorship for programs such as "State Alert" which is the early warning system developed in Western Australia through PC COPS (a telephone notification program coordinated by the WA police computer service) which sends mass messages to all members in the community by phone when an incident occurs (Kwinana Industries Council, 2010).

KIC assisted with developing the Western Australian series of WESTPLANS. WESTPLANS provide strategic state level arrangements for the management of incidents in Western Australia. WESTPLANS are developed by Hazard Management Authorities that are responsible for the management of incidents specific to their expertise. The plan that would be implemented for Dangerous Goods or Hazardous Material within Kwinana district would be the Hazardous Materials Management Plan known as WESTPLAN-HAZMAT. This plan details the arrangements for dealing with emergencies that result from hazardous materials. The plan would be implemented under the control of the Fire and Emergency Services Authority (FESA) as the approved Hazard Management Authority.

3. Disaster management arrangements

Disaster Management in Australia is managed on a multi-tiered structure including National, State, Regional, Local and corporate levels (ACMA 2010). Primarily the existing scale of the problem and the potential for the problem to escalate determines the management of any disaster. The management of disasters in Australia involves two approaches: comprehensive and integrated.

A comprehensive approach to mitigate disaster aims to eliminate or reduce the propensity for community damage. It also aims to increase the community's resilience to disasters through effective management. These include:

- Preparing for Emergencies - establishing plans and arrangements to educate the community to minimize the impact of disasters.
- Preventing Emergencies - aims to eliminate or reduce the risk of disaster.

- Responding to Emergencies - strategies to deal with the emergency.
- Recovering from Emergencies - strategies that aim to reconstruct communities and to look at the longer term effects of social, economic, emotional and physical well being. (EAM 2009a).

The integrate approach refers to the effective coordination and control of disasters and the roles respective Australian Governments play in providing effective emergency management. The Australian Emergency Management Arrangement-Manual 2 (EMA 2004a) describes the emergency management arrangements for each jurisdiction within Australia within their legislative frameworks.

4. Command and control arrangements

Command and control arrangements are key functions within emergency management. The control function is exercised through an incident controller who has the overall management responsibility of the direction and management in an emergency. The command function relates to the control and resources of an organization during an emergency. Additionally there is a coordination function that occurs both horizontally across agencies and vertically within agencies to ensure an effective response to an emergency.

4.1 National Arrangements

Australia's government has multi levels of management with multiple legislative frameworks that has the potential to create massive confusion with regards to the responsibility of an incident/disaster. Therefore Emergency Management in Australia requires a high level of coordination.

The Federal Government's Attorney General's Department manages the Emergency Management Australia (EMA) organization. EMA provides the secretariat for high-level governance including the Australian Emergency Management Committee (AEMC) and the Ministerial Council for Police and Emergency Management (MCPM). Both of these groups develop strategic policy for emergency management issues within Australia. The other committee supported by EMA via the Australian Emergency Management Committee is the Remote Indigenous Communities Advisory Committee who provides strategic policy advice to remote indigenous communities. Representatives from each State participate in each of these groups. An example of the coordination actions of the AEMC is their role in developing a working group to facilitate the 2004 agreement to implement Recommendations 56 & 57 (Catastrophic Natural Disaster Review) from the Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements Report. This team comprised representatives from each Australian State and Territory and other key "value adding" groups (Pearce 2009).

Emergency Management Australia (EMA) is the peak organization that is tasked with the responsibility of managing emergency management in Australia. EMA's role is to assist the States and Territories of Australia with emergency mitigation by providing the following services.

- a) Education and Development - the EMA facilitates training programs on emergency management to

assist state and local government and corporate Australia with strategies to mitigate emergencies and disasters. This includes access to a large library dedicated to Emergency Management information.

- b) Coordination nationally and internationally with other agencies for assistance during times of emergency. This includes situations where Australian's may be involved in overseas emergencies. (EMA 2009b)

- c) Implementing and maintaining the Australian Emergency Management Arrangements.

- d) Providing support during State and Territory emergencies including financial support, operational support and logistical support with services such as meteorological, hydrological and geophysical information.

4.2 State Arrangements

Whilst representative from each state participates in strategic policy decisions, this information is filtered through to the development and management of State Emergency Management. Each state has its own regulatory frameworks, emergency plans, Emergency Management Committees and structures.

In Western Australia a hierarchy of management has been established. Three primary committees exist. Each of the committees is called together to implement plans that have been established that are dependent on the location and scale of the incident including:

- a) Local Emergency Management - Local Emergency Management Committee.

- b) District Emergency Management - District Emergency Management Committee.

- c) State Emergency Management - State Emergency Management Committee.

Each of the committees is essentially constructed in the same way, however their delegation of authority is determined by the level of emergency, i.e. State, District or Local.

One of the functions at a state level is to provide strategic policy and management plans for incidences and emergencies in Western Australia. When an incident occurs an appropriately qualified Hazard Management Authority or Combat Agency will respond to the emergency.

Under the Emergency Management Act 2005 (WA) s20, a public authority undertakes the development of State Emergency Plans or WESTPLAN. The agency is required to:

- a) Prepare or assist in the preparation of a State Emergency Plan (the plan).
- b) Review or assist in the review of the plan.
- c) Amend or replace or assist in the amendment or replacement of the plan; and
- d) To test or assist in the testing the plan. (FRSA 2009a)

The following example is an extract from the FESA website (FESA 2009a) and indicates the Hazard Management Agency and the respective WESTPLAN to deal with an emergency of the hazard listed. Currently there are 24 WESTPLANS. A full list of these plans has been provided in Appendix 2.

HAZARD	RESPONSIBLE AGENCY	CONTACT	WESTPLAN LINK	COMMENTS
Hazardous Materials Emergencies (including radioactive materials)	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 9323 9311	<u>HAZMAT (2005)</u>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006

Fire and Emergency Service Authority, 2009a, p.1)

WESTPLANS are also supported by other emergency plans. Support plans provide the additional coordination of specific issues such as health, communication, telecommunications, welfare etc. There are currently 8 support plans (a list of support plans is attached at Appendix 2). Each of the areas of support has a structured hierarchy to ensure effective coordination. For example a representative of the Health Support Function is a member of the respective Management Committee.

District and Local Emergency Management Committees are structured in the same format as the State Emergency Management Committee. Their role is primarily a supporting role to Local Government so that communities can and mitigate incidents effectively within their respective boundaries. A flowchart outlining the interrelationship is attached at Appendix 1.

4.3 Corporate arrangements

The Local Emergency Management Committee structure relies on Local Government, community groups, corporate business and individuals. Everyone has a part to play in mitigating disasters and emergencies. Twigg (2001) defines corporate emergency management as a Corporate Social Responsibility (CSR) and that there are 5 elements of this responsibility; philanthropic, contractual, collaborative, adversarial, and unilateral. This is supported by the Kyoto University (n.d) who claims these elements should exist, but in reality CSR is usually a one off intervention, reactive and does not involve the community.

This is comparable with Hopkins (2006 & 1999) findings where following investigations in the Longford Gas Explosion and Moura Mine Disaster Emergency Management planning was found to be ineffective and reactive. Evidence shows that over the past 5 years the corporate world is developing systems, processes and plans to manage serious incidents and disasters. This is more apparent with the introduction of Emergency Management Acts in the Australian jurisdictions that force corporate business to take responsibility for emergency management, specifically in relation to Hazard Management Facilities.

Corporate bodies are required to develop Safety Management Plans and Emergency Management Plans to effectively plan for and to mitigate hazardous situations.

4.4 Inter-relationship with arrangements

With many levels of management for emergencies it is possible that confusion could easily take hold during an emergency, however protocols exist for managing emergencies. These protocols enable an organized inter-
20 of 30

relationship between the various arrangements. To gain an understanding of emergency management within the Kwinana district employees were interviewed at a primary industrial complex and their induction was attended.

The case study complex was a refinery located 22 kilometers south of Perth. Employing over 1,000 people, the refinery produces alumina that is exported for the manufacture of aluminum and a chemical grade alumina used in a number of industrial applications. The site contains numerous hazardous and dangerous goods materials. Significant threats that may occur due to hazards located on this site may include explosion, severe weather events, fires and power failure. The complex runs its own power station with a backup diesel pump should power failure occur. When the power station fails it takes some time for the diesel system to "fire up". As a result the site experiences product overflows consisting of caustic soda with hydrate and a contaminate mud waste product.

If an emergency event occurs such as a fire, an evacuation alarm is raised and all personnel onsite are required to report to specific muster areas. Employees are accounted for and receive further instructions from the Chief Warden. The Chief Warden (CW) will determine the level of the event (1, 2 or 3. See Appendix 2 for details) and determine whether the event is manageable within the boundaries of the plant (Induction Program 2009). should escalation be required the Chief Warden notifies the Fire and Emergency Services Authority (FESA) who are the Hazard Management Authority (HMA) for industrial events and the WESTPLAN HAZMAT would be implemented.

The site lies within the Hope Valley gazetted fire district. Members of the Kwinana Industries Council's Kwinana Industry Mutual Aid team provide support between industry members in the event of larger scale incidents. A significant event also activates an Incident Support Group (Local Emergency Committee [LEMC] or an Operations Area Support Group [OASG]). These groups assist the Hazard Management Authority to render the site safe. The operational area support group would implement the local emergency management arrangements and manage the event with support from the disaster emergency management coordinator if required. Members of the Kwinana Local Emergency Management Committee include Fire & Rescue Services, Bush Fire Brigades, State Emergency Services, Kwinana and District Police, Kwinana Industry members (KIC) the Salvation Army and Department for Child Protection (Town of Kwinana 2010). Support plans may be implemented. For example, the Local Emergency Management Committee Welfare Plan for spiritual and welfare support, provision of

food, water and accommodation/evacuation center support. A Communications Protocol is implemented to ensure communication is current and accurate. An emergency coordination center may be established.

In a situation where an incident escalates the Local Emergency Management Committee would notify the District Management Committee for additional support. Where an incident escalates and there is potential to affect the whole Region then communication to the State Emergency Management Committee would follow. This ensures that all levels of Emergency Management are kept well informed of the situation and that support resources are available as needed. A flowchart of the process is attached in Appendix 1.

5. Emergency management crisis preparation and plans

A crisis is an event "where management is required to divert a proportion of their attention, time, energy and resources away from normal operations to manage this untoward event. If the crisis escalated further and overwhelms the management's capabilities to cope, control will be lost and the event will then be regarded as a disaster" (Standards Australia, 2006, p. 10). In an emergency situation crisis management is defined as the process used before, during and after an event to resolve a crisis, minimize loss and downtime or otherwise protect the organization (Marwitz et al. 2008). The development of Emergency Response Plans (ERP) and Crisis Management Plans (CRP) enables a company to minimize the impact of a crisis. The Emergency Response Plan is generally the culmination of considerable work by a team of hazard management professionals through prevention, planning, testing and evaluating strategies to mitigate emergencies. Planning for crisis situations would be similar; however implementing Crisis Management Plan for different types of emergencies would be different depending on the issue. The following planning strategies have been considered for dealing with a fire emergency.

5.1 Planning. Designing for emergencies

The first stage in an emergency management preparation is to consider emergencies at the design phase of construction. A risk assessment should be conducted to establish all the potential risks associated with locating, planning, design, construction and operation of a facility (Safetyline Institute 2009). In Western Australia the Fire and Emergency Services Authority's Built Environment Branch inspect designs and provides advice on the construction of new commercial and industrial buildings. This is undertaken in their role of administer the fire safety sections of the Building Code of Australia (BCA) and Building Regulations 1989 (WA).

These evaluations assess the suitability of the following items:

- Locations of fire hydrants, including numbers required and capacities.
- The adequacy of water supplies for the building.
- Whether fire pumps and other associated equipment are required.
- The type of fire detection systems required - sprinkles and alarms.
- What smoke management systems are appropriate in the event of a fire.
- Access for emergency services vehicles.
- Locations and numbers of emergency exits (FESA 2009b).

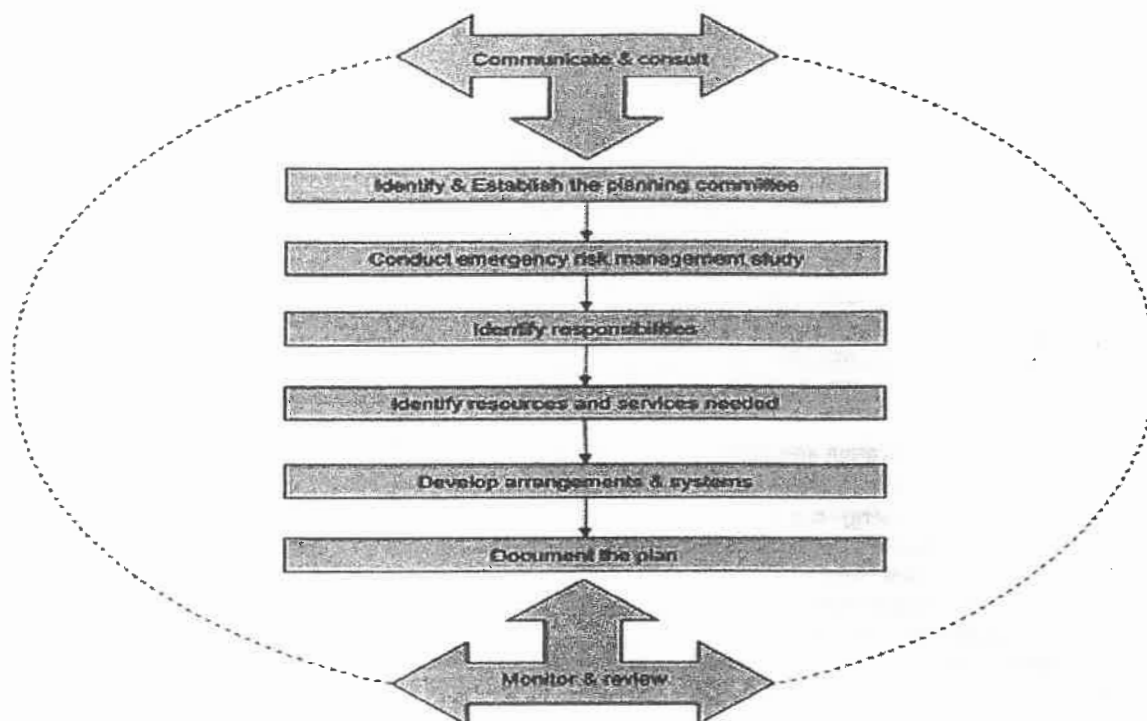
Once the building has been constructed, FESA will then attend site and test equipment to ensure it complies with Australian Standards and FESA requirements (FESA 2009b). When an emergency occurs at a building that has been assessed by FESA the crew are provided with relevant information on the building en-route to the incident via the information database maintained.

Other factors to be considered in building design include:

- Weather conditions. For example do buildings need to be cyclone proof?
- Environment. For example, is the area prone to having bush fires? If so the building will need to be constructed with fire retardant building materials and adequate fire breaks will need to be maintained around the building.
- Locations of emergency facilities, including muster points, first aid, medical centers and operation centers for dealing with emergencies.
- Providing adequate clearance from power lines and trees.
- Designing safe pedestrian traffic through and around sites.
- Using non-slip surfaces on floors.
- Designing to minimize manual handling (i.e. warehouse and forklift access).
- Incorporating facilities for building maintenance (i.e. window cleaning anchors on the roof for high rise buildings).
- Considering what facilities would be required in the future for building maintenance (ASCC 2006).

5.2 Planning. Risk assessment

It is important to establish a Planning Committee consisting of Safety and Emergency personnel and of key management personnel. Hazard identification and risk assessment are required to identify all the possible hazards associated with the business. The risk analysis should include a credible event scenario analysis to enable situation plans to be developed (similar to WESTPLANS, however directed to the actual business). Using the Kwinana Complex example the risk assessment would require a high level of assessment based on the hazard and operability process. The following schematic diagram outlines the process for planning for emergencies.



Source: Emergency Management Australia 2004b p.7

There should be a preliminary risk assessment as this will provide a summary of risks that need further assessment. Using a formal risk process such as a Hazard and Operability Study (HAZOP) or Failure Mode and Effects Analysis (FMEA) a more detailed risk assessment should be conducted that will include potential for systems failures (control and operational), component failure, maintenance failures and human intervention errors such as a behavioral culture (e.g. complacency, ignorance, lack of attention, short cutting). As many employees as practical should participate in the development of risk assessments because employees usually have the intimate knowledge of how things/systems/components work as well as how they fail.

All risks will require evaluating using risk matrix. Appropriate control measures should be implemented using the Hierarchy of Controls. The risk should again be evaluated to determine the residue risk. Further strategies will be required where work activities maintain a high residue risk. A Risk Control Effectiveness Guide should be developed to ensure all employees are aware of situations that require management intervention. A risk register should be developed that will form part of the Emergency Management Plan.

Additional activities that need to be considered in the risk assessment are:

- Evacuation points and control and alarms.
- Human resource requirements (skills base & training requirements).
- Materials (firefighting equipment, onsite ambulance, first aid equipment, breathing apparatus).

- Communications - employee, community, emergency services.
- Emergency management drills for various types of incidents.
- Financial Management - funding for crisis management and training.
- Response Management - for different levels of emergency.
- Recovery Management - restoring employees and the community to pre-crisis mode (as much as possible) (EMA 2004b).

5.2 Planning. Emergency management systems

Upon completion of risk assessments additional emergency management system requirements must be considered. These include:

- Document Control (including access to information).
- Development of Safety Management Plans.
- Development of Emergency Management Plans.
- Evacuation management/ site drawings and signage (alarm system).
- Testing, Review, and Monitoring of the above documentation.
- Communications plan - to alert authorities and neighbors of incident. Consider compatibility of inter-agency communications and back up services).

Once an Emergency Management Plan and associated support documents and systems have been developed they should be tested and reviewed annually or following an event.

6. Recovery

Recovery from a disaster, emergency or crisis is not just about rebuilding the damaged infrastructure or working through the loss of life or income. Recovery is defined by Emergency Management Australia as *the coordinated process of supporting disaster affected communities in the reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical well being* (EMA 2004c, p3).

One of the key risks for business is their capacity to recover from a disaster and the success of business continuity. One of the tools for assisting with the process is to develop a Disaster Recovery and Business Continuity Plan. Business continuity, or resilience planning, is a strategy used by businesses to identify, before a crisis or disaster happens, how to keep the business operating. The cycle for Business Continuity Planning is to identify any risks to business disruption. Look at the Maximum Acceptable Outrage, which is the maximum time that customers or the workplace can operate normally without the product, service, facility person or people. Identify the Recovery Time Objective, which is the time that it is anticipated that it will take the business to have normal operations. Identify, prepare for and implement strategies to keep business services operating normally if a crisis or disaster does occur and this product, service, facility, person or people are not available. Implement business continuity plans if they are required. These plans should be tested, evaluated and opportunities for improvement should be identified to ensure that they are effective.

Many businesses are successful in response management to deal with a crisis. Many will have established emergency management and response plans to work through the key issues relating to the disaster. The challenge comes when the immediate cause of the disaster has passed and the business moves into the recovery phase. Planning for the recovery and managing risk will minimize the impact to the community, employees, shareholders, clients and other businesses reputation and assets.

6.1 Stakeholders recovery

Stakeholders refer to employees, suppliers, clients and the community, in fact anyone who has direct or indirect involvement with the company. Maintaining a list of key stakeholders, communication plans and action plans for the management of stakeholders will minimize the impact of the crisis or disaster and enable a prompt return to normal operations. Part of the process for Emergency Management is planning for recovery. A key feature for recovery should include consultation with stakeholders and the community. Engaging suppliers when developing a company Disaster Recovery Plan (DRP) is critical to understanding availability of materials. This will assist in identifying the need to store materials or to plan based on the availability of materials. If key suppliers are not able to supply promptly then contingencies need to be considered to ensure the functions of the business can continue, especially if business continuity is dependent on the supply of materials.

Keeping clients informed of the progress of an emergency is critical to ensure they feel reassured that their business will not be impacted upon. Keeping an open and honest dialogue with clients is critical to ensure business continuity. Involving key clients in the crisis recovery process reassures them of the commitment and organization that stands behind the business.

Shareholders and Directors need to be involved in the disaster recovery plan as disaster have the potential to destroy a business. The selling of stocks by nervous shareholders could result in a sudden plummet in the share price. Effective communication and a well informed Board would reduce the financial impact to the business.

All employees, contractors and agency staff affected (either directly or indirectly) by a disaster will require support. Implementing strategies for employee assistance may involve immediate onsite relief or post emergency care. This may be via a Psychological Services team, monitoring, peer support and supervision or self-monitoring (EMA 2004c). Engaging with the Employee Assistance Program Service Provider (EAPSP) in the planning stages of emergency management planning provides them with an understanding of the business and the types of crisis and disasters that may impact on employees. The Employee Assistance Program Service Provider is then able to effectively assist the business through the recovery management phase.

Other members of the community may be involved in the emergency management planning and recovery phases. Specifically neighbors will have an interest in an emergency to determine if there will be any impact on their business. Schools/ kindergartens etc that have children attending where parents may have been killed or injured by a disaster will need to manage the impact to students. Local Hospitals will be impacted by their capacity to manage a number of injuries at a given time or a particular risk (acid burns for example) and strategies for evacuating to other hospitals if required. The local church may be involved for spiritual care of affected people.

State or Local Government involvement is primarily activities such as the Local Emergency Management Committees, however their involvement will assist the business in identifying disaster management support from agencies able to assist for both business continuity but also issues such as insurance and legislative reporting requirements - specifically where a Major Hazard Management Facility may be involved. Once the emergency is under control the organization's insurance company should be notified so that financial and other help can be provided to the organization to assist with business recovery and continuity. As appropriate, relevant legal authorities will need to be notified about the cause and outcomes of the emergency situation.

A significant event will likely draw the attention from the media. Strategies need to be considered in the crisis recovery process for communication dissemination. This may be as simple as providing a "hotline" for information and having a person in a designated employment position to provide information to the media and stakeholders if this information is requested or required.

The key issues for business throughout the recovery phase will be related to business continuity and the resolution of the physical and psychological effects of the disaster. Physical Effects include damage to physical infrastructure. This may be as a result of building damage and the need to relocate. It may mean closing a section of the building and staff being located to a different section of a building. There may be difficulties with utility supplies, gas, electric, water, sanitary and communications access. Communication would include the capacity for incoming calls, faxes and use of computers.

The following outlines the strategies for recovery managing the community and stakeholders as recommended by the EMA (2002c p132;135).

1. Prevent De-bonding. Ensure that strategies are tested and implemented to enable the preservation of business continuity. Management and business recovery plans for all anticipated emergency events should be built into business continuity planning. Communication should be second nature and everyone should be educated to understand their role.
2. Minimize fusion. Keep information relevant and frequent. Validate processes to ensure disruption is minimized.
3. Provide short term personal support. Ensure timely disaster related support organization intervention.
4. Intercept cleavage planes. Intercept issues in a proactive way. Establish a comprehensive communications strategy.
5. Bridge cleavage planes by actively managing rumors and myths. Envelope community support and empathy. Encourage intergroup communication.
6. Provide medium term personal support by planning and implementing interventions for mobilizing community cohesion and social support to facilitate psychological recovery.
7. Promote constructive differentiation. Facilitate community communication to rebuild morale and identity.
8. Provide long term personal support by supporting people with chronic stress responses.

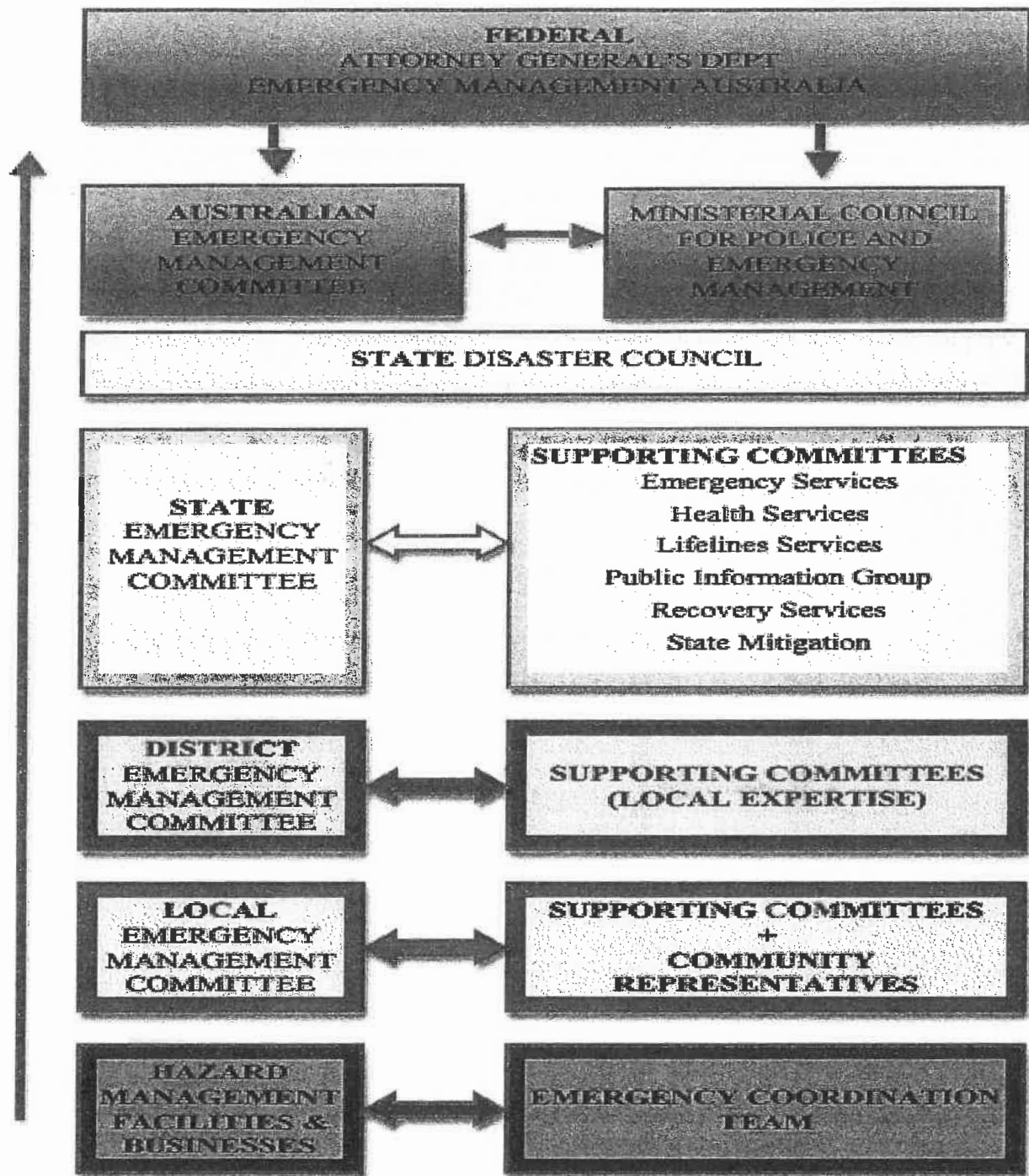
6. Conclusions

This article has explored emergency management starting with the structures and hierarchy of government support for corporate businesses. Within corporate emergency management there has been exploration of the 3 levels of emergencies. Emergency Management has been demonstrated to be a diverse discipline that is complex and as such many plans need to be considered to ensure that different levels of community or organization can recover from a crisis or disaster situation. Through this article it is evident that Emergency Plans should be descriptive such as the Emergency Response Plan to deal with the response, Recovery Plan to deal with recovery and Business Continuity Plan to assist the business to move forward and recover from the crisis situation or disaster.

References

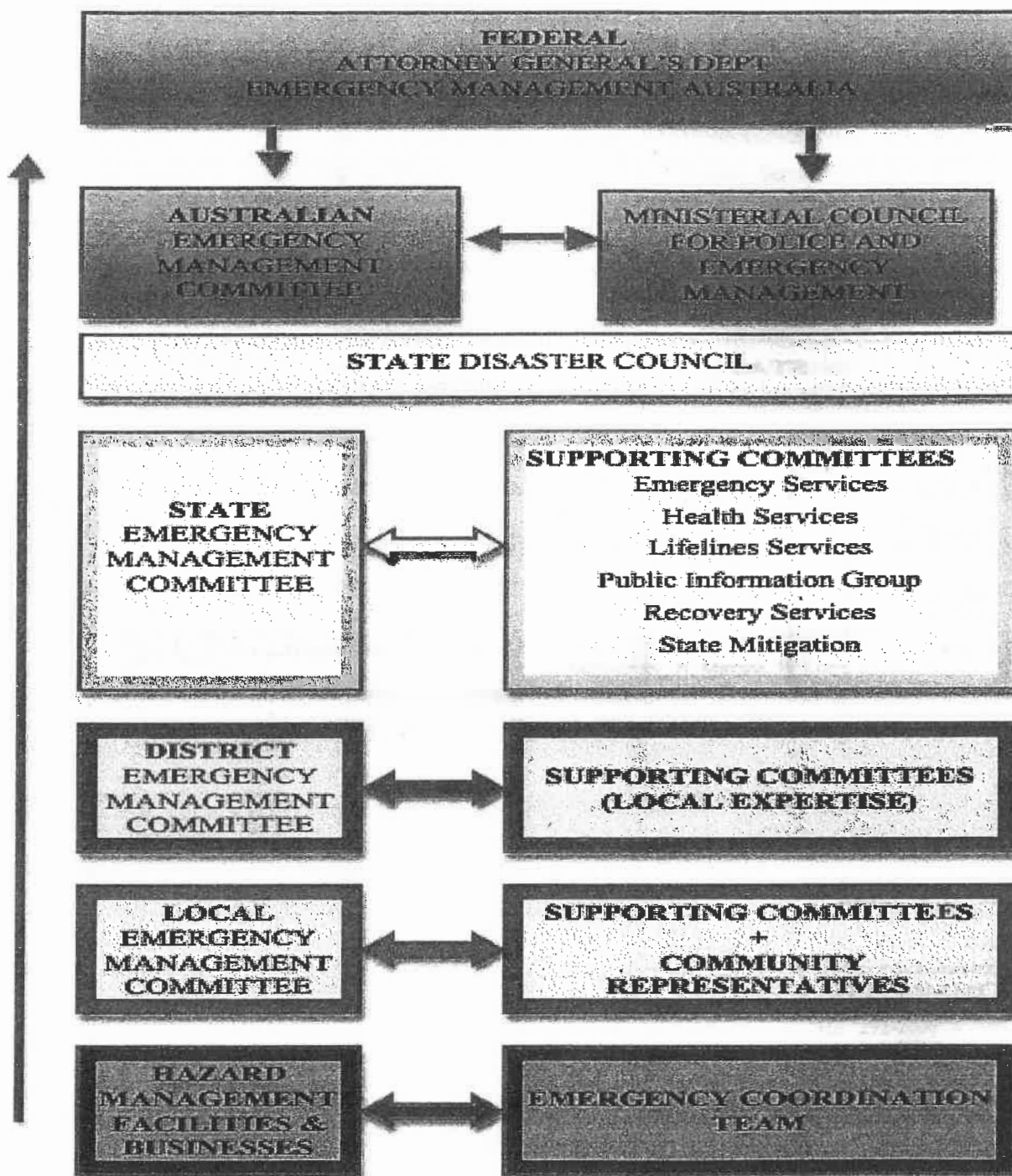
- Australian Communications & Media Authority. (2010). Appendix A: Australian Emergency Management Arrangements. <http://www.acma.gov.au> (accessed March 21, 2010).
- Australian Safety & Compensation Council. (2006). *Guidance on the Principles of Safe Design for Work*. Commonwealth of Australia. Canberra.
- Emergency Management Australia. (2009a). *Emergency Management Approaches* <http://www.ema.gov.au/> (accessed March 21, 2010).
- Emergency Management Australia. (2009b). *Australian Emergency Management Arrangements*. <http://www.ema.gov.au/> (accessed March 21, 2010).
- Emergency Management Australia. (2004a). *The Australian Emergency Management Arrangement - Manual 2*. <http://www.ema.gov.au/> (accessed March 21, 2010).
- Emergency Management Australia. (2004b). *Emergency Planning - Manual 43*. <http://www.ema.gov.au/> (accessed March 23, 2010).
- Emergency Management Australia (2004c). *Recovery - Manual 10*. National Capital Printing. Canberra.
- Fire and Emergency Services Authority (FESA). (2009a). *State Emergency Management Plans*. www.fesa.wa.gov.au (accessed March 21, 2010).
- Fire and Emergency Services Authority. (2009b). Building Assessment Overview. www.fesa.wa.gov.au (accessed March 23, 2010).
- Fire and Emergency Services Authority. (2005). Western Australian Hazardous Materials Emergency Management Plan. 3rd Ed. www.fesa.wa.gov.au (accessed March 10, 2010).
- Kyoto University. (nd.). The Corporate Sector Role in Disaster and Environmental Management: beyond Corporate Social Responsibility. Global Forum for Disaster Reduction (GFDR) and Graduate School of Global Environmental Studies, Kyoto University. www.wcdr.gfdr.org (accessed March 16, 2010).
- Kwinana Industries Council. (2010). Kwinana Industrial Area. <http://www.kic.org.au/> (accessed March 10, 2010).
- Marwitz, S., N. Maxson, B. Koch, T. Aukerman, J. Cassidy & D. Belonger. (2008). Corporate crisis management, managing a major crisis in a chemical facility. *Journal of Hazardous Materials*. 159: 92-104 <http://www.sciencedirect.com> (accessed March 23, 2010).
- Pearce, T. (2009). Catastrophic disasters - how do we assess capability and are we prepared? *Safety in Australia*. 28(2):6-19.
- Safetyline Institute. (2009). Management of Major Hazard Facilities. <http://www.bizline.docep.wa.gov.au/> (accessed March 15, 2010).
- Standards Australia. (2004). HB76:2004 Dangerous Goods - Initial Emergency Response Guide. Sydney, NSW: Author.
- Standards Australia (2006) HB 292-2006 *A Practitioners Guide to Business Continuity Management Handbook*. Sydney, NSW: Author.
- Town of Kwinana. (2010). Earthquakes, tsunamis HAZMAT and pandemics. <http://www.kwinana.wa.gov.au> (accessed March 10, 2010).
- Twigg, J. 2001. *Corporate Social Responsibility and Disaster Reduction: A Global Overview*. Benfield Greig Hazard Research Center, University College London.
- University of Sydney. (2010). *Emergency Response Levels* <http://www.usyd.edu.au> (accessed December 10, 2010).

APPENDIX I - EMERGENCY MANAGEMENT HEIRARCHY



AUTHOR'S INTERPRETATION OF THE CURRENT SYSTEM.

APPENDIX 1 - EMERGENCY MANAGEMENT HEIRARCHY



AUTHOR'S INTERPRETATION OF THE CURRENT SYSTEM.

HAZARD	RESPONSIBLE AGENCY	CONTACT	WESTPLAN LINK	COMMENTS
Air transport emergencies	WA Police Service	Emergency Operations Unit Tel: (08) 9370 7115	<u>Aircrash (2009)</u>	Date approved: 1 December 2009 SEMC Resolution No: 116/2009
Animal and Plant Biosecurity	Department of Agriculture and Food	Manager Emergency Services □ Tel: (08) 9368 3418	<u>Animal and Plant Biosecurity (2008)</u>	Date approved: 11 March 2008 SEMC Resolution No: 27/2008
Bushfire	Fire and Emergency Services Authority/Department of Environment & Conversation/Local Government	FESA Operational Services Tel: (08) 9323 9304	Bushfire (2009)	Working Draft for 2009/ 2010 season Noted by SEMC □ 1/12/2009
CBRN	Fire and Emergency Services Authority	FESA Operational Coordination Tel: (08) 9323 9852	RESTRICTED <i>Please contact responsible agency</i>	Date approved: 27 June 2008 SEMC Resolution No: 58/2008
Collapse	Fire and Emergency Services Authority	FESA Operational Coordination Tel: (08) 9323 9852	<u>Collapse (2008)</u>	Date approved: 10 June 2008 SEMC Resolution No: 60/2008
Dam break	Water Corporation	Corporate Incident Management Coordinator Tel: (08) 9420 3247	<u>Dambreak (2004)</u>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Earthquake	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 9277 0555	<u>Earthquake (2003)</u>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006 UNDER REVIEW
Fire (urban)	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 9323 9493	<u>Urban Fire (2000)</u>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Flood	Fire and Emergency Services Authority	FESA Operational Services □ Tel: (08) 9277 0555	<u>Flood (2004)</u>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Fuel Shortage Emergencies	Department of Consumer and Employment Protection	Gas & Emergency Management □ Tel: (08) 9422 5202	<i>Not available - currently under review</i>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Hazardous Materials Emergencies (including radioactive materials)	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 9323 9311	<u>HAZMAT (2005)</u>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Human epidemic	Department of Health	Executive Officer, Emergency Management Tel: (08) 9222 2777	<u>Human Epidemic (2008)</u>	Date approved: 2 December 2006 SEMC Resolution No: 117/2008
Land search and rescue	WA Police Service	Emergency Operations Unit Tel: (08) 9370 7115	<u>Land SAR (2007)</u>	Date approved: 4 December 2007 SEMC Resolution No: 100/2007
Marine oil pollution	Department for Planning and Infrastructure	Manager Marine Environmental Protection Tel: (08) 9216 8802	<u>Marine Oil Pollution □ Plan (2006)</u>	Date approved: □ 12 December 2006 SEMC Resolution No: 77/2006
Marine transport emergencies	Department for Planning and Infrastructure	Marine Safety Directorate Tel: (08) 9216 8902	<u>Marine Transport Emergencies (2007)</u>	Date approved: 20 March 2007 SEMC Resolution No: 26/2007

Nuclear-powered warships	WA Police	Emergency Management Coordination Unit Tel: (08)94893186	Restricted <i>Please contact responsible agency</i>	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
PTA Rail Crash	Public Transport Authority	Policy & Business Management Systems Tel: (08) 9326 2760	PTA Rail Crash	Date approved: 1 December 2009 SEMC Resolution No: 121/2009
Road transport emergencies	WA Police	Emergency Management Coordination Unit Tel: (08)94893186	Road Crash (2008)	Date approved: 10 June 2008 SEMC Resolution No: 56/2008
Sea search and rescue	WA Police	Emergency Management Coordination Unit Tel: (08)94893186	Marine SAR (2008)	Date approved: 11 March 2008 SEMC Resolution No: 23/2008
Space re-entry debris	WA Police	Emergency Management Coordination Unit Tel: (08)94893186	Space Debris (2001)	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Storm/tempest	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 94799321	Storm (2004)	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Tropical cyclone	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 94799321	Cyclone (2007)	Date approved: 4 December 2007 SEMC Resolution No: 102/2007
Tsunami	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 94799321	Tsunami (1999)	Date approved: 31 January 2006 SEMC Resolution No: 4/2006 UNDER REVIEW
Rail Freight Emergencies	Westnet Rail	Access Manager WestNet Rail □Tel: (08) 9212-2807	Westnet Rail 2008	Date approved: 2 December 2008 □SEMC Resolution□No: 115/2008

Business Structure taken from University of Sydney example and HMA Structure from FESA Western Australia

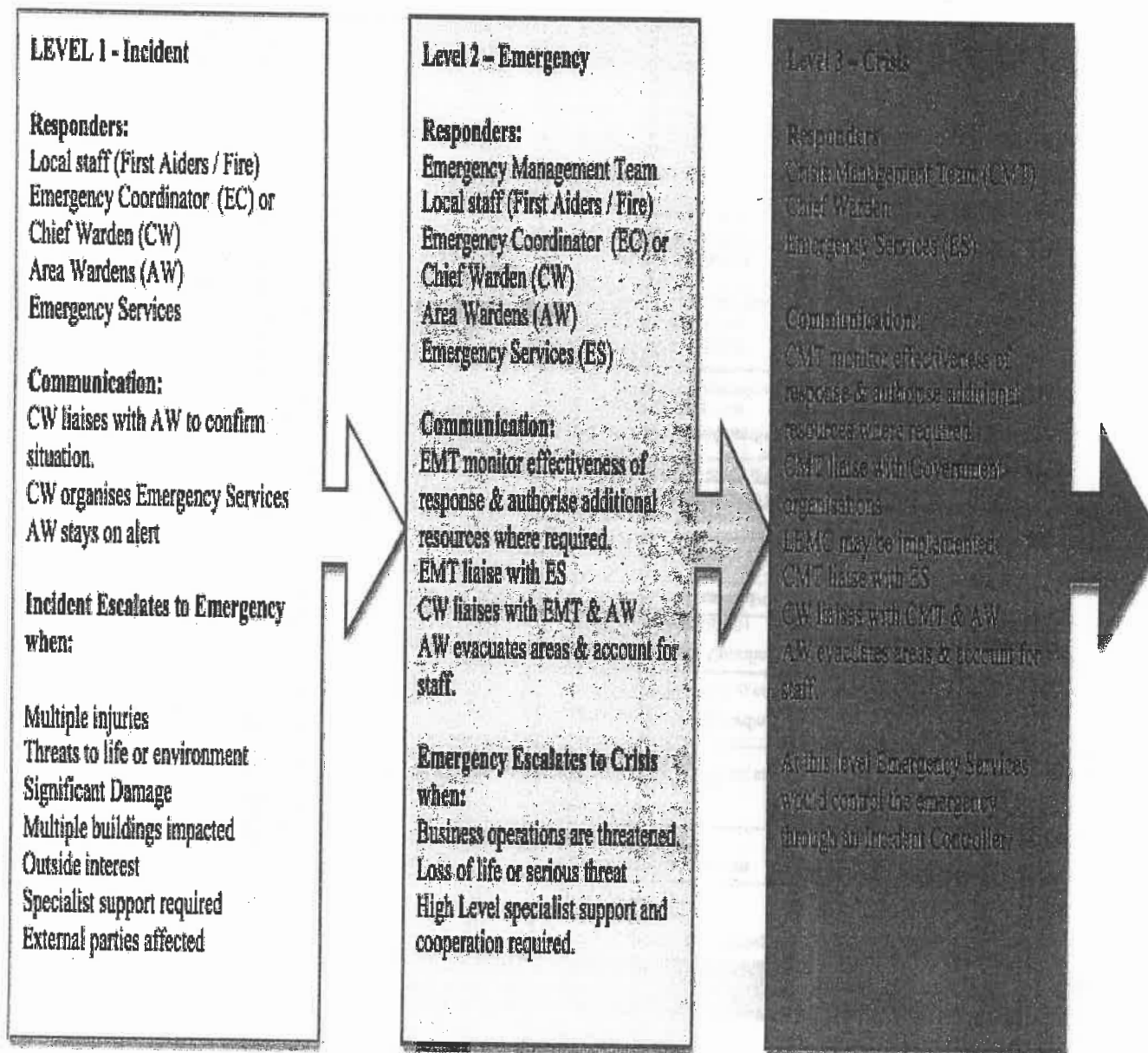
SUPPORT PLANS

SUPPORT FUNCTION	RESPONSIBLE AGENCY	CONTACT	WESTPLAN LINK	COMMENTS
Health support	Department of Health	Executive Officer, Emergency Management Tel: (08) 9222 2777	Westplan Health (2007)	Date approved: 4 September 2007 SEMC Resolution No: 74/2007
Isolated communities freight subsidy	Fire and Emergency Services Authority	FESA Operational Services Tel: (08) 9277 0555	Freight Subsidy Plan (1999)	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Public information support	SEMC Public Information Group	Regional Director Bureau of Meteorology Tel: (08) 9263 2210	Public Information (2008)	Date approved: 11 March 2008 SEMC Resolution No: 25/2008
Reception of Australian citizens and approved foreign nationals evacuated from overseas	Department for Child Protection	Emergency Services Coordinator Tel: (08) 9277 0366	Reception 2009	Date approved: 1st December 2009 SEMC Resolution No: 119/2009
Registration and inquiry support	Department for Community Development	Emergency Services Coordinator Tel: (08) 9277 0366	Registration and Inquiry (2003)	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
State Recovery Coordination	Department of the Premier and Cabinet	Executive Government and Security Services Tel: (08) 9222 9424	Recovery (2008)	Date approved: March 2008 SEMC Resolution No: 29/2008
Telecommunications support	Fire and Emergency Services Authority	FESA Business Services Division Tel: (08) 9323 9373	Telecommunications (2005)	Date approved: 31 January 2006 SEMC Resolution No: 4/2006
Welfare support	Department for Community Development	Emergency Services Coordinator Tel: (08) 9277 0366	Welfare 2009	Date approved: 31 January 2006 SEMC Resolution No: 4/2006

SOURCE: www.fesa.wa.gov.au

APPENDIX 3 - LEVELS OF EMERGENCY SITUATIONS

Author's interpretation of the current system (University of Sydney, 2010)





The WSO's 24th Annual International Environmental and Occupational Safety and Health Professional Development Conference 2011

Will be at Sam's Town Tunica
1477 Casino Strip Blvd
Robinsonville, Mississippi 38664
(800) 456-0711

July 18-20, 2011

Our Key Note Speaker will be: Mr. James "Perry" Huckabay

Perry has over thirty years of experience and leadership in developing and directing risk management, claims administration, loss prevention, safety and training programs for major insurance carriers and employers for both the private and public sector. He is the former Director of Workers' Health and Safety for the State of Texas and was instrumental in establishing the loss prevention division for the largest self insurance pool in the United States. Perry has had the opportunity to assist hundreds of employers and trained thousands of employee's in his career. As a nationally recognized speaker and trainer, Perry has presented to audiences across the country on such topics as; Methods On Reducing Workers' Compensation Costs, Fleet Safety, Preventing Workplace Violence, Illusions - the Reality of Managing Your Risk, Preventing Sexual Harassment, Effective Claims Management, The Customer and Customer Service, Liability Prevention and Many others. He is a graduate of the University of Texas at Tyler and Western States University and holds a Ph.D. in Occupational Safety and Health. He is a member of the World Safety Organization, American Society of Safety Engineers, is a WSO-Certified Safety Executive and a licensed Claims Adjuster.

Call for Speakers: If you would be interested in giving a presentation at this Conference, you can send in a short abstract of a proposed subject. Your abstract will then be forwarded to the Conference Committee for their evaluation. If your abstract is selected, we will send you a note letting you know the tentative date and time of your presentation.

Since the WSO Conference is our annual fund raiser it is not the WSO's policy to pay any speakers travel, accommodations, meals or any other expenses that might be incurred by a presenter or attendee.

Early Bird Special: We have implemented the early bird special for attendees of the conference. We have also implemented student registration fees. If you have any questions please contact the WSO World Management Center info@worldsafety.org or (660) 747-3132.

Re-certification: As you know it is becoming more and more imperative that certified people keep current in the ever changing field of safety. Most all of the certifying organizations (including the WSO) have some type of re-certification requirements, asking what you are doing to keep up with the changes that are being implemented daily. One of the requirements is Continuing Education Units. This may be easily achieved by attending Safety Conferences, like the World Safety Organization's we cannot stress enough how important this is to everyone's safety career.

Our Group rates are: \$49.00 for Sunday - Wednesday per night plus tax & \$109.00 for Saturday night plus tax. When you make your hotel reservations, please specify the World Safety Organization group rate code: **WORG11A**

Individual Conference Registration Form

24th Annual WSO International Environmental & Occupational Safety & Health Professional Development Conference

- Registration fees include attendance of all Technical Presentations.
- Upon request, registrants who are not members of the WSO may receive their first year of WSO membership at a reduced rate.
- For your convenience, this Registration Form may be copied as needed.
- All fees must be paid in advance and in U.S. Dollars to be considered pre-registered.

Please note that registration fees do not include lunches or dinners

	Before April 30 th , 2011	During the Month of May 2011	After June 1, 2011	Registration at the Conference
WSO Member	\$ 450. ⁰⁰	\$ 500. ⁰⁰	\$ 600. ⁰⁰	\$ 700. ⁰⁰
Non-WSO Member	\$ 525. ⁰⁰	\$ 575. ⁰⁰	\$ 675. ⁰⁰	\$ 775. ⁰⁰
Student registration	\$100. ⁰⁰			

Corporate Discounts are Available (For WSO Corporate or Affiliate Members)

- > 6 Attendees 20% overall discount on registration fees
- > 10 Attendees 30% overall discount on registration fees
- > 25 Attendees 50% overall discount on registration fees

WSO Awards Banquet (July 18th, 2009) \$45.⁰⁰ per person

Continuing Education Units (CEUs) \$20.⁰⁰ for this certificate

Please select and **CIRCLE** to identify the applicable registration fees and fill out the form below.
Return this registration form with the appropriate total fee to the WSO World Management Center.

 Please Print or Type

NAME: _____

COMPANY: _____

ADDRESS (home or work please specify): _____

CITY: _____ STATE/PROV: _____ COUNTRY: _____

POSTAL CODE: _____ E-MAIL: _____

WORK TELEPHONE: _____ FAX: _____

TOTAL PAYMENT ENCLOSED OR CHARGED TO MY CREDIT CARD: \$ _____

Checks / Money Orders / Bank Drafts etc., should be made payable to: World Safety Organization Inc.:

☐ I prefer to pay by credit card: ☐ VISA or ☐ Master Card ☐ American Express ☐ Discover

Card Number: _____ Expiration Date: _____

Signature: _____ Today's Date: _____

Note Cancellation Policy: Should you need to cancel your reservation after payment of the fees, you will be entitled to a refund less \$50.⁰⁰ administration fee until May 1st, 2011. A 50% refund will be provided until June 1st, 2011. No refunds will be provided after June 31st, 2011. A Substitute attendee may be designated at any time.

WSO Code of Ethics

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

1.Members must be responsible for ethical and professional conduct in relationships with clients, employers, associates and public.

2.Members must be responsible for professional competence in performance of all their professional activities.

3.Members must be responsible for the protection of professional interest, reputation and good name of any deserving WSO member or member of other professional organization involved in safety or associated disciplines.

4.Members must be dedicated to professional development of new members in the safety profession and associated disciplines.

5.Members must be responsible for their complete sincerity in professional services in the world.

6.Members must be responsible for continuing improvement and development of professional competencies in safety and associated disciplines.

7.Members must be responsible for their professional efforts to support the WSO motto "Making Safety A Way Of Life...Worldwide".

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