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Statement of Purpose and Objective

WSO's purpose is to internationalize all safety fields, including occupational and environmental safety and health, accident prevention movement, etc., and to disseminate throughout the world the practices skills, arts, and technologies of safety and accident prevention.

WSO's objective is to protect people, property, resources, and the environment on local, regional, national, and international levels. WSO membership 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.

WSO is in Consultative Category II Status (Non-Governmental Organisation-NGO) to the Economic and Social Council of the United Nations.

The WSO is a Not-for-Profit Corporation (Missouri, USA), non-sectarian, non-political movement dedicated to

"Making Safety a Way of Life…Worldwide."

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Article Submission

Articles for inclusion in this journal will be accepted at any time; 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 11 point. Articles should have an abstract of not more than 200 words. Articles shall be submitted as Times New Roman print 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, current employment position, a brief bio, and a photo of the author. 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 7th ed.

Books are referenced as follows:
Author. (Year of publication). *Title of publication*. Publisher.

Articles are referenced as follows:
Author (Year). Title of article. *Name of Journal. Volume* (Issue), Page numbers of article.

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Submissions should be mailed to:
WSO World Management Center
Attn: Editorial Staff / Dr. Janis K. Jansz
PO Box 518, Warrensburg, MO 64093, USA
or emailed to: j.jansz@curtin.edu.au

Articles, wherever 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.

Workplace Safety, Enablers and Barriers.

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Abstract

This article reports the findings of a focus group discussion by 61 people from 12 countries to identify success factors, barriers and enablers for workplace safety and health. The focus group discussion was conducted at the World Safety Organisation Global Round Table XXI at the request of the United Nations Economic and Social Council. The following enablers and success factors were identified. Having a mission and a culture of caring for everyone who comes on the business premises. Including suppliers in workplace safety and health initiatives. The government having workplace safety and health laws that are enforced and followed by everyone. Cost of workers compensation. Advice, personal relationships developed, training and supervision that safety professional provides to managers and other employees at the workplace. Conducting research to improve workplace safety, implementing the findings and evaluating the results. The ability to cease unsafe work and having every employee considered as a safety person. Barriers to workplace safety were identified as employees not feeling listened to or appreciated, having a safety consultant who was more concerned with making money than providing work related safety, having ineffective and non-enforced country workplace safety and health laws. In some countries, without the right connections to the right people the safety professional is unable to do anything to promote workplace safety and health. Recommendations based on the identified themes were submitted to the United Nations Social and Economic Council and are included in this article.

Key words: Workplace safety and health. Safety culture. Role of the Safety Professional.

Introduction

The World Safety Roundtable was convened on the 7th of October 2019 and commenced at 1530 hours. The purpose of this Roundtable was to provide advice related to workplace safety to the United Nations Economic and Social Council with which World Safety Organisation has had consultative status since 1987. This Global Roundtable focus group was convened during the 32nd World Safety Organisation International Environmental and Occupational Safety and Health Professional Development Symposium, held in Las Vegas, Nevada, United States of America.

Methodology

The Moderator of this focus group was Mr Edward E. Hogue. There were 61 focus group participants. They included Gregory Adkinson, Stephen Austin, Perry Ballard, Joseph Bernardo, Gail Brandys, Robert Brandys, Monica Cervantes, Manuel Correa, Stephanie Gerken, Dr David Gilkey, Christopher Hicks, Joann Jackson-Bass, Hilary Konczal, James Lane, Manuel Machado, Willy Macias, Bo Mitchell, David North, Douglas Perryman, Scott Peters, Kayla Rath, Dr Lourrinda Renee, David Robertson, Meliton Sarmiento, Gardner Tabon, Dr Michael Thomas, Margarita Thompson, William Thompson, Karen Townsend, Kristiana Varkalhoff, Norris Varkalhoff (all from the United

States of America); Engr. Alfredo De La Rosa, Cethrobelle Brinas, Jean-Marie De La Rosa, Jeric Quilatan Del Rosario, Christian Dimayuga, Miguel De Vera Morante, Engr. James Porter, Cecile Del Rosario Salanda, Ricardo Verdida Salanda Eros Zuniga (from the Philippines); Kevin Brown, Michael Brown, Tim Cole, Martin Logan, Graham Moore. Emmanuel Sariento, Andrea Shadgett (from Canada); Professor Dr Elias Choueiri (Lebanon); Subhan Dhini, Cynthia Febrina Maharani, Bambang Riyanto, Dr Ir Rudiyanto (Indonesia); Yung Kai Hsu (Taiwan); Dr Janis Jansz (Western Australia); Joseph Mweu Kimeu (Kenya); Ugochi Obidiegwu, Olukayode Mobolaji Omiwole, Olusayo Oladotun Olanipekun (Nigeria); Kosgolle Gedara Premaratne (Kuwait) and Rafiu Zakaria (Qatar). It was determined that a large focus group was the most effective way to gain knowledge about workplace safety to provide a report on this subject to the United Nations. The theme of workplace safety was first discussed in small groups and then feedback and further discussion on workplace safety was held with leading and promotion of further ideas for deeper discussion by the moderator, Mr Edward Hogue.

Results

The main themes to emerge from the focus group discussion were the role of government legislation, accident investigations, safety professionals, managers, and other employees as barriers to, and enablers of, workplace safety.

Canada

In Canada safety success factors are related to the Canadian government enforcing workplace safety and health laws that are followed by workplace employers, employees, and other relevant people. In Canada company work contracts are awarded following a review of the company safety records. The Ministry of Labour in each Province has slightly different laws and standards, but all are effective in promoting workplace safety. For breaching the law, a company may be charged, and fines have approached $1.5 million depending upon the offence, and the negligence by the employer. Without good

workplace safety, in Canada insurance premiums also become too expensive so, for cost effective company management, the CEO must support workplace safety and safety is promoted from the top down.

If there is not satisfactory workplace safety, for example an employee working on at heights is not wearing fall protection, then the CEO, manager, supervisor, and worker are all responsible and all can be charged. In Canada employees can belong to a Union which promotes workplace safety. If a supervisor asks a worker to do unsafe work, and the worker dies as a result of doing this work then the supervisor will be penalized with a fine or criminal prosecution with potential for jail time. Employees are expected to own safety and have the right to refuse any unsafe work requests and can report a supervisor who asks them to perform unsafe work.

The Workers' Compensation system has lead safety promotion. When a person in Canada accepts an offer of employment at a company, they give up the right to sue if they have a work-related accident, work related ill health, or die due to a work-related cause. Injuries sustained while at work are insured through the Workers' Compensation system, which will support injured workers financially, and will support worker retraining and job placement after an accident.

A safety success story from Canada relates to a high-rise construction company. At the commencement of a safety improvement program this company had 172 employee work related injuries for the year and had 400 workers. The Safety Professional trained the CEO, managers, supervisors and other workers about workplace and work processes safety. All workers on site became responsible for safety. Workers organized onsite toolbox talks to keep their work-related safety knowledge up to date. The employees were taught about hazards, risk management and mitigation. Everyone (from the CEO to hands on workers) had a 'buy in' to work safely and to promote workplace safety. In the first year of the program implementation there were 32 incidents reported. In the second year there were only 7 incidents reported and the

company increased in profitability and now employs 800 workers. The Safety Professional was able to sell to the CEO that the cost of not having safety at work is much higher than having workplace and work processes safety. The Safety Professional made sure that the company Owner knew that his / her role was to protect the Owner and the business, and told each person at the work site that he / she was there to help and protect them. If an employee did not want help, the Safety Professional educated them to prioritize workplace safety and health, for the betterment of every worker and the company as a whole.

United States of America

In the United States of America (USA) the law requires that employers provide a safe and healthy workplace free from recognized hazards (OSHA, 1970). If employers do not develop appropriate safety programs to manage workplace hazards and employees are injured and both the CEO and the company are found to be negligent, it is likely they will be found liable outside of the no-fault workers' compensation system and can be sued for not having workplace, or and work processes or employee safety to protect workers.

In the USA significant attention and resources have been focused on methods to develop and improve safety climate and culture in USA companies. The research in safety climate and culture support the assertion that safety must be a priority that is supported by company leadership to effectively reduce and/or eliminate occupational injury, disease and fatality. Greater emphasis has been placed on addressing leading indicator of behaviours that may lead to injury rather than relying on lagging indicators of injury and losses.

In the USA, it is felt, and should be taught, that every employee is considered a safety person. The employer must provide training, proper equipment, tools and conditions to work safely and build a positive safety climate where all employees buy-in to safe work practices and do not take unsafe shortcuts. and there is joint responsibility by both the employer and employee for workplace safety. In the USA, the Safety Professional assists with workplace safety management and can stop work if it is unsafe. The Safety Professional is expected to be a leader of people (not a manager) and model safe behaviours as well as train workers in hazard identification and controls and ensure the work process and environment are free of recognized hazards for workplace safety.

In California it had been found that if the workers, do not feel valued in their workplace, some employees had made a claim for a work-related injury, even if they were not injured.

Through the Department of Safety, Health and Industrial Hygiene, the School of Mines and Engineering at the Montana Technological University recently taught a 3-hour workshop-training program called Foundations for Safety Leadership. This program was designed by the Center for Construction Research and Training (CPWR) and professors at the University of Colorado with the concepts of transformational leadership (Goldehar, Schwatka and Johnson, 2019). The 3-hour workshop was conducted to enhance alignment of frontline supervisors with the company's vision, mission, and company values for safety. This program focused on 5 core safety leadership skills: 1) Leads by example, 2) engages and empowers team members, 3) actively listens and practices 3-way communication, 4) develops team members through teaching, coaching and feedback, and 5) recognizes team members for a job well done. The program focuses on frontline supervisors for the greatest positive impact to improved safety climate.

Transformational leadership for safety strives for alignment of the organization from top to bottom and from bottom to top for work safety. A mining company in Montana that uses a transformational leadership style for business implemented this program to enhance their safety climate despite their stellar safety record with has had no lost time injuries for 10 years. This is a safety success story that can be duplicated.

In the USA there has been an evolution of occupational safety and health to include

public health concepts and practices that have led to what is called Total Worker Health (TWH). Total Worker Health is intended to be more holistic and include worker safety and health from both protection and prevention perspectives. The inclusion of the social determinants of health helps the employer address disparities that may exist based upon socioeconomic factors. Employee participation is critical to achieve success in overall health and safety. The multidiscipline approach is advocated rather than any single discipline managing the health and safety needs. The National Institutes for Occupational Safety and Health now funds several Total Work Health Centres across the country. The concepts and practices that support positive safety climate supports the tenants of total worker health. Many safety professionals are learning about total worker health as they look for strategies to build strong positive safety climate and culture throughout USA companies.

In relation to the work of the Safety Professional in the USA it was stated that the Safety Professional only found what was looked for. The role of the Safety Professional in promoting workplace safety in the USA, and other countries, was to always tell the truth, be focused on what was being done, show caring for workers, not to give up and to always be there to help with improving workplace safety and health.

In the USA it was stated that safety is about building personal relationships. People do not care about how much the Safety Professional knows, until they know how much the Safety Professional cares. Distracted employees, such as those with home personal problems, are more likely to get injured so, the Safety Professional needs to step in and work with them and assist with finding professional help with problem solving if this is required. People need to be let know and feel that they are important and the safety professional should reinforce that that all employee are important.

It was stated that it was important for a Safety Consultant to quit their client if the client would not listen to what the Safety Consultant had to say when there was a poor safety culture in the workplace and the problems with the client stemmed from management practices and company policies.

Sometimes the problem was the client, but in the USA it was stated that there were some Safety Consultants, particularly for construction and building maintenance companies, who only thought about lining their own pockets, rather than looking after their client long term. Unfortunately these companies had to live with the consequences until they could find an ethical, well-trained safety professional.

Another all too common barrier in the commercial construction world is when the scheduled completion of the project is behind schedule and/or over budget, safety is no longer a priority so there is a requirement to deliver your portion of the project, no matter how you do it.

The success of any program is mutual trust. Normally, management wants the workers to trust them; however, management do not trust their workers to make the right decisions. Trust is built on open communications in both directions. Management expects their communications to be followed; however, the "speed of trust" in the other direction from the workers determines the success or failure of the overall program. It should never be an "us versus them" relationship.

The best example of safety culture is water in an aquarium. The water affects everything that happens in the tank; so it is with the work environment. Safety is not just safety; it is management. Without truth, there can be no trust; without trust, there is no communication; without trust, there can be no change. Everyone wants change for the better. If more is expected, the outcome is more. If more is expected from workers then workers expect more from their management. It was stated that none of us can do what all of us can do together.

Kenya-East Africa
In Kenya the government, through the Directorate of Occupational Safety and Health Services-Kenya (DOSHS-Kenya) which is under the Ministry of Labour and

Social Services, has the power to inspect any workplace at any time. DOSHS-Kenya, as the Regulator, may issue improvement and/or prohibitory notices to workplaces that do not comply with the Occupational Health and Safety Standards (as provided for in the Occupational Safety and Health Act, 2007). DOSHS-Kenya has the power to shut down/ cease operation of any/ all activities if this is required for workplace safety. For example, no planes were allowed to use the airport while the runway was being repaired.

The workers have strong union support for safety and will always reach DOSHS-Kenya representatives / officers and inspectors through doshdept@labour.go.ke if their safety requirements are not met internally as per the laid down safety procedures.

As an enabler for workplace safety and health Safety Professionals in Kenya under the fast growing Workplace Safety Professional Association of Kenya (WSPAK) which has been duly registered by the Kenya government, has Instagram-@wspa_kenya, twitter(@WSPAK_Kenya) and LinkedIn platforms where continuous awareness, updates on improving, sustaining safe work practices and enhancing professionalism to safety practitioners is shared. In addition, this Association has plans to undertake various activities in Kenyan organizations, share knowledge and improve workplaces in matters safety. For example, they conduct professional meetings and forums where Members can share occupational safety and health knowledge and insight in various industrial operations/applications.

Middle East-Kuwait
A Safety Professional working for G4S Kuwait; an Integrated Security services provider with contracts in oil and gas, Aviation, Universities, colleges, major international branded malls, Health institutions, construction, banks projects among others in Kuwait Middle East described what he did to promote workplace safety. In 2016 the company he works for was rated as a high-risk company due to numerous High Potential Incidents, Road Traffic Incidents and poor safety

culture amongst the employees. In 2017, it was classed as a medium risk company and by 2018 was categorised as a low risk company as it had achieved a high standard of workplace safety. This success in safety improvement was generated by the Safety Professional promoting management to conduct Safety walk and talks (SWATs), toolbox talks, inspections for facilities and vehicles, full enforcement of the internal Golden Rules of Safety and to listen to what employees wanted to be done to improve their safety. Success was also due to the engagement of employees by management, the Employee Representative/s and the Safety Professional's passion for workplace and work processes safety.

Another Safety Professional working in the Middle East had up to 46.000 people working at the company he was employed by. He promoted successful workplace safety by looking at workers as people (not just employees). He found that when care was shown employees listened. He agreed with the above Safety Professional in that passion for what you do is an important success factor for each Safety Professional. This was agreed with by other focus group Safety Professionals who stated that the Safety Professional was the person in the middle who had to sell workplace safety good practices to the Managing Director and all workers, and that having passion for safety was important to have been able to achieve this.

Nigeria
In Nigeria, work is being done to improve workplace safety in different industries. Currently, some children have access to some safety education courtesy of advocacy initiatives of safety professionals. Direct training and story books are used to share the safety message with them.

Philippines
For the Philippines it was identified that the size of the organisation affects the effectiveness of workplace safety and health practices. In small organisations of 200 or less people, the manager was more likely to know and support everyone and have an open door policy. This promotes a culture of care as the employees doing the hands on work are listened to, risk control

measures are implemented as appropriate and employees are treated fairly. People like to work for companies where this occurs as safety is promoted from the top down and is valued by everyone who works for the company.

On the 17th of August in 2018 new safety and health, legislation became law and was called Republic Act No. 11058 entitled "An Act Strengthening Compliance with Occupational Safety and Health Standards and Providing Penalties for Violations Thereof". Subsequently, on the 7th of December in 2018, DOLE Department Order No. 198-18, Implementing Rules and Regulations of this law was issued. The WSO-Philippines representatives actively participated as part of the Technical Working Group (TWG) that supported the government in crafting the new Implementing Rules and Regulations. It was ground breaking in that finally employers will be fined for wilfully violating the rules (s.29). Fines range from P20,000 to P100,000. If employees perceive that there is imminent work related danger employees are now able to stop and refuse to do unsafe work without retaliation from the employer (s.6), have the right to report work related accidents (s.7), to be provided with personal protective equipment if this is required for safe work (s.8), and are entitled to workers compensation for work related disability or death (s.27).

Under s4(a) of this legislation every employer, contractor or subcontractor and any person who manages, controls or supervises the work being undertaken shall:
1. Equip a place of employment for workers free from hazardous conditions that are causing, or are likely to cause, death, illness or physical harm to the workers;
2. Provide complete job safety instructions and proper orientation to all workers including, but not limited to, those relating to familiarization with their work environment;
3. Ensure that, so far as is reasonably practicable, the chemical, physical and biological substances and agents, and ergonomic and psychosocial stresses under their control are without risk to health when the appropriate measures of protection are taken;
4. Use only approved specific industry set of standards of devices and equipment for the workplace, as applicable;
5. Comply with OSH standards, including training, medical examination, and when necessary, provisions of protective and safety devices such as PPE and machine guards. Training for workers shall include health promotion, hazards associated with their work, health risks involved or to which they are exposed to, preventive measures to eliminate or minimize risks, steps to be taken in cases of emergency, and safety instructions for the jobs, activities and tasks to be handled by workers;
6. Make arrangements for workers and their representatives to have the time and resource to participate actively in the processes of organizing, planning and implementation, monitoring, evaluation and action for improvement of the OSH management system;
7. Provide, when necessary, for measures identifying trainings and drills, evacuation plans, etc., to deal with emergencies, fires and accidents including first-aid arrangements;
8. Comply with all reportorial requirements of the OSH standards; and
9. Register establishment to Department of Labour & Employment (DOLE) as provided under the OSH standards.

Under section 4(b) the duties of employees are to:
1. Participate in capacity building activities on safety and health and other OSH related topics and programs;
2. Proper use of all safeguards and safety devices furnished for workers' protection and that of others;
3. Comply with instructions to prevent accidents or imminent danger situations in the workplace;
4. Observe prescribed steps to be taken in cases of emergency including participation in the conduct of national or local disaster drills; and
5. Report to their immediate supervisor or any other responsible safety and health personnel any work hazard that maybe discovered in the workplace.

To ensure that there is workplace safety s.13 requires each workplace to have an occupational safety and health committee to effectively plan, develop, oversee and monitor the implementation of the OSH program.

Section 14 requires Safety Officers to have prescribed OSH training and experience proportionate to the total number of workers and equipment, size of work area and the classification of the workplace.

It is anticipated that the implementation of this law will improve workplace safety and health for everyone.

Lebanon
Occupational health and safety in Lebanon still has a long way to go. It is something of little importance; for instance, there exists no system for monitoring occupational injuries and an unknown but small proportion of employers have insured their workplace and workers against accidents. The Lebanese workers' compensation law requires employers to provide workers injured on the job with comprehensive medical care, 75% of their daily wages from the day of injury and compensation for permanent disability and death. Some employers purchase workers' compensation insurance from private insurance companies, but most employers choose to pay out of pocket at the time of the injury. Insurance policies are issued for the site as a whole, and not in the name of each worker (ILO, 2016).

Employers and insurers have a vested interest in reducing injuries as a whole and the most costly and serious injuries in particular. Most workplace incidents and injuries are preventable, and basic safety measures, education and training are proven cost-effective interventions that reduce the overall incidence of workplace accidents. The public health system should play a leading role in training, raising awareness and setting up systems for monitoring occupational accidents. However, this is quite difficult in Lebanon, where the delivery of health care is mainly private and market-oriented.

To improve workplace safety in Lebanon, effective labour governance is vital to achieve socio-economic progress, even more in a context of fragility. It contributes to making decent work a reality, by improving working conditions and improving employment and productivity. This is important in promoting and anchoring a culture of prevention, compliance and decent employment practices for improving working relationships and working conditions, all of which will contribute to improved productivity and incomes. This requires efforts to strengthen labour legislation in line with incentives for a productive labour market and its alignment with international labour standards, including the conventions ratified by Lebanon. At the same time, labour inspection and the promotion of occupational safety and health should be improved.

Even though improvements have been made, there exists no real evidence that the improvements have made a significant difference in occupational safety and health in Lebanon. What is urgently needed, in this respect, is a change in policy and operations at ministerial and legislative levels. Besides, an efficient and effective enforcement system is deemed necessary.

Saudi Arabia
In Saudi Arabia, it was stated that everything is controlled through family power. Without the right connections the Safety Professional is unable to do anything to improve workplace safety.

Taiwan
In Taiwan, a success factor is that safety professionals set up an industrial safety inspection team to perform the inspection. Inspections include projects and general work safety inspections. The purpose of safety inspections is to detect unsafe health factors and potential dangers at an early stage, and related safety and health personnel can immediately review and improve workplace and work process factors to prevent disasters and accidents and protect the safety and health of workers.

Indonesia

Occupational Safety and Health (OSH) in Indonesia commenced in 1910 when the government of East Indies Dutch launched Veiligheids Reglement 1910 regulation for general industry and Mijn Politie Reglement for the mining industry. In line with the global OSH developments, and after becoming an ILO Member and ratifying the ILO Convention 155, in 1970 the Indonesian government issued the Occupational Safety Act No. 1 year 1970, at the same time that similar Safety Acts were made law in the USA and UK.

In January 2020, Indonesia OSH legislation was 50 years old. Workplace safety is growing very rapidly although there are still many weaknesses and shortcomings. In the period of 1980, the Indonesian Government issued various OSH regulations and guidelines to build the OSH Culture in Indonesia such as construction OSH, pressure vessel OSH, fire prevention and safety and other regulations and guidelines.

In 1984, the Indonesian Government established DK3N (the Occupational Safety and Health National Council) such as BSC (British Safety Council) in the UK or NSC (National Safety Council) in the USA. In this year, the Indonesian Government also set a national OSH symbol and flag, which are still very popular now and are used to promote workplace safety.

In the period 1990, the growth and development of Indonesian OSH was very significant. The OSH consciousness in middle of society is increasingly higher. In 1990, for the first time the Indonesian Government set an Indonesia National OSH Month, from 12 January to 12 February each year, which is commemorated annually throughout Indonesia now. To promote and reward workplace safety every year, in National OSH Month events, the Indonesian Government presents various OSH awards to their Citizens, Organizations, Companies and Local Governments. An example is the Zero Accident Awards for companies that do not have a reported LTI accident in at least 1 million working hours. Gold Flag Awards are presented to companies that have implemented their OHS Management System with a minimum achievement of 85%.

In the 1990s various organizations in Indonesia were established, such as Organizations of Industries OSH, Construction OSH, Mining Safety, Oil & Gas Safety, Industrial Hygiene, Health, Fire Safety, etc. To promote workplace safety in the year 1996 the Indonesian Government issued a National OSH Management System (called SMK3) which refers to OHSAS 18001, which had to be implemented in every company with a total workforce of 100 people or more that had high risk activities, such as in mining companies, oil and gas companies, construction companies, etc.

In the period of 2000 OSH became a national program and implemented in all sectors of development in Indonesia. All stakeholders are now involved in OSH and are increasingly fierce in enforcing workplace safety. There are many National OSH Seminars, OSH Educational programs and other OSH Certifications, involving some OSH Professionals in Indonesia.

In the year of 2003, the Government of the Republic of Indonesia issued Law No 13 about Manpower which requires all companies to apply the SMK3 (National OSH Safety Management System) which is then strengthened by the presence of PP (Government Regulation) No. 50 implemented in 2012 on SMK3. This resulted in various industry sectors developing safety management systems for their workplaces and specific OSH Management Systems that were enforced in their own development sectors. For example, in the Mineral and Coal Mining Sector, there emerged SMKP (the Mining Safety Management System – Mineral and Coal). In the oil and gas sector, there emerged the SMKM (the Oil & Gas Safety Management System). In the construction sector there emerged SMKK (the Construction OHS Management System). In the health sector there emerged their Health Management System, and in the sector of transportation, there emerged the SMKT (the Transportation Safety Management System). Unfortunately, the

number of occupational accidents were still high.

The Indonesian government, based on Law No. 13 year 2003, established the National Professional Certification Board we call BNSP for various types of professions. The government appoints a certification body we call LSP to conduct the examinations. There are various types of OHS competencies examined including Safety Expert, Industrial Hygiene, Fire safety, Construction safety, Mining safety, etc. In Indonesia there are 2 schemes for Safety Professional work qualifications.

1. The Ministry of Manpower [the workplace safety and health law enforcement agency] issues a Safety Certificate for Safety Experts for various skill such as general safety, pressure vessel, boiler, chemical etc. This Certificate is issued by government to the employer or company to appoint the person as a Certified Safety Officer. It is a licence to work and valid for 3 years or until the person is not working anymore for the company.

2. Personnel Certificate through LSP for the individual as Certificates of Competencies. Many Safety Professionals in Indonesia are looking at obtaining International Certification such as through WSO CSP, NEBOSH, IOSH, etc.

In line with the OSH development and needs, the field of OSH education is growing rapidly as a facilitator of workplace safety in Indonesia. There are many majors or study programs in various universities in Indonesia that were established to teach workplace safety. In 2020 there are about 40 Universities that have OSH majors or study programs.

Despite the progress that has been achieved by the Indonesian nation, the number of occupational accidents is still relatively high. In 2018 there were reported 153,313 cases of accidents with a death toll of more than 3,500 people. The Indonesian citizens' safety culture, especially among workers, is still low. Many workers still not care about the OSH rules and implementation of them in their respective work areas, when without strict supervision. Therefore, the Government of

Indonesia 10 years ago proclaimed the Indonesia OSH culture that is run across companies all over of Indonesia to promote a positive workplace safety culture.

Another problem that is felt by the Indonesian OSH Practitioners, is the weakness of OSH law enforcement, because in the Indonesian Law No. 1 year 1970, that is aged 50 years, the penalty for breaching this OSH Act is only subject to a fine of IDR 100,000 (just about $6.67). Therefore there have been many demands from Indonesian Safety Practitioners to the Government of the Republic of Indonesia to revise the Act No 1 year 1970, immediately. Compared to the Factory Act in the USA, that has been amended several times, the Indonesian legislation has not had its fines updated.

Qatar

The hosting of the world cup in 2022 placed Qatar under international watch by multiple international groups (International media, labour groups, human rights organizations). The Government evidently and sincerely is providing the required budget for infrastructures, health & safety, welfare arrangements, required resources in terms of work force, machineries, know-how and materials to mention a few.

Supervision of works is always directed by the Government institutions and their representatives. Good examples are found with the Public Works Authority and QP whose management people are directly involved in the supervision of work, sometimes indirectly through the appointment of supervising consultants to monitor and supervise works with the contractors and subcontractors. Implementation of workplace safety is given a serious priority in the state of Qatar.

Enablers and Success Factors

There is very strong commitment by the Government towards workplace health and safety. In addition, guidance documents and procedures such as the Qatar construction safety guide, work zone traffic management guide, Qatar labour law, contractor HSE plans, Risk assessments, Method statements, QP HSE regulations for contractors and related internationally

acceptable Workplace HSE requirements is available and imposed upon all companies and organizations before works, during works and will be audited after works to ensure implementations.

Respective government bodies (Roads & infrastructures, housing, oil & gas) responsible for awarding different projects are obligated to provide monitoring and supervision of workplace safety implementations. Organizations must submit pre-qualification information when bidding for projects and among other things, prove of successes and competency, provide workplace health and safety records of the company which is a major factor considered before projects are awarded. The workplace health and safety budget is awarded by the Government prior to work commencement to ensure arrangements of workplace health and safety are provided and achieved. Such arrangements include welfare, safe access and egress, transportation, P.P.E, provision of adequate safety supervision for all workers, provision of trainings & awareness, inductions and 3rd party training and other factors related to workplace safety and employee health.

Barriers

The current structure of workplace inspections are all affiliated with the same Government offices who award projects. This has allowed for more priority given to work completions which may encourage compromises towards the priorities of Workplace safety supervision and implementation. It was considered that if workplace safety was independent from the same government body allocating the works, they will be more effective but if they remain under the same umbrella then compromises will exist.

As it is with most authoritarian regimes, labour unions, organized workplace safety and health institutions are not independently available which has left safety professional by themselves, with some support from committed management and no support if the management is not committed.

The reality is that the Government always provides the funds for the implementation of HSE and for the welfare of the worker. The structure of supervision and monitoring of workers and state projects will simply do better if they are separated rather than keeping them under the same umbrella and management.

Western Australia

Workplace safety education in Western Australia commences with educating the children. For children in Western Australia there have been a series of videos that have been shown on TV to promote children to think of safety before they act. WorkSafe Western Australia has 'Planet ThinkSafe' as an online educational resource for primary school children. It provides information to help children develop a positive attitude towards, and the skills to be, safe at school, home and in the community. It is part of the educational curriculum in primary schools and has cross-curricular courses and activities that have been organised into three levels; for lower, middle and for upper primary school children.

The WorkSafe SmartMove website is a comprehensive occupational safety and health educational resource for senior high school students and for new young workers that are entering the workforce on a work placement, work experience, or as a school-based trainee/apprentice. Features of the SmartMove website include having a SmartMove Certificate program containing one general and fifteen industry modules. High school students must pass and obtain this Certificate before being allowed to do industry work experience. The SmartMove Safety Passport program contains eight progressive online lessons that include videos, online learning activities, printable worksheets and a resource section that contains information sessions on current occupational safety and health topics. This program also has mapping documents and assessment tools for the national competency unit BSBWHS201A, over seventy printable occupational safety and health lesson plans and worksheets that provide over 100 hours of activities for educators.

In Western Australia it is considered that all children need to know the principles of safety and health before they enter the workplace, have an understanding of how to identify work related hazards, assess the risk, report this risk to their supervisor and refuse to do any work that they do not consider safe for them to do. In Australia now young people, below 20 years old, are less likely to make a workers' compensation claims per million hours worked than people over 50 years old (Safe Work Australia, 2020)

Please see the Quality Care Model in Appendix one. This model shows what is required for the employer / managers to do [under the heading of management], employees and suppliers to do to have a high standard of workplace safety and health and was developed through research. The model includes research being conducted to make improvements, findings publicised throughout the organisation and used to improve organisational activities. The outcomes are minimal employee occupational injuries and sick leave. Another outcome of having a mission and a culture of care for everyone was that private hospitals had more customers [this research was conducted in healthcare organisations] while public hospitals had less customers. Having a high standard of customer care increased the profits of private hospitals as they had more customers. In public hospitals giving the best care practicable meant that there were less patient readmissions and patients got better faster. This saved tax payers money so spending on healthcare could be decreased by the government.

This philosophy of having a general duty of care for a high standard of workplace safety and health was identified by the Robens Report in Britain in 1972 (Bennett, 2015). On the 3rd of June 1981, the main recommendations of the Robens Report were included in the International Labour Organisation (ILO) Convention number 155. This ILO Convention was ratified by the Australian government and this general duty of care required by employers, employees, designers, manufacturers, installers, contractors and everyone who can influence workplace safety and health

came into the Australian legislation in all Australian States and Territories. This Australian legislation includes the roles of Safety and Health Representatives who represent the people in their area of work. Trained [they complete a 5 day course on their role] Safety and Health Representatives can issue a Provisional Improvement Notice (PIN) if their employer does not rectify reported hazards in the workplace. This brings a legal requirement to the employer to rectify the hazard to make the work process / workplace safe. Having the input and influence of the people conducting the work assists with enabling workplace safety. Inspectors can issue a Prohibition Notice to cease work that is hazardous as well as issue Provisional Improvement Notices. This stops unsafe work conditions to prevent work related deaths.

Section 39 of the Occupational Safety and Health Act 1984 of Western Australia allows for the employer to establish a workplace safety and health committee where at least half the members are safety and health representatives and the rest are management who represent the employer.

Section 40 of this Act describes the functions of this committee as 'to facilitate consultation and cooperation between an employer and the employees of the employer in initiating, developing, and implementing measures designed to ensure the safety and health of employees at the workplace' 'To keep itself informed as to standards relating to safety and health generally recommended or prevailing in workplaces of a comparable nature and to review, and make recommendations to the employer on, rules and procedures at the workplace relating to the safety and health of the employees.' 'To recommend to the employer and employees the establishment, maintenance, and monitoring of programmes, measures and procedures at the workplace relating to the safety and health of the employees'. 'To consider, and make such recommendations to the employer as the committee sees fit in respect of, any changes or intended changes to or at the workplace that may reasonably be expected to affect the safety or health of employees at the workplace.' 'to consider

such matters as are referred to the committee by a safety and health representative and to perform such other functions as may be prescribed in the regulations or given to the committee, with its consent, by the employer. A well-functioning safety and health committee allows both the employee representatives and management to work well together to improve workplace safety and health and to maintain a safe workplace, safe work processes and safe actions by people at work.

With the exception of the police all employees have the right to refuse to do work that puts them into danger. This helps to prevent work related injuries, ill health and deaths. The Occupational Safety and Health Act 1984 of Western Australia has a general duty of care and is underpinned by Regulations that provide specific instructions for workplace safety and employee health.

In Australia there are industrial manslaughter laws which do differ in penalties depending on the State or Territory in which are law. In Victoria, if there is negligent conduct by any person, including the employer, a manager or self-employed person, that causes the death of an employee or a member of the public, the maximum fine is $16 million for a company, 20 years imprisonment for the individual and there is no statutory limitation period to bring proceedings for workplace manslaughter to the regulator. In the Northern Territory the maximum penalty for an individual is imprisonment for life (Ashurst, 2019). In the past just having fines for industrial manslaughter meant that small companies went bankrupt with all of their workers losing their employment while fines of even $16 million meant nothing to large corporations with profits of billions of dollars. For this reason individual imprisonment for industrial manslaughter was brought into law.

Despite penalties for not meeting the legal requirements related to workplace safety and health in Australia in 2018 there were 144 people who died as the result of a traumatic work related injury (a fatality rate of 1.1 per 100,000 workers) in Australia (Safe Work Australia, 2020a) and 107,335 employees (frequency rate of 5.5 per million hours worked) in 2017-18 who made a workers' compensation claim (Safe Work Australia, 2020b).

In the Western Australian Work Health and Safety Bill 2019 (which has been passed by the Lower House in Parliament but which is awaiting approval by the Upper house), for industrial manslaughter there are two levels of offences with one being a *crime* and the other a *simple offence.* These apply to the person conducting the business or undertaking that causes the death of an individual. The company fine is $10 million and for an individual there is 20 years imprisonment and a fine of $5 million for a *crime.* For a *simple offence* the fine is $5 million for a company and 10 years imprisonment with a fine of $2.5 million for the individual. A *crime* is when the company or person fails to comply with their health and safety duty knowing that this is likely to cause death. A *simple offence* is when the health and safety duty is not complied with and the failure causes a death (Ashurst, 2019).

In this Bill, part 2, division 3, section 26A (3) work health and safety service providers must ensure that the services or advice that they provide is effective. If a recommendation for how to control a risk is inadequate or if a training course for workers about how they can avoid being exposed to risks is not effective then the safety service provider commits an offence that is punishable under the proposed law. This is different to in the Philippines law where education of safety professionals is law and not punishment.

In Australia, before a Safety and Health draft law goes to Parliament as a Bill to be passed by the Parliament it is put out to the general public for comments to be sent back to the Minister concerned to consider in relation to the proposed Bill. Appendix two is an example of a response recommending changes to the Bill and the Minister's reply. It is interesting to note in the letter that, despite having workplace safety and health laws, there was not always safe work processes or a safe workplace. This is a

barrier to workplace safety and employee good health. An enabler for safer workplaces and work processes would be to include into law best practices from other States, Territories and countries.

This Minister [Hon Bill Johnson] previously worked as a union official who supported employees in having a safe workplace and safe work processes. He was very keen to improve safety and health for all industries in Western Australia. For example, the government has provided more resources to WorkSafe [the regulatory authority], has doubled the number of workplace regulator inspectors to 90 and is working to improve the State workplace safety and health laws.

Summary

The findings from the focus group participants' responses have been summarised in two tables. The first table includes the 13 factors that participants stated were barriers in their country to providing workplace safety.

Table 1. Barriers

Country	Barriers
USA	Clients may not listen to Safety Professional's advice and have an unsafe workplace &/or work processes.
USA	If a construction project is behind schedule, or over budget, cost saving or completion, not safety, is the priority.
USA	Lack of trust between management and workers.
USA	If employees do not feel valued they may make a false claim for a work related injury that did not occur.
Lebanon	No system for monitoring occupational injuries.
Lebanon	OSH law enforcement system is not effective.
Saudi Arabia	Everything controlled through family power.
Indonesia	Safety culture, especially among workers, is still low.
Indonesia	Weakness in OSH law enforcement.
Indonesia	Penalty for breaching the OSH Act is $6.67.
Qatar	The government awards work and may favour some companies.
Qatar	Safety Professionals only have support if management is committed to workplace safety and health.
Australia	Not all employees have the right to refuse to perform unsafe work.

The main barriers identified were employees not feeling valued by their employer; clients not listening to the Safety Professionals' advice. No management support for workplace safety. Focus on work completion on time or finance leading to safety ignored. Having weak government enforced of workplace safety and health law. Having a poor employee safety culture in the workplace.
Having family power control if the family was not committed to workplace safety and health. Not all employees having the right to refuse to do unsafe work.

The second table includes the factors that participants found in their country promoted a high standard of workplace safety and health. There were 38 enablers reported and some of the enablers were common to multiple countries.

Table 2. Enablers

Country	Enablers
Canada Australia	Government enforces workplace OSH laws
Canada Australia	Cost. Fines for breaching laws. Insurance costs.
Canada Kuwait Australia	Management commitment to safety. CEO supports safety. Safety promoted from the top down.
Canada Kenya	Union promotes workplace safety
Canada Australia	Employees own safety and have the right to refuse to do unsafe work. Employees can report a supervisor who asks them to perform unsafe work.
Canada Kuwait Australia	Workplace toolbox talks to increase work related safety & health knowledge.
Canada Philippines Australia	Employees taught about hazards, risk management & mitigation.

Country	Description
Canada	Workers' Compensation System leads to safety promotion.
USA Indonesia Australia	Employers required by law to develop and implement appropriate workplace safety management programs.
USA	Positive safety culture & safety climate promoted in many workplaces.
USA Australia	Safety Professional can stop unsafe work.
USA Kuwait Australia	Safety Professional is a leader, not a manager, of workplace safety. Safety Professional builds personal relationships with people to promote a culture of care & workplace safety.
USA	Safety Transformational Leadership education provided.
USA Philippines	Total worker health promoted.
Kenya Australia	Government inspections for safety. Government Power to issue Prohibition or Improvement notices. Government power to stop unsafe work.
Kenya	Workplace Safety Professional Association of Kenya promotes sharing and improvement of OSH knowledge for Safety Professionals and other people.
Kuwait	Management conducts safety walks & talks. Engagement of employees & employee representatives by management.
Kuwait Taiwan Australia	Inspections of facilities, work processes and vehicles daily. Risk control measures implemented for any identified safety or health risks.
Kuwait Australia	Safety Professional listens to what employees want to improve their safety.
Kuwait Australia	Safety Professional is passionate about workplace, work process and employee safety.
Nigeria Australia	Children provided with safety and health education.
Philippines	Education for Safety Professionals required by law.
Philippines Australia	Employers, contractors & employees fined for breaches of the OSH laws.
Philippines Australia	Workplace accidents and deaths reported to the Government Regulator.
Philippines Australia	Employers provide employees with personal protective equipment if this is required for safe work.
Philippines Lebanon Australia Canada	Employees are entitled to compensation for a work related disability or death.
Philippines Australia	Employers required providing a safe workplace, safe work processes, safe products & equipment and employee safety education.
Philippines	Workers given work time & resources to participate actively in the processes of organizing, planning, implementation, monitoring, evaluation & to take action for improvement of OSH management system.
Philippines Australia	Employees required to participate in capacity building safety and health activities, work related education, use safe guards, safety devices and personal protective equipment as required. Employees required to follow safe work instructions & report any dangers to their immediate supervisor or a responsible OSH person. Employees to ensure their own safety & health at work and to avoid adversely affecting the safety or health of any other person through any act or omission.
Philippines	Have an Occupational Safety & Health Committee to effectively plan, develop, oversee & monitor implementation of the OSH program.
Indonesia	Opportunities provided for Safety Professionals to receive relevant education & to become accredited.
Indonesia Australia Qatar	Workplace safety & health is promoted by the Government

Qatar	Government monitoring and supervision of OSH in workplaces.
Qatar Australia	Laws, guidance documents and procedures for workplace safety provided by the government.
Qatar	Work projects awarded by the government require the company tendering to submit pre-qualification information that includes their safety management system, induction information, training provided and competencies, safety record and other relevant workplace safety and health information.
Australia	Research conducted and implemented to improve workplace safety & health.
Australia	General duty of care for everyone who comes onto the work premises or who can be affected by the work, products, equipment, service, etc. required by law.
Australia	Have worker involvement in safety and health through the election of safety and health representatives who are provided with OSH training, and through the workplace safety and health committee.

The main enablers to having a high standard of workplace safety and health were having support from everyone in the workplace and from enforced government laws. Having a workplace culture of caring for everyone. Everyone educated about workplace safety including hazard identification, risk assessment, risk control and mitigation. Being able to stop work if there was a risk of harm. Allowing time, and providing resources for employee involvement in workplace safety and health. Having regular workplace inspections and safety improvements. Having educated, qualified Safety Professionals. Having people passionate about workplace, work processes and employee safety and health.

Conclusions and Recommendations
The opportunity to come together from all over the world to discuss workplace health and safety challenges and learning solutions was amazing. Conclusions were that safety professionals must all work together to improve the networking of solutions to reach other parts of the world to share best practice safety and health knowledge.

All focus group participants from all countries agreed that it was important for Safety Professionals to continue to learn to keep up to date with the latest information related to promoting workplace safety. Participants considered it was important to network with other Safety Professionals to share ideas on what works and how to make improvements in workplace safety. In some countries the government was not committed to workplace safety so it was suggested that the Leader (e.g. President) should be involved in improving occupational safety and health for their country. It was interesting to note that in Indonesia the penalty for breaching the OSH Act was $6.67, while in Victoria, Australia it was up to $16 million for a company and in the Northern Territory in Australia it was life imprisonment if the legislation breach caused a death. In Canada it was concluded that a fine of only $1.5 million was effective in promoting workplace safety. In Australia imprisonment for legislation breaches is law because it was found that even large fines were not deterrent to companies with billions of dollars in annual profits, but that large fines made small business bankrupt resulting in the loss of employment for their workers.

Every person matters. It was concluded by the participants that together we, as a profession, can do great things and Safety Professionals should ask every worker what they can do to make their work safer. It was considered by the participants that to be effective Safety Professionals need to know the employees as individuals, to have a high level of support from the company owners and all workers and that company owners should focus on people and worker engagement, not just numbers.

It was also concluded that safety and employee health should be an organisational priority core value with safety being included in the way that business is done in the workplace so that everyone can go home as healthy as when they came to work. When developing workplace safety it is important to implement practices that facilitate employee engagement, provide positive employee reinforcement for safe work and achieve best workplace safety and health practices in the target industry. This would increase employee productivity and be beneficial for the employer and shareholders. A conclusion was that in a workplace with a good safety culture there was care for all with everyone, including the CEO, personally committed to workplace safety.

Recommendations provided to the United Nations Economic and Social Council were as follows.

- Workplace health and safety must be promoted as the collective responsibility of all workers from top to bottom. It should not only be the responsibility of the HSE Professional. Workplace health & safety roles and responsibility must be defined for all positions, especially for supervisors and managers, in the *Hierarchical Organization Chart.*
- Policies must support the HSE professional to remain independent and to hold violators accountable where due diligence is evident rather then been held accountable for other workers deliberate negligence's and compromise. This would encourage a better culture towards safety.
- Independent, self-sustainable institutions should be considered and supported to inspect workplace health and safety compliances and there must be business opportunities to *generate revenue* by providing solutions via consultations, raise revenues from violators as a deterrence, cover the cost of operations and to provide additional employment for the region.
- Governments should not only have workplace safety and health legislation, but

that this legislation must be enforced by the government of the country to promote a high standard of risk control risk mitigation, workplace safety and health. Best practices from other countries OSH laws should be identified and included into each countries' workplace safety and health laws.

- All employees should have the right to refuse to perform unsafe work. Work should be made as safe as practical before requiring employees to do the work.
- All workplaces should be required to have a safety management system that is known, used and effective.
- Safety Professionals and employees should be provided with workplace safety and health education so that they can work safely and promote a good safety culture at their workplace.
- In all countries, there should be a government system for reporting and monitoring work related injuries, diseases and deaths and for the government then making improvements in promoting workplace safety and health for minimising common causes of these work related injuries, diseases and fatalities.
- A General Duty of Care for everyone who comes onto the work premises, or who can be affected by the work, products, equipment, service, etc. must be required by law.
- Research should be conducted, implemented and evaluated to improve workplace safety and health.
- Workplace safety and health education must be provided to school children before they enter the workplace as this has been proven effective in providing a knowledge of hazard identification, risk assessment, risk control and a culture of having safe work practices.

References

Ashurst. (2019). *Victoria and NT pass industrial manslaughter laws, WA proposes similar laws and NSW conforms status quo.* Ashurst. https://www.ashurst.com/en/news-and-insights/legal-updates/victoria-and-nt-pass-industrial-manslaughter-laws/

Bennett, D. (2015). Health and Safety after the Robens Report of 1972 [Review of the book Safety or profit? International studies in governance, change, and the work environment, by Nichols, T., & Walters, D]. A Journal of Environmental and Occupational Health Policy, 25(1) 130–137.

Department of Labor & Employment, Republic of the Philippines. (2018). Department Order No, 198. Implementing rules and regulations of Republic Act no. 11058 entitled 'An Act strengthening compliance with occupational safety and health standards and providing penalties for violations thereof.' Author.

Goldenhar, L., Schwatka, N., & Johnson, S. (2019). Leadership skills for strengthening jobsite safety climate. Journal of Safety Research, 70, 263-271.

International Labor Organization (ILO). (2016). Decent Work Country Programme of Lebanon 2017–2020. https://www.ilo.org/wcmsp5/groups/public/---arabstates/---ro-beirut/documents/genericdocument/wcms_656561.pdf

Jansz, J. (2014). Contractor safety management for nursing. In G. Smith, (Ed.). *Contractor Safety Management*. London, UK: CRC Press, Taylor & Francis. pp. 73-103

OSHA. (1970). OSH Act of 1970. OSHA. https://www.osha.gov/laws-regs/oshact/toc.

Safe Work Australia. (2020a). *Worker Fatalities.* https://www.safeworkaustralia.gov.au/work-related-traumatic-injury-fatality-time-series

Safe Work Australia. (2020b). Australian Workers' Compensation Statistics 2017-18. https://www.safeworkaustralia.gov.au/collection/australian-workers-compensation-statistics

Western Australian Government. (2018, October). Occupational Safety and Health Act 1984. (WA) https://www.slp.wa.gov.au/pco/prod/filestore.nsf/FileURL/mrdoc_41381.pdf/$FILE/Occupational%20AUTHORSSafety%20And%20Health%20Act%201984%20-%20%5B07-j0-01%5D.pdf?OpenElement

Edward E. Hogue
Focus Group Moderator.

Mr. Hogue was the World Safety Organisation Immediate Past President-Director General and a retired Chief Warrant Officer, U.S. Marine Corps. A World Safety Organisation (WSO) member since 1995, he was known for his dedication and work with British Petroleum (BP), the U.S. Marine Corps (USMC), for his work and assistance in promoting the WSO, and his work with the professional military organizations that assisted retired and young people. He served for many years on the WSO Certification Board and assisted WSO members during their re-certification process. Edward Hogue was a leader and mentor for all who worked for, and with, him on a daily basis. Mr. Hogue's passion truly was the WSO's motto "Making Safety a Way of Life Worldwide" a reality.

In November 2019 Mr Edward Hogue died due to the ill health effects of Agent Orange exposure. The exposure occurred when he was serving in the U.S. Marine Corps in the Vietnam War. He is sadly missed by his family, friends and the many people he worked with and for.

From Elias Choueiri
Your passing is really sad and a great loss indeed to all of us who have had contact with you. You were a very pleasant and accommodating personality. I am deeply saddened that you will no longer be around us in person, but your love, your voice and your smile will be forever imprinted in my heart, my thoughts, my mind, my soul and my whole being, till forever! With every day that passes by, I miss you more because, without you, WSO will no longer be the same. Rest in peace in the company of the LORD! †

From Rafiu Zakaria
Ed Hogue was special in many ways and all about making safety a priority for all. I believe his legacy will continue to live on as we work together to continue to influence others with what Mr. Ed shared with us, with what we all love and have a passion for, which is helping to improve the condition of workplace safety around the globe.

Figure 1.

QUALITY CARE MODEL

A MISSION & CULTURE of CARING

↓

MANAGEMENT	EMPLOYEES	SUPPLIERS	RESEARCH
• show strong leadership in promoting care, consideration, health & safety of employees, customers & potential customers. • provide adequate human & material resources & good workplace conditions. • are team orientated. • provide & facilitate employee education and training. • plan, set & implement standards, & provide clear methods on how to perform tasks. • provides competent supervision. • regularly evaluate organisational activities, provide feed back & implements follow-up action as necessary. • communicate effectively	• have a culture of caring for everyone on the premises. • are provided with enough time to complete work tasks. • work together as a team. • are educated & trained in work related tasks. • are empowered. • are consulted & participate in the planning, implementation & evaluation of services & change. • have security of continuing employment. • communicate effectively	• partners in quality activities.	• conducted to improve the quality of service. • research findings are publicised throughout the organisation. • research findings are used to improve organisational activities

Customer satisfaction.

Private hospitals only
Increase in the number of customers.

High standard of health care.

LEVEL 4 QUALITY ACTIVITIES

Cost effective service delivered.

Employee commitment.	Minimal employee occupational injuries & sick leave.	Good organisation wide communication.	Continual improvement in organisational activities.	Able to adapt to changes in government policy.

Hon Bill Johnston MLA
Minister for Mines Petroleum; Energy; Industrial Relations
Level 9,Dumas House
2 Havelock Street, West Perth WA 6005

Your Ref:WHS Bill 2019
Our Ref:DLC112019
November 30, 2019

SUBJECT: WORK HEALTH SAFETY BILL (WHS) 2019 AND ITS APPLICATION TO POLICE

Dear Minister,

The Occupational Health Society of Australia WA Branch (Inc) the society, as part of its constitutional obligations, reviews new, changed or amended legislation affecting the health of workers. If these reviews reveal shortcomings or omissions then it is within our ambit to respond to the regulator, bill draftees and effected employee representative organisations highlighting the Society's concerns, whilst if practical and possible offering a solution to the issues identified.

Recent issues that have come to the Society's attention are the silica dust risks to health in the kitchen top manufacturing industry, lack of health monitoring in legislation in favour of self-regulation procedures and reduction in legislative enforceable powers when regulations are reduced to codes of practice or guidance material.

Having just read and digested the WHS Bill the society is concerned that one particular group of workers is being discriminated against based solely on the wishes of their employer. These are a group of police workers working under the Police Act as directed by the Commissioner of Police. This includes sworn police officers, aboriginal police liaison officers, police auxiliary officers and police protective service officers. It does not affect unsworn police staff. The group of police workers identified perform operational police duties with a varying degree of danger attached to those tasks. Some of those dangers have associated risks to health and some may be classified has dangerous operations, currently catered for in s4A of the current Occupational Safety and Health (OSH) Act. That section of the Act together with s3(1) were inserted in August 2003 to provided sworn police officers with inclusion in all aspects of OSH legislation.

To refresh your understanding of those two sections, they came about as the WA Police Force (WAPF) had long resisted protection of their sworn officers under OSH legislation as they considered inclusion would hamper the ability of police officers to do their job and subject the WAPF to unnecessary oversight by another State Government regulatory establishment, WorkSafe. To avoid protracted exclusion the WA Police Union (WAPU) reluctantly accepted the insertion of those sub sections on the proviso that a Code of Conduct be created to administer rules concerning the types of dangerous operations that would fit exemption of ceasing or refusing to continue to work that is associated with s26 of the OSH Act. Due to problems associated with interpretation and thus exposing WAPU members to unnecessary risk the WAPU submitted a request to remove s4A during the 2006 Hooker Review. Note: The Statutory requirement to again review the OSH legislation in 2012 never occurred, denying WAPU a further opportunity to request removal of s4A of the OSH Act.

Having read the WAPF submission into the draft WHS Bill and knowing that the WAPU opposed continuance of similar legislation being contained in the WHS Bill, it is clear that the WAPF still requires their police workers to be treated adversely different from the general workforce and more importantly their police worker counterparts in all other jurisdictions throughout Australia. Together with other areas of emergency workers in Western Australia such as Fire and Rescue Firemen,

Paramedics, Emergency workers in hospital and State Emergency Service staff and volunteers. None of the employers of these groups of workers have requested any dilution in protection under OSH or WHS legislation as s84(2) police workers performing dangerous operations and covert operations and s85(7) where a Health and Safety representative cannot direct a police worker to cease or refuse to work in a dangerous operation or covert operation. A protection normally afforded to all other workers under s26A.

Further evidence of police workers being treated differently is associated with the lack of Police Specific Compensation legislation should they be injured or become ill through work related issues and be subjected to a loss of confidence notice. 'Great' police workers risks their lives performing a dangerous operation and as a result can no longer perform a function of their office, seriously affecting their occupational future and security.

The WAPU through their affiliation with the Police Federation of Australia (PFA) worked with Safework Australia (2012/2014) with the intention of creating a WHS Code of Practice for Managing Risks in Policing. The Australian New Zealand Police Administration Authority (ANZPAA) were also involved in these negotiations and strongly resisted efforts by the PFA to insert real examples of police workers operational duties. After continual bureaucratic frustrations the PFA decided to go alone and using the expertise of each jurisdiction's Safety Officers they produced the PFA Good Practice Code for Managing Risks in Policing (May 2014.) This comprehensive yet easy to follow code for police workers is an indication that the Australian peak police workers organisational representative body cares more about their members than the various police forces around Australia and in particular the WAPF Management.

Members of the society are employed or previously have been employed by the WAPF or have friends and family working there; they are naturally concerned by this adverse treatment in the WHS Bill 2019. By way of example some of those concerns are illustrated by the following occurrences;
• Directed to attend a task in a dangerous condemned building. Fremantle Power Station. Resulting in a partial finger amputation.
• Directed to work at heights on a shopping centre roof. Floreat. Resulting in serious life threatening injuries. Breach of the OSH regulations.
• Directed to work in a below ground in a confined space with no PPE. Perth. Luckily no illness. Breach of the OSH Regulations.
• Directed to continue work in two Pilbara Police Stations well knowing that the mould could have a detrimental effect on long term health. Breach of OSH Regulations.
• Directed to continue work in a police station at Rockingham whilst a large air conditioning unit was being lowered into place directly above police workers. A clear breach of duty of care and even worse rejection of a SHR PIN that was instigated as a control measure.
• Directed to a disturbance in a country location with backup not available, with history of violence firearm ownership and having no reliable means of communications. A breach of OSH regulations.
• Directing police workers to remain in a building at the Maylands Police Complex where asbestos dust was present and respiratory illness has occurred. A clear breach of OSH Regulations. The WAPU Safety Officer had to intervene and place an Unsafe Workplace Notice on the property and report directly to the Commissioner of Police.
• Directing Internal Investigators police workers to remain in a building where construction work was occurring on all other floors of the leased building exposing the workers to noise hazards and dust. A breach of OSH Regulations.
• Allowing staff to remain in the Margaret River Police Station whilst old vinyl floor tiles were being removed exposing police workers to an asbestos adhesive dust hazard. Then not having an alternative place of work other than an adjacent building that also contained asbestos material. A clear breach of duty of care and obvious lack of planning.

- Directing police workers in the Pilbara and other places to conduct a high risk search warrant lacking any procedural policy or approved use of force entry tools. Resulting in a serious injury. A clear breach of the duty of care.
- Directed to perform patrol duties at Mt Barker with no reliable form of communications. A clear breach of the OSH Regulations

Some ongoing issues that could be described as fitting the description of dangerous operation are;
- Directed to conduct single police vehicle Random Breath Tests without identifying safe areas to perform such duties.
- Directed to perform Scene of Crime Duties whilst armed alone in areas where there may be a propensity for risk and delayed back up response. A breach of the WAPF Single Officer Patrol Policy.

If a police worker does go ahead and refuses to work in a dangerous operations then they expose themselves to disciplinary action under s23 of the Police Act and subservient Police Force Regulations that could result in dismissal.

As the WAPF is unlikely to raise any concerns with s84(2) and s85(7) of the WHS Bill 2019 the society is of the opinion that after appropriate consultation with the Minister of Police and Road Safety encourage use of s5(e) of the OSH Act and have representatives from the WAPF and WAPU consult and reach a workable remedy, as have other jurisdictions, that will remove the adverse effect on police workers without exposing the general public to danger. Thus continuing to provide adequate protection of life and property.

Eagerly awaiting a positive response.

Yours Sincerely
Dave Lampard, President, Occupational Health Society of Australia WA Branch Inc.

(Note: Letter of concern sent to the Western Australian Police Union (WAPU). Copy of this correspondence sent by email to the Minister for Police and Road Safety.)

Mr Dave Lampard

President
Occupational Health Society of Australia WA Branch Inc.
oshwa@outlook.com.au

Our Ref: 71-13078
Your Ref: DLC112019

Dear Mr. Lampard,

Thank you for your letter dated 30 November 2019 regarding the Work Health and Safety Bill 2019 (WHS Bill 2019) and its application to the Western Australia Police Force (WA Police).

The development of the WHS Bill 2019 has to this point involved very extensive public and stakeholder consultation, and I appreciate the Occupational Health Society of Australia WA Branch Inc. providing feedback. The current *Occupational Safety and Health Act 1984* (OSH Act) provides specific and limited exclusions when the right to cease unsafe work, or the power of the Regulator to issue prohibition notices, will adversely affect a 'covert operation' or a 'dangerous operation' (defined terms). As you have noted, these exclusions have been adopted in the WHS Bill 2019.

The community has an expectation that every worker has the right to return home safely each day, and the WHS Bill 2019 has been drafted in accord with this expectation. The WA Police, like all other employers, has a clear general duty of care to ensure the safety of its officers, as far as is reasonably practicable. This duty is modified not diminished by the exclusions in the WHS Bill in as far as it applies to the Police.

Parliamentary debate on the WHS Bill 2019 will commence early this year. The Government is also busy developing the WHS regulations. It is intended that the new legislation will come into effect as soon as possible. Please visit the Parliament of Western Australia website to access the WHS Bill 2019 Explanatory Memorandum, which provides further detail on each section. The link is:

>   https://www.parliament.wa.gov.au/parliamenUbills.nsf/BillPogressPopup?open
>   Form&ParentU NIO=8F320741B83643A8482584BFO00CF89B

To keep informed on the progress of the WHS Bill 2019 and its regulations, please consider subscribing to the DMIRS newsletter. The link is:

>   http://www.commerce.wa.gov.au/worksafe/subscribe-worksafe-newsletters

I appreciate the opportunity to provide you with advice on this major initiative of the McGowan Government.

Yours sincerely

Hon Bill Johnston MLA
Minister for Mines and Petroleum; Energy; Industrial Relations

1 3 FEB 2020

Exploring the Relationship Between Young Workers and Workplace Safety

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Abstract

Young workers aged between 15 and 24 years of age are considered a vulnerable workgroup due to their inexperience in the workplace. In addition, young workers are still developing their physical and emotional maturity. This article reviews published literature to gain insight into factors affecting young workers behaviour in regards to workplace safety. Resources available to support young workers and their employers are also highlighted within this article.

Key Words: Young workers, safety, workplace, accidents, injury.

Introduction

Young workers continue to be injured in Australian workplaces. Workers aged between 15 and 24 years of age are recognised as 'young workers' and this definition will used throughout this paper (Okun, Guerin, & Schulte, 2016; Tucker and Turner (2015). Young workers are considered a vulnerable group of workers as they are still developing their physical and psychological maturity and they lack the ability to identify hazards due to their limited workplace experience (Sámano-Ríos et al., 2019; Thamrin, Pisaniello & Stewart, 2010; Smith et al., 2015).

In New South Wales, Australia, the Work Health and Safety Act 2011 requires a person conducting a business or undertaking to ensure, so far as is reasonably practicable the health and safety of workers engaged by the person and workers whose activities in carrying out work are influenced or directed by the person while workers are at work at the business or undertaking (New South Wales WHS Act 2011, s. 19). This requirement is referred to as a person conducting a business or undertaking's primary duty of care.

Safe Work Australia (2019) report fatality statistics per age groups and whilst it is positive to observe that the overall fatality rate of young workers has fallen in Australia since 2003, young workers continue to die in workplace incidents. In 2016, 14 young workers in Australia and 366 young workers in the United States were killed at work (Safe Work Australia, 2019a; Bureau of Labor Statistics, 2019).

In relation to workers compensation claims, Safe Work Australia (2018) defines a serious claim as a claim involving an absence from work of at least one week. During 2016/17 there were 13,720 accepted serious claims in Australia involving young workers with young males accounting for 71% of these claims (Safe Work Australia, 2018). A person injured in a workplace incident not only suffers physically, but emotionally and financially as well (Okun et al., 2016). Workplace incidents also have a ripple effect and involve the injured person's family, their co-workers, employer and the wider community (Okun et al., 2016). This ripple effect is even more pronounced when a fatality is involved. This evidence highlights the need to look further into the factors that put young workers at higher risk compared to other workgroups so that effective preventative controls can be implemented.

Methodology

To investigate factors relevant to workplace safety and young workers an initial search was conducted using the Science Direct and PubMed databases. A search using the Science Direct database with the keywords 'young workers' and 'safety' provided 37 results. A refined search was conducted to display review articles and research articles published between 2009 and 2019 which yielded 25 results. A second search was conducted using the PubMed database which provided 7 results. Additional filters were applied to identify articles written in English that were published from 2009 onwards which yielded six articles.

Further research was conducted using the keywords 'young workers' and 'workplace safety' in the search engine Google which returned 362,000 results. Results from credible Australian and international government agencies such as Safe Work Australia, SafeWork NSW, WorkCover Queensland, the European Agency for Safety and Health at Work have been included in this literature review.

From both database searches conducted, 31 articles were reviewed that considered a link between young workers and workplace safety. Articles that appeared in both database searches were excluded as were articles that did not have a direct link to a workplace environment. Articles where a full text article could not be located were also excluded. One article was obtained using the reference list of an article from the above database searches. A total of nine articles, four publications from government sources, one code of practice concerning children and young workers and one piece of legislation are cited in this review.

Discussion
What could an inexperienced young worker look like?

A young worker may gain their first job in the food industry as a kitchen hand. This worker could be 15 years old and have never assisted with preparing meals at home. They have rarely used a knife and are unaware that a blunt knife is more dangerous than a sharp knife. It is obvious this worker needs thorough workplace training and supervision to perform even the most basic jobs in a kitchen. Consider another young worker who starts their first job working in the fast food industry. They are exposed to hazards such as hot oil in deep fryers, and hazardous chemicals used for cleaning. This worker needs to be trained how to prepare food safely but also needs to be trained in how to safely use cleaning chemicals. The worker may need to learn how to prepare chemicals by mixing full strength chemicals with water, what personal protective equipment is required for different cleaning tasks and how to read a safety data sheet for hazardous chemicals that they use.

Supervisors may ask young workers if they know how to perform a particular task. Young workers may want to please their supervisor and decide to exaggerate their knowledge of a task or pretend they are experienced when in fact they have never performed the task. A young worker who over sells their knowledge or experience is placing themselves at risk as supervisors may not provide essential instructions to the worker since the worker advised they already know how to perform a task. This example highlights the vulnerability of young workers. On the other hand, young workers may not be confident enough to raise safety matters even if exposed to unsafe conditions (Turner et al., 2015).

Employers can support young workers and train them how to identify hazards, assess risks and controlling risks present in the workplace. Employers can also assist young workers by pairing up experienced co-workers to mentor young workers as they settle into their new role (Queensland Government, n.d.).

Young workers and safety behaviour

The Work Health and Safety Act 2011 (NSW) imposes a duty on workers to "take reasonable care for their own health and safety, take reasonable care that their actions do not adversely affect the health and safety of other persons, and to comply with reasonable instructions, policies and procedures from the person conducting a business or undertaking" which relates to health and safety at the workplace. (New South Wales WHS Act 2011, s.28). Whilst young workers may be eager to work, young workers require the opportunity to develop their risk management skills if they are to work safely.

Workplace safety resources are more effective when developed specifically with young workers in mind. One example is the Young Worker Safety Toolkit developed by WorkSafe Queensland which aims to assist employers to 'engage with their young workers regarding workplace safety' (Queensland Government, n.d., p.2). This interactive toolkit includes video links of young workers describing the impact their workplace injury has had on their life, presentations on health and safety risk management that can be used in training sessions with young workers and website links that can be utilised in training programs (Queensland Government, n.d.). The toolkit focuses on four factors that can have a positive or negative influence on the health and safety of young workers: "education and learning, mind and body, work culture, and work design" (Queensland Government, n.d., p.6.).

In New South Wales there are approximately 500,000 young workers, of which 15,000 young workers are injured annually (SafeWork NSW, 2018). To support young workers, SafeWork NSW have also developed an e-Toolkit for young workers which include short videos as well as drop down menus with answers to questions from young workers.

(https://www.safework.nsw.gov.au/resource-library/young-workers-toolkit/young-workers).

Whether students have gained occupational health and safety knowledge can depend on what subjects are studied at school as well as the experiences of their teacher (Thamrin et. al, 2010). A study investigating how headmasters (also referred to as principals) teachers and workplace supervisors pass workplace safety knowledge to their students was conducted in Sweden (Andersson, Gunnarsson & Rosen, 2015). Of concern is that only 50% of teachers had received specific training in occupational health and safety, though they were required to impart knowledge to students studying vocational subjects such as industrial technology, food technology, transport and woodwork (Andersson et al, 2015). The study by Andersson et al. (2015) showed that students studying industrial technology or woodworking gained knowledge of risks associated with plant and use of personal protective equipment and some, but not all, teachers of food technology and transport subjects imparted safety knowledge to their students. It has been suggested that safety education become a mandatory topic in high schools which would ensure students entering the workplace have at least a basic knowledge of safety (Thamrin et. al., 2010).

Many young workers move from educational settings into the workplace (Queensland Government, n.d.). Young workers may either be employed directly as a worker or as an apprentice or trainee performing work for a host employer .Young workers are present in all industries and may be employed on a full time, part time or casual basis. Prior to a young person starting work they need to be provided with information and training that enables them to perform their role safely (Queensland Government, 2016).

Development of young workers maturity level

As young workers enter the workplace they are still developing both physically and emotionally. Young workers, specifically those aged under 18, undergo rapid growth spurts which Sámano-Ríos et al., (2019) caution can lead to joint instability causing ligament injuries. Young workers do not have the same physical strength as adults as their muscle strength is still developing (Queensland Government, 2006).

Young workers are experiencing neuromaturation, where cells of the central nervous system are maturing, which is related to emotional responses (Sámano-Ríos et al., 2019). Also a human's brain is not fully developed until a person reaches their mid-20s meaning that young workers may not perform tasks such as problem solving as effectively as older adults (Queensland Government, n.d.). Young workers have not yet developed logical decision making skills (Sámano-Ríos et al., 2019; Queensland Government, n.d.). Additionally, young workers are still developing emotionally meaning they are less likely to be able to handle stressful and uncommon situations (Queensland Government, 2006).

Turner, Tucker and Kelloway (2014) investigated microaccidents, more commonly referred first aid treatment incidents, and the safety behaviour of 19,547 young workers in Canada. One of the behaviours investigated by Turner et al. (2014) is termed 'safety voice' which describes young workers who are confident to speak up about safety concerns. It was found that workers aged 15 to 18 had less safety voice than workers aged 19 to 22. (Turner et al., 2014). Tucker and Turner (2015) conducted further research involving safety voice with 155 employed Canadian teenagers aged 15 to 19 years old. It was found that young workers with the highest safety voice were more likely to have suggestions to improve workplace safety and be committed to their employer (Tucker & Turner, 2015).

Tucker and Turner. (2015) highlight the importance of young workers identifying hazards in the workplace and suggesting how the hazards could be controlled. Fostering young workers to develop a safety voice is a sentiment echoed by the European Agency for Safety and Health at Work (2013) who highlight that young workers should feel confident to question the safety behaviours of more experienced co-workers.

Young workers and their appetite for risk

A young workers maturity level also affects how they behave in the workplace. Sámano-Ríos et al., (2019) describe several factors that place young workers at increased risk of workplace injuries including "impulsivity, lack of understanding and awareness of risks" (p. 390). Young workers with minimal experience may have a false belief about risks and this can lead to them either underestimating or overestimating risks (Tucker & Turner, 2015). .A study by Breslin et al. considered that "younger workers may accept work injuries as part of the job" (as cited in Cunningham et al., 2018, p. 62). This reasoning is sound as young workers that are in their first job will have no other workplace to compare how often they are injured or the overall safety culture of a workplace.

Factors that can affect the safety of young workers include their specific risk profile, risk-taking behaviour and the influence of their peers (Queensland Government, n.d.). Young workers often engage in tasks without thinking what the possible consequences are (Queensland Government, n.d.). To reduce young workers participating in risk taking behaviour examples of consequences used that they can relate to should be used, such

as the inability to play football whilst recovering from an injury. Peers, such as co-workers, influence how a young worker's attitudes towards safety develop (Queensland Government, n.d.).

In 2017, Pek, Turner, Tucker, Kelloway and Morrish reviewed how injunctive safety norms affect risk-taking behaviour in the workplace. Injunctive safety norms (ISNs) are the "perceptions of others' expectations of one's safety related conduct" (Pek et al, 2017, p.1). Researchers found that friends (ISNs) are linked with more work injuries attributed to an increase in risk taking in the workplace" (Pek et al, 2017). It is also recognised that young workers may have a tendency to experience thrill seeking feelings (Sámano-Ríos et al., (2019).

Young workers may not have yet developed confidence to report problems to their supervisor (Queensland Government, 2016). One reason why young workers may not communicate safety concerns is their perception of risk is different to that of adults (Queensland Government, n.d.). Young workers may not speak up about unsafe tasks out of concern for losing their job (Tucker & Turner, 2015; Queensland Government, 2016).

Conclusion

Young workers play an important role in the workplace and have the right to expect to return home healthy at the end of their shift, just the same as adult workers. This group is at an increased risk of workplace injuries given that their safety is affected by their specific risk profile, risk-taking behaviour and the influence of their peers. Interactive learning resources that provide engaging material easily understood by both young workers and their supervisors should be actively promoted, such as Queensland's Young Workers Safety Toolkit. Employers need to recognise that not only do they need to provide

occupational health and safety information but that they verify young workers have understood the information also. A continued focus on the safety of young workers currently in the workplace will ensure the workplace is a safer environment for future young workers, and for all workers.

References

Andersson, I., Gunnarsson, K., & Rosèn, G. (2015). Role of Headmasters, Teachers, and Supervisors in Knowledge Transfer about Occupational Health and Safety to Pupils in Vocational Education. *Safety and Health at Work, 6(4),* 317-323. doi: 10.1016/j.shaw.2015.07.012

Bureau of Labor Statistics. 2019. Spotlight on statistics. https://www.bls.gov/spotlight/2019/25-years-of-worker-injury-illness-and-fatality-case-data/home.htm

Cunningham, T. R., Guerin, R.J., Keller, B.M., Flynn, M.A., Salgado, C., & Hudson, D. (2018). Differences in safety training among smaller and larger construction firms with non-native workers: Evidence of overlapping vulnerabilities. *Safety Science, 103*, 62-69. doi: 10.1016/j.ssci.2017.11.011

European Agency for Safety and Health at Work. (2013). Involving young workers in OSH. https://osha.europa.eu/en/tools-and-publications/publications/e-facts/e-fact-78-involving-young-workers-in-osh/view

Okun, A. H., Guerin, R. J., & Schulte, P. A. (2016). Foundational workplace safety and health competencies for the emerging workforce. *Journal of Safety Research, 59,* 43-51. doi: 10.1016/j.jsr.2016.09.004

Pek, S., Turner, N., Tucker, S., Kelloway, E.K., & Morrish, J. (2017) Injunctive safety norms, young worker risk-taking behaviors, and workplace injuries. *Accident Analysis & Prevention, 106*, 202-210. doi: 10.1016/j.aap.2017.06.007.

Queensland Government. (n.d.). Young worker safety toolkit. https://www.worksafe.qld.gov.au/__data/assets/pdf_file/0003/109677/young-workers-toolkit.pdf

Queensland Government. (2006). Children and young workers - Code of Practice. https://www.worksafe.qld.gov.au/__data/assets/pdf_file/0008/58157/children-young-workers-cop-2006.pdf

Safe Work Australia. (2018). *Australian workers' compensation statistics 2016-17*. https://www.safeworkaustralia.gov.au/syste

m/files/documents/1904/australian-workers-compensation-statistics-2016-17_1_1.pdf

Safe Work NSW (2018). Safety in the workplace for young workers. https://www.safework.nsw.gov.au/__data/assets/pdf_file/0014/430610/young-workers-infographic-.pdf

Safe Work Australia. (2019) Fatality statistics by age. https://www.safeworkaustralia.gov.au/statistics-and-research/statistics/fatalities/fatality-statistics-age

Safe Work Australia. (2019a). Young workers. https://www.safeworkaustralia.gov.au/young-workers

Sámano-Ríos, M.L., Ijaz, S., Ruotsalainen, J., Breslin, F.C., Gummesson, K., & Verbeek, J. (2019). Occupational safety and health interventions to protect young workers from hazardous work – A scoping review. *Safety Science, 113*, 389-403. doi: 10.1016/j.ssci.2018.11.024

Smith, P.M., Saunders, R., Lifshen, M., Black, O., Lay, M., Breslin, F.C., ,Tompa, E. (2015). The development of a conceptual model and self-reported measure of occupational health and safety vulnerability. *Accident Analysis & Prevention, 82*, 234-243. doi: 10.1016/j.aap.2015.06.004.

Thamrin,Y., Pisaniello, D., & Stewart, S. (2010). Time trends and predictive factors for safety perceptions among incoming South Australian university students. *Journal of Safety Research, 41(1),* 59-63. doi: 10.1016/j.jsr.2009.11.003

Tucker, S., & Turner N. (2015). Sometimes it hurts when supervisors don't listen: the antecedents and consequences of safety voice among young workers. *Journal of Occupational Health Psychology. 20(1),* 72-81. doi: 10.1037/a0037756

Turner, N., Tucker, S., & Kelloway, E.K. (2015). Prevalence and demographic differences in microaccidents and safety behaviors among young workers in Canada. *Journal of Safety Research. 53*, 39-43. doi: 10.1016/j.jsr.2015.03.004.

Work Health and Safety Act 2011 (NSW). https://legislation.nsw.gov.au/#/view/act/2011/10/part2/div4/sec28

Author

Emma Roland is a WHS Officer and has 14 years' experience in safety roles. Emma has worked in retail, local government and her current role provides exposure to both the food manufacturing and stockfeed industries. Emma is passionate in ensuring that employees and all others on site are able to return home safely to their family after completing their duties. Emma achieves safety improvements due to her effective engagement and collaboration with management and employees.

Work related psychosocial issues in Fly In Fly Out workers and how to reduce them

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Abstract

Organisations in the Fly In Fly Out (FIFO) industry often don't consider the work related stress their employees are under. This can lead to psychosocial issues. This review looks at what impacts FIFO work has on the employee, their families and employer, as well as how to use interventions to enhance the mental and physical wellbeing of these workers and their families.

Key Words:
Psychosocial, FIFO workers, work, stress, Job Demands-Resources theory, Psychosocial Safety Climate.

Introduction

Fly in fly out (FIFO) workers are people who are required to fly in to their workplace for their job (usually to a remote location) and fly out to go back to their permanent residence. Throughout this review we will look at the impact of mental health on FIFO workers who work on mine sites and what this means for their employers. The review will also look at how the Job Demands-Resources theory and the Psychosocial Safety Climate can help as an intervention for FIFO workers and then assess and review some of the recommendations mine sites should implement to enhance the mental and physical wellbeing of their workers, as well as their families.

Rationale

Popular FIFO rosters in Australia include "two weeks on and one week off (14:7 roster), nine days on and five days off (9:5 roster), and six days on and four days off (6:4 roster)" (Blackman, Welters, Murphy & Pryce, 2014). The FIFO lifestyle is very demanding, with working 12 hour days on site, causing pressure because the worker is away from their family and friends for extended periods of time as well as having constant deadlines they have to meet before they fly back home. If workers are placed at worksites in extremely rural locations by the company they can even be expected to work one month on, one month off rosters (Blackman, Welters, Murphy & Pryce, 2014). All these stressors lead to a decline in most people's mental health, and is

shown and supported by studies such as McIntosh's (2012) study that found communities "suffer erosion of social, human, economic, institutional and environmental capital" (p.336). The stress increased through heightened work pressure and reducing workers job control will increase short term efficiency for the company but in the long term will be detrimental to them through decreased mental health of the workers, resulting in mental health outcomes depression and anxiety (Safe Work Australia, 2016). This review will focus on these workers, but the author acknowledges that not all people are the same and there are a minority of people who do enjoy this lifestyle and don't feel as stressed as most in these positions get.

In Australia, on average, one in five people experience a mental health issue each year (Mental Health Australia, 2014). Mental Health Australia (2014) also found that for workers in the mining industry, the ratio increases to one in three. The Australian Medical Association (2011) has shown that FIFO workers mental health is one of the most tabooed subjects when talking about their job. The stigma surrounding it is due to mental health having a negative image within the population, especially within the male population. As the FIFO industry is very male dominated (over 80%) and mostly Caucasian backgrounds with the average age being 40 years old (Kelly, Hazell & Considine, 2012; KPMG, 2013; Pryce, Welters, Lynch, Murphy &

Blackman, 2013), they allow for more stigma to form as they refuse to speak up when there is something wrong (Vojnivic, Michelson, Jackson & Bahn, 2014). As Carrington, Hogg, McIntosh, and Scott (2011) found when studying FIFO workers, there are a lot of responses that are along of the lines of "I'll be right" and that they get told to "harden up" when the mental health subject is broached. Another common saying that FIFO workers get called is "cashed up bogans" due to having higher incomes yet still having the characteristics of a working class person (Pini & Mayes, 2012; Vojnivic et al., 2014).

The reason this topic needs to be addressed is that the rate of suicide in male miners has increased to four time greater than that of the male general population (Australasian Centre for Rural and Remote Mental Health, 2010). Depressed workers cost organisations on average between $2,791/year to $23,143/year, ranging from mild to severe depression (Safe Work Australia, 2016). Overall in Australia there is approximately $10.9 billion per year spent on untreated psychological health problems through absenteeism, presenteeism and worker's compensation. The "macho" workplace environment has led to barriers for the minority of workers such as female and overseas workers as well as members of minority groups (Vojnovic et al., 2014). This also impacts on partners and families at home (Gardner, Alfrey & Vandelanotte, 2018). Gardner, Alfrey and Vandelanotte (2018) found that when FIFO workers come home from site, they bring home the stress they had with them at work. This then negatively impacts on their relationships with their partners, their families and can result in homes being broken up (Gardner, Alfrey & Vandelanotte, 2018). This is due to the partner who works away becoming detached from the typical support structure by becoming used to being isolated. Their studies also showed that without a good support system at home, their mental health and their well-being deteriorated much faster, as they were more likely to talk to a partner to unburned some of the stress they received at work than they were to talk to a mental health professional about the same

topic (Gardner, Alfrey & Vandelanotte, 2018). When this has happened to partners who have a family, the FIFO work life is not compatible with a single parent so thus will have to change their job to be able to support and be home for the children.

Interventions
Job Demands-Resources (JD-R) theory is used to evaluate employee well-being and performance (Vojnovic et al., 2014). It is a universal intervention as it can be applied to any work site in the state, but not specific to individual jobs at each site when talking about FIFO. Demands and resources can be "physical, psychological, social or organisational job components", while resources are additionally "achieving work goals, reduce demands and associated costs, and to stimulate growth, the learning and development of the employee" (Vojnovic et al., 2014, p.244; Bakker and Demerouti, 2006, p.312). Strain is the direct outcome from the stresses organisations apply on their employees, with resources providing motivation for them.

The advantages of this theory is that the Job Demands-Resources theory has tested multiple times for the demands and resources at home, and has shown that is unaffected over time (Hakanen et al., 2008; Vojnovic et al., 2014). This shows that the JD-R theory will work well in a FIFO context due to being able to only measure the on-site influences as the home ones do not change (Vojnovic et al., 2014). Bakker and Demerouti (2006) found that resources provided by organisations can alleviate stressors at work, as well as using the JD-R theory to provide feedback on both positive and negative well-being factors at work.

A disadvantage of the JD-R theory is that the theory is broad on regulations when it comes to applying it to particular jobs. The theory is more applied, for example when looking at FIFO, to whole sites and not particular jobs such as engineering, boilermakers, etc. (Vojnivic et al., 2014). It also does not show details about the positive and negative outcomes, just stating whether they are positive or negative for the employee and employer (Vojnivic et al., 2014).

The Psychosocial Safety Climate (PSC) can work hand in hand with the Job Demands-Resources theory by provided links between work stress and workplace well-being, health and safety (Vojnivic et al., 2014). It is a type of organisational climate, characterised by prioritising employee psychological health. It can influence the health outcomes of depression, psychological distress (a combination of anxiety, sadness and depression) and engagement (fulfilment from work with vigour, dedication and absorption). It is a benchmark which uses policies, practices and procedures as well as aspects of the company that assess and ensure that employees mental health and safety are maintained. It is important because the strategies that promote good mental health are established prior to the working conditions (Vojnivic et al., 2014).

The advantages of using the PSC system is that it helps identify job demands, such as work pressure, work and family conflict and emotional demands, as well as job resources, such as supervisor and co-workers support, that affect employee health and wellbeing (Vojnivic et al., 2014). It can predict stressors that can impact on the employee's job, their social relationships, as well as health and safety (Dollard & Bakker, 2010; Law, Dollard, Tuckey, & Dormann, 2011). Silva, Souza, Borges and Fischer (2010) showed that hundreds of studies on PSC provide evidence that high stress jobs, such as FIFO, have a significant Effort-Reward Imbalance can have negative impact on worker's quality of life, and that employers that implement PSC can help improve that.

The disadvantages of using the Psychosocial Safety Climate is that at a policy level, not much progress has been made when it comes to psychosocial risks (Safe Work Australia, 2016). This means on site they do not have guidelines on specific psychosocial hazards, thus making workers reactions to these hazards relatively unknown as they are not sure what the hazards are to begin with, and consequently do not remember their specific reactions to be able to report them.

The present study that used PSC interviewed 4242 people (2404 women, 1838 men) in the Australian Workplace Barometer project in 2014-2015. Safe Work Australia (2016) found that establishing and maintaining good PSC in organisations mitigates psychosocial hazards that can result in poor psychological health outcomes. It was also shown in the study that there was a correlation between low PSC and higher sickness rates, therefore developing higher frequencies of workers suffering depression.

Psychosocial Safety Climate is a universal and selective, as it can be applied broadly across the state, but also more specifically to individual mine sites, right down to individual jobs at those sites.

Recommendations:
The recommendations the author suggests to apply are:
1. To implement the Psychosocial Safety Climate on all sites as FIFO mining employees will be more likely to report better employee health and work outcomes (Vojnivic et al., 2014).
2. To give more resources to employees on all sites as its proven to result in less stress and reduce the pressure on completing demands that are given by employers (Vojnivic et al., 2014). This will also then result in better work life balance for employees, as well as not taking the stress they have from work back home, when they fly out of site.
3. Having a trained professional at every site who can provide counselling to employees. This should be passed through legislation, as some sites still are not require to have this. This then in turn does not let employees know who they can go talk to if they are at one of the sites without help being provided, and with the culture they are in they will not seek help when they get home.
4. Lastly, following on from recommendation three, would be to work with the industry to address the stigma surrounding mental health and talking about the macho culture that is

reinforced when the employees are on site. Having a trained health professional at every site would allow programs to be run by them that can break down those barriers and make employees feel more comfortable coming to talk to them.

Conclusion

In conclusion, FIFO workers are at a much higher risk of developing poor mental health due to the high demands placed on them for their job. They have significant struggles with the culture and stigma of being a "macho" man and not being able to talk openly about mental health with colleagues and health professionals, as well as their family. This then impacts them in their everyday life, even when they are off site and at home with family and friends. The Job Demands-Resources theory would be able to help as a broad intervention over all mine sites, providing the employees with more resources to cope with the high demands. The Psychosocial Safety Climate will be able to help by providing more help at a selective level through being applied to specific jobs at the sites. Overall, with these being implemented at sites and through addressing the stigma of mental health issues within the work environment, companies would save time and money on helping their employees recover from a mental health issue that they helped cause.

References

Australian Centre for Rural & Remote Mental Health (2011). *This Place is Doing my Head in*. http://www.acrrmh.com.au/assets/Uploads/This-Place-...-Brochure.pdf

Australian Medical Association, WA (2011). *Inquiry into the Use of Fly-In, Fly-Out Workforce Practices in Regional Australia*. http://www.aph.gov.au-house-committee-fifodido-sub146

Bakker, A. & Demerouti, E. (2006). *The Job Demands-Resources Model: State of the Art*. Journal of Managerial Psychology, 22, pp. 309-328.

Blackman, A., Murphy, L., Welters, R., & Pryce, J. (2014). *Workers' perceptions of FIFO work in North Queensland, Australia*. Australian Bulletin Of Labour, 40(2), 180-200. https://www.researchgate.net/publication/290484481_Workers%27_perceptions_of_FIFO_work_in_North_Queensland_Australi a

Carrington, K., Hogg, R., McIntosh, A., & Scott, J. (2011). *Safeguarding Rural Australia: Addressing Masculinity and Violence in Rural Settings*. ARC Final Report, QUT.

Dollard, M. F., & Bakker, A. B. (2010). *Psychosocial safety climate as a precursor to conducive work environments, psychological health problems, and employee engagement*. Journal of Occupational and Organizational Psychology, 83(3), 579- 599.

Gardner, B., Alfrey, K. & Vandelanotte, C. (2018) *Mental health and well-being concerns of fly-in fly-out workers and their partners in Australia: a qualitative study.* BMJ Open, 8(3). DOI: 10.1136/bmjopen-2017-019516

Kelly, B., Hazell, T. & Considine, R. (2012). *Mental Health and the NSW Minerals Industry* NSW Minerals Council, Newcastle.

KPMG. (2013). *Analysis of the Long Distance Commuter Workforce Across Australia*. KPMG, Melbourne.

Latimer, C. (2015). *Mental health stigma stopping FIFO workers speaking up*. Australian Mining. https://search-proquest-com.dbgw.lis.curtin.edu.au/docview/1700496099/fulltext/9E730EC6E24D4615PQ/1?accountid=10382

Law, R., Dollard, M. F., Tuckey, M. R., & Dormann, C. (2011). *Psychosocial safety climate as a lead indicator of workplace bullying and harassment, job resources, psychological health and employee engagement*. Accident Analysis & Prevention, 43(5), 1782-1793.

McIntosh, A. (2012). *Thinking Space: Ten Truths about Australia's Rush to Mine and the Mining Workforc*e. Australian Geographer, 43, pp. 331-337, doi: 10.1080/00049182.2012.731297

Mental Health Australia (2014). Homepage. Cited on http://mhaustralia.org/

Pini, B. & Mayes, R. (2012). *Gender, Emotions and Fly-in Fly-out Work*. Australian Journal of Social Issues, 47, pp. 71-86.

Pryce, J., Welters, R., Lynch, P., Murphy, L. & Blackman, A. (2013). *Identifying and Profiling Potential FIFO Workers.* Report, James Cook University, Cairns.

Safe Work Australia. (2016). *Psycho social safety climate and better productivity in Australian Workplaces: costs, productivity, presenteeism, absenteeism*. South Australia: Safe Work Australia.

https://www.safeworkaustralia.gov.au/syste
m/files/documents/1705/psychosocial-
safety-climate-and-better-productivity-in-
australian-workplaces-nov-2016.pdf

Silva, A. A., Souza, J. M. P. d., Borges, F. N.
d. S., & Fischer, F. M. (2010). *Health-
related quality of life and working
conditions among nursing providers*.
Revista de Saúde Pública, 44(4), 718-725.

Vojnivic, P., Michelson, G., Jackson, D., &
Bahn, S. (2014). *Adjustment, Well-being
and Help-seeking Among Australian FIFO
Mining Employees*. Australian Bulletin of
Labour, 40(2), 242-261. https://search-
proquest-
com.dbgw.lis.curtin.edu.au/docview/16352
89921/fulltextPDF/2A6D808F9302484AP
Q/1?accountid=10382

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In Need of a Helping Hand: The Impact of Occupational Contact Dermatitis

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Abstract

Occupational Contact Dermatitis (OCD) is an occupational skin complaint that affects between 1.3 and 8.1 per 10,000 workers internationally. It is often seen in hairdressers, hospitality workers, healthcare and metal working industries. The condition may be mild in symptoms, however, may have a significant impact on the affected individual. Psychosocial factors such as lower self-esteem, anxiety and social isolation, as well as being unable to conduct their normal day to day activities at home and work impact on the workers quality of life. The employer may also financial pressure from absenteeism, provision of additional protective equipment and job modifications.

Key Words:

Occupational Contact Dermatitis, Quality of Life, Return to Work, Contact Dermatitis

Introduction:

Occupational Contact Dermatitis (OCD) is the most prevalent of the skin conditions and comprises 70% to 95% of occupational skin disorders (Diepgen & Coenraads, 1999). Typically affecting hands, due to their exposure to liquids and other causative agents, OCD may cause red, scaly and often blistered skin, which may be itchy and painful.

OCD may have significant impact on the individual both at home and their workplace. Often the symptoms of the condition may be mild, however the worker may feel the effects far greater than the apparent symptoms. Over the years, dermatologists and other medical professionals have started to take steps to determine the quality of life of patients with OCD and other skin complaints to greater understand the prognostic factors and comorbidities that may be present.

Methodology

A review of recent literature was conducted using various search terms on both Curtin University's Library Catalogue and Google Scholar. Initially, the search was conducted on the Curtin University catalogue using the search terms: occupational contact dermatitis impact. This returned 4,108 results, filtered to only include peer-reviewed articles and a date range of 1999-2019. Searches also using the following terms were also conducted and filtered as per previous search: occupational contact dermatitis return to work, resulting in 732 entries; and occupational contact dermatitis quality of life, resulting in 2657 entries. To determine a starting point for critique, the searches were adjusted to include parentheses to narrow the literature results. The search terms were "occupational contact dermatitis" "return to work", yielding 8 results, and "occupational contact dermatitis" "quality of life" yielding 60 results. These results were reviewed for relevance prior to performing matching searches on Google Scholar to validate the literature scope.

Discussion

Occupational Contact Dermatitis Characteristics

Occupational dermatitis forms the vast majority of occupational dermatoses, or skin lesions, and can be segregated into different classes depending on their cause or aetiology (Koch, 2001). The most common forms of OCD are allergic contact dermatitis (ACD) and irritant contact dermatitis (ICD). Lau, Burgess, Nixon, Dharmage, and Matheson (2011) describes ACD as a delayed immunological response to skin contact with an allergen, whereas ICD is a result of "inflammatory mediators" being released following contact with causative agents such as wet work (working with liquids or frequent hand washing),

solvents, detergents, friction or heat.

Occupational contact dermatitis affects the hands in 80 % to 90 % of cases, as they are the point of contact with the aggravating agent (Halioua et al., 2013; Koch, 2001). The skin on the hands may be itchy, red, scaly and blistered (vesicular) in the acute stage of OCD. Over time, the dermatitis may progress to the chronic form with skin fissures, hyperkeratosis and lichenification (Diepgen & Coenraads, 1999).

Diagnosis of the causative agent, or agents, in OCD can be laborious and time consuming. Patch testing is available to determine the allergenic substance in the case of ACD; however, ICD does not have a diagnostic tool, and diagnosis often comes as a result of ruling out allergens via patch testing (Lau et al., 2011). Prick tests may also be used to eliminate atopy, or a genetic tendency to allergic rhinitis (hayfever), atopic eczema or allergic asthma (Diepgen & Coenraads, 1999).

Incidence
Within Western or developed countries, skin diseases are one of the most prevalent occupational related diseases, with OCD forming between 70 % and 95% of these skin conditions (Diepgen & Coenraads, 1999; Romano-Woodward, 2010). The incidence of reported OCD in Australia was found to be 2.15 per 10,000 full-time workers in 2005. This incidence places OCD at the lower end of the international statistics, with a range between 1.3 and 8.1 per 10,000 cases in full-time workers per year (T. Keegel, Moyle, Dharmage, Frowen, & Nixon, 2009).

Victorian workers' compensation data, derived from the 2001 census, was collated and reviewed by G. Keegel, Benke, Nixon, and Lamontagne (2013), and a reported incidence of 9.4 claims per 100,000 part-time or full-time were lodged by Victorians. The actual incidence of OCD may be much greater, with under-reporting often occurring due to misdiagnosis (or a lack of diagnosis), or inaccessibility to medical professionals (T. Keegel et al., 2009). Some may also not report the condition as an occupational related problem as it may be seen by the individual as "part of the job" or not seen to be serious enough to warrant reporting (Lau et al., 2011).

Incidence may also be skewed in regions with higher proportions of high risk occupations, such as those working in the beauty, healthcare, construction, metal fabrication, leather, catering and food industries (Koch, 2001). The incidence may also be higher in regions with differing environmental and cultural factors. Croatian hairdressers, for example, exhibited higher incidences of OCD than their European neighbour, Denmark, which may be attributed to the absence of prevention education and use of protective equipment such as gloves (Samardžić et al., 2016).

Impact on Person and Family
The psychosocial impact and subsequent quality of life of OCD has been assessed through several studies, using observations, questionnaires, and surveillance schemes. Often the impact of OCD on an individual is underestimated due to mild symptoms being present, and it often is seen as a normal risk of the occupation (Hutchings, Shum, & Gawkrodger, 2001; Lau et al., 2011). OCD can, however, have profound effects on both the individual and the family unit. Whilst tackling contact dermatitis in general, rather than occupationally specific dermatitis, Skoet, Zachariae, and Agner (2003) determined that skin conditions related to, and including dermatitis, place a significant burden on a person fulfilling their personal and familial responsibilities. Simple tasks such as washing dishes, cooking and washing laundry are made more difficult (Rabin & Fraidlin, 2007). This inability to perform normal day to day tasks at home may place an additional burden on the family unit, with others having to take on additional roles within the home.

The length of time required to adequately diagnose OCD and its triggering agent can cause increased emotional and physical symptoms in a patient. The individual may have increased anxiety, a lack of self-confidence and frustration at not being able to determine the source of the pain and physical manifestations (Boehm et al.,

2012).

A German study into the mental health of OCD patients conducted by Boehm et al. (2012) showed significantly increased levels of anxiety, with almost half of the study participants being categorised with borderline anxiety. A reported 20% of participants showed a positive anxiety score within the study, compared to 3% to 6% indicative of the general population. This increased level of anxiety was also evidenced in a Swedish study, although it was not limited to occupational related contact dermatitis (Moberg, Alderling, & Meding, 2009).

Whilst one study conducted by Cvetkovski et al. (2006) in Denmark showed that patients with OCD did not exhibit a higher prevalence of depression than expected in the general population, the previously mentioned German study demonstrated a higher level of depressive symptoms (Boehm et al., 2012). The level of depression evidenced in the German study showed no significant differences in gender, age or socioeconomic status. There was however, a detectable difference when comparing between males and females, between the levels of depressive symptoms in those with severe versus non-severe eczema within the same gender. Males with severe hand eczema, therefore, showed to have greater levels of depression than their non-severe counterparts.

The affect of OCD on sexual relationships is not specifically addressed in many studies, however the studies may look at relationships with partners, feelings of embarassement and lack of self confidence. It may then be inferred that OCD would have impact on sexual relationships amongst those affected. One study into patients with OCD in Israel, aimed at the psychosocial implications of OCD, found that over 45% of respondents had feelings of shame and rejection, thus avoiding social interactions. This feeling of shame and rejection carried over to a lowered body image with the visibility of the disease and 18% of participants noted family difficulties including their sexual relationships. Two participants from the study of 70 attributed OCD to the failure of

their marriage, with feelings of shame, rejection and a decreased level of attractiveness due to the visibility of the dermatitis (Rabin & Fraidlin, 2007). Similar results were noted by Holness (2001) with patients noting difficulties in relationships and sexual participation.

In addition to the affects on the individual at home, OCD can affect the level to which an individual can effectively conduct their occupation. The study conducted by Hutchings et al.(2001) noted that 45% of men, and 53% of women with OCD in the study were not affected at work by their physical symptoms or emotional problems. However, of those that were affected, a significant percentage of men and women (85% and 83% respectively) were affected both physical symptoms and emotional problems. The physical symptoms may prevent the workers from conducting their job to capacity, and include pain. Pain can not only make working difficult but can relationships with friends and family, and lower the interest or availability to participate in leisure activities as previously mentioned, but also can affect sleep. This lack of sleep can then lead into the possibility of fatigue related injuries at work or at home. Although Boehm et al. (2012) found only a weak correlation between sleeplessness and OCD, a study conducted by Holness (2001) showed that sleep was affected in over 40% of occupational related participants. Sleep may also be affected by persistent itching, identified in several studies including both Boehm et al (2012) and Holness (2001).

The presence of OCD does not necessarily result in decreased time at work; however, it can cause prolonged absences and the requirement to change careers (Halioua et al., 2013; Hutchings et al., 2001). Absenteeism from work is a common theme throughout literature, with studies all reflecting a level of absenteeism from work, ceasing work completely or the requirement to change occupation. The French study of OCD conducted by Halioua et al. (2013) noted an average of 37.3 workdays lost per employee. A change of occupation is often a necessity to allow the skin to heal and prevent reoccurrence. Rabin & Fraidlin (2007) reported 40% of

participants had to change careers or occupations as a result of OCD. More impactful however, is that one third of participants in the study has ceased working altogether.

Impact on Employer

Many of the impacts on an individual also impact on the employer of that individual. Absenteeism, a decrease in productivity and changes required to job processes are all a burden on both employer and employee (Hong, 2008). There may be a significant economic burden placed on the employer through absenteeism, with the employer having to cover the costs of both the affected individual if the condition is reported as occupational, as well as the costs of replacement staff (including potential training costs associated with bringing on additional staff). The study conducted by Holness (2011) examined the return to work status and implications of workers six months following diagnosis with OCD. Thirty eight percent of participants were not working six months following diagnosis. Of these individuals, 96% were not working due to their skin conditions. A total of 15% were receiving workers compensation and 3% were covered via their employment insurance. It can therefore be seen in many situations; this would pose a significant burden on the employer.

Coupled with absenteeism is the requirement for changes to occupation. Whether an employer is able to assist in the transition of a worker to an alternate position within their company that does not place the worker at risk of incurring OCD is dependent on factors such as the size of the company and the variety of positions available. The instances of occupation change is quite high in the literature, with Rabin & Fraidlin (2007) reporting 40% of respondents requiring a change of occupation as previously mentioned, and Holness (2011) reporting that those that had changed jobs in the 6 months following diagnosis with OCD, over 90% attributed the change to their skin condition.

Recommendations to workplaces with an incidence of OCD, or in an industry known to be a predictor for OCD, for example hairdressing, metalwork, and construction industries using cement would also place both a cost to the employer as well as requiring additional impacts in education and training of staff. Many guidelines have been set by Occupational Health bodies, Industry bodies and regulators to prevent the incidence and recurrence of occupational skin disorders.

It is recommended that employers implement programmes to reduce exposure to known causative agents by substitution, elimination, education and personal protective equipment (Romano-Woodward, 2010). The provision of appropriate gloves and barrier creams is also not enough by itself, and an additional impact can be identified in the provision of education in the use of such personal protective equipment. Changes to procedures and processes may also require increased levels of supervision. With any change to procedures, the management of change must be monitored, and employers must ensure that assessment of OCD is available and adequate (Romano-Woodward, 2010; Samardžić et al., 2016).

Barriers for Return to Work

Several barriers to the return to work process have been identified internationally in literature, and these barriers appear to occur across legislative boundaries as well as industries, suggesting that they are common and prevalent barriers.

The training and education programmes suggested by policy makers and occupational health bodies have shown effectiveness in many areas. A study conducted by Zack, Arrandale & Holness (2018) reported the effectiveness of training programs in skin-specific training in patients with OCD in Canada, with over 85% of respondents finding it memorable, useful and often common sense in nature. A lack of advice provided to both the employer and employee with regards to skin care, job or workplace changes may provide additional barriers that both the employer and employee have to negotiate (Holness, 2011)

A barrier in returning to work that should be taken into consideration is the age of the

employee. Adisesh, Meyer & Cherry (2002) identified that the older age group of OCD patients found it more difficult to return to work or if they leave their position, more difficult to return to the workforce. Whilst their prognostic factors and treatments were no less effective than the younger patients, the older age group were more likely to take additional time off and leave their current occupations rather than seek job modifications or changes to process that would prevent recurrence of their OCD.

Care must also be taken to ensure that the psychosocial aspects mentioned as impacting the individual and family must also be addressed to prevent it from posing an additional barrier to returning to work. The feelings of shame, rejection and social isolation can carry across to the occupational environ, with individuals also feeling reluctant to be involved in their occupation. Individuals having had extended periods of time off may feel isolated and rejected by their colleagues and also lacking in self-confidence due to their appearance (Boehm et al., 2012; Halioua et al., 2013; Rabin & Fraidlin, 2007). If they have had to undergo modifications to their job, or include additional protective equipment such as changes to the types of gloves used, may also add to the feelings of isolation (Holness, 2011).

Obligations of the Employer
Under the *Occupational Safety and Health Act 1984* (Western Australia) (OSH Act) employers have an obligation to ensure as far as reasonably practicable a safe and healthy workplace for their employees, volunteers and visitors. This workplace must provide an adequate level of protection from hazards emanating at or from their business.

In addition to the OSH Act, the *Workers' Compensation and Injury Management Act 1981* (Western Australia) (CIM Act) states that an employer must provide compensation to a worker if the worker has an occupational injury. In the case of OCD, although the cause may not be directly related to a specific task that employee is required to do, it can also cover frequent

hand washing required to ensure the health and safety of the individual or others. This compensation must be paid to the employee from the date of incapacity.

An employer is obliged to ensure that an injury management plan is established and that the plan is adequate. A return to work plan must also be established in accordance with medical professionals and under medical guidance. An employer also has an obligation to obtain and maintain a policy of insurance to cover the health and safety of its employees.

Obligations of the Insurance Company
Each insurance company is required under the CIM Act to provide a statement to WorkCover each month of employer policy renewals as well as those whom their policies have lapsed. They are also required to indemnify the employer and may not refuse to pay compensation without sufficient grounds.

Obligations of the Employee
As part of the *Occupational Safety and Health Act 1984,* employees also are required to be responsible for their own health and safety at work. They must not risk their own health and safety through their actions or omissions, as well as not risking the health and safety of others. As part of this framework, an employee must ensure that their actions causing the injury do not result from serious and wilful misconduct, else the claim of workers' compensation may be disallowed.

Under the CIM Act, employees are required to advise employers of any injury that has been sustained at work, or through the processes at work within a practicable timeframe. If employees are receiving compensation payments, they must advise their employer if they commence any other paid work (other than for their employer).

Barriers to these Obligations under this Legislation
A barrier to legislation in other regions may be a lack of dispute resolution and workers compensation procedures, however, in Western Australia, any potential disputes and subsequent arbitration is mandated by the CIM Act.

One barrier that is found in many realms is the lack of knowledge or awareness of the Acts by small to medium businesses. Small businesses in particular, may lack knowledge surrounding compensation payments, injury management and return to work programmes.

Another barrier that is seen in other facets of occupational health within small businesses may be the underreporting of injuries. The financial burden of an occupational injury may result in affected workers not reporting the injury to prevent financial and legislative repercussions on their employer, as well as the employer acting outside their legal obligations to reduce the costs and insurance implications.

Conclusions

Whilst occupational contact dermatitis is seen as having a fairly low incidence rate in Australia as well as internationally, the impact on the individual, their family and their employer can be significant. OCD may lead to self-esteem issues, anxiety and depression, and place a burden on the family of the affected individual in that other members may have to assume additional responsibilities in the home. The worker may feel isolated and outcast at their workplace due to job modifications and absenteeism.

A financial burden is placed on the employer to manage the exposure of causative agents, as well as the costs of compensation, insurance and modifications to job processes. Education programmes that are skin-specific have been found to be beneficial to workers, preventing further recurrences of OCD and increasing awareness of potential causes. As with many occupational related injuries, particularly within small business, the acceptance of injury as par for the course, and underreporting to prevent financial pressures needs to be addressed in order to alleviate the impact on affected workers

References

Adisesh, A. Meyer, J. D. and Cherry, N. M. (2002), Prognosis and work absence due to occupational contact dermatitis. Contact Dermatitis, 46: 273-279.

doi:10.1034/j.1600-0536.2002.460505.x

Boehm, D., Schmid-Ott, G., Finkeldey, F., John, S. M., Dwinger, C., Werfel, T., . . . Breuer, K. (2012). Anxiety, depression and impaired health-related quality of life in patients with occupational hand eczema. *Contact Dermatitis, 67*(4), 184-192. doi:10.1111/j.1600-0536.2012.02062.x

Cvetkovski, R. S., Zachariae, R., Jensen, H., Olsen, J., Johansen, J. D., & Agner, T. (2006). Quality of life and depression in a population of occupational hand eczema patients. *Contact Dermatitis, 54*(2), 106-111. doi:10.1111/j.0105-1873.2006.00783.x

Diepgen, T. L., & Coenraads, P. J. (1999). The epidemiology of occupational contact dermatitis. *International Archives of Occupational and Environmental Health, 72*(8), 496-506. doi:10.1007/s004200050407

Halioua, B., Bensefa-Colas, L., Bouquiaux, B., Crépy, M. N., Assier, H., Billon, S., & Chosidow, O. (2013). Occupational Contact Dermatitis in 10,582 French Patients Reported between 2004 and 2007: A Descriptive Study. *Dermatology, 225*(4), 354-363. doi:10.1159/000342175

Holness, D.L. (2001), Results of a quality of life questionnaire in a patch test clinic population. *Contact Dermatitis,* 44: 80-84. doi:10.1034/j.1600-0536.2001.440204.x

Holness, D.L. (2011) Workers with Occupational Contact Dermatitis: Work Outcomes and Return to Work Process in the First Six Months following Diagnosis, *Journal of Allergy*, 2011, doi:10.1155/2011/170693.

Hutchings, C. V., Shum, K. W., & Gawkrodger, D. J. (2001). Occupational contact dermatitis has an appreciable impact on quality of life. *Contact Dermatitis, 45*(1), 17-20. doi:10.1034/j.1600-0536.2001.045001017.x

Keegel, G., Benke, G., Nixon, G., & Lamontagne, G. (2013). Occupational contact dermatitis: Initial and subsequent workers' compensation claims in Victoria, Australia. *Occupational and Environmental Medicine, 70*(Suppl 1), A41-A42. doi:10.1136/oemed-2013-101717.123

Keegel, T., Moyle, M., Dharmage, S., Frowen, K., & Nixon, R. (2009). The epidemiology of occupational contact dermatitis (1990–2007): a systematic review. In (Vol. 48, pp. 571-578). Oxford, UK.

Koch, P. (2001). Occupational Contact Dermatitis. *American Journal of Clinical*

Dermatology, 2(6), 353-365. doi:10.2165/00128071-200102060-00002

Lau, M. Y. Z., Burgess, J. A., Nixon, R., Dharmage, S. C., & Matheson, M. C. (2011). A Review of the Impact of Occupational Contact Dermatitis on Quality of Life. *Journal of Allergy, 2011*(2011). doi:10.1155/2011/964509

Moberg, C., Alderling, M., & Meding, B. (2009). Hand eczema and quality of life: a population-based study. *British Journal of Dermatology, 161*(2), 397-403. doi:10.1111/j.1365-2133.2009.09099.x

Rabin, B., & Fraidlin, N. (2007). Patients with Occupational Contact Dermatitis in Israel: Quality of Life and Social Implications. *Social Work in Health Care, 45*(2), 97-111. doi:10.1300/J010v45n02_06

Romano-Woodward, D. (2010). Handle with care. *Occupational Health, 62*(8), 17-19.

Samardžić, T., Varnai, V. M., Bakotić, M., Babić, Ž., Brans, R., Cvijetić Avdagić, S., . . . Macan, J. (2016). Skin health and safety at work in Croatian hairdressing apprentices. *Contact Dermatitis, 75*(1), 25-31. doi:10.1111/cod.12603

Skoet, R., Zachariae, R., & Agner, T. (2003). Contact dermatitis and quality of life: a structured review of the literature. In (Vol. 149, pp. 452-456). Oxford, UK.

Wiszniewska, M. & Walusiak-Skorupa, (2015) Recent Trends in Occupational Contact Dermatitis. *Current Allergy and Asthma Reports, 15(7)*. doi: 10.1007/s11882-015-0543-z

Zack, B., Arrandale, V., Holness, D.L. (2018) Skin-specific training experience of workers assessed for contact dermatitis, *Occupational Medicine*, 68(3) doi: 10.1093/occmed/kqy022

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Influence of risk perception on safe behaviour and practical approaches

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Abstract

This literature review builds on Sarajlic& Jansz (2020). Factors that influence perception of risk are examined by investigating how workplace and personal factors influence motivation towards safe behavior and potential practical approaches that could be applied to manage risk perception from a workplace safety and health risk management perspective. A Model of Risk Perception Management was developed as an outcome of the research. The research findings form a basis for further research to be undertaken to evaluate and mitigate the impacts of employee and employer poor risk perception. It is expected that a potentially new stream of psychosocial risk management may evolve from the findings of this research.

Key words: Risk perception. Workplace safety culture. Communication.

1. Introduction

Sarajlic & Jansz (2020) examined what risk perception is and how it is developed within the individual, finding that as each individual selects, organises and interprets the information that is gained from their senses differently, objective perception can be considered extremely difficult, if not impossible (Krallis & Csontos, n.d.). This results in the individual's attitude, belief and value system (Nielsen et al, 2013), based on a perception of a risk, directly affecting the level of energy directed towards a task or to the management of a risk (Dester & Blockley, 1995).

Risk perception affects an organisation in a multitude of ways. At the individual level it can affect the safe behaviour of workers and the ways in which they respond to hazards within their environment, this can generally be attributed to optimism bias (Koh, Wong & Chandrasekar, 2014) and inexperience (Mitchell & Braithwaite, 2008). Additionally workers may be inclined to accept a risk without following defined mitigation measures due to positive affect (Haase & Silbereisen, 2011), where a positive mental stimulation results from working with uncontrolled risk, often described as a "rush". At the organisational level, a low perception of risk in regard to the hazards presented in its chosen industry can negate the level of resources dedicated to its occupational health and safety (OHS) management system, this can largely be seen in small to medium enterprises (SME) where various organisational functions can be limited (Eakin, Champoux, & MacEachen, 2010).

Furthermore, organisations have shown to negate high-impact but delayed-effect risks in favour of low-impact, immediate-effect risks due to management inability to accurately judge the impact of an effect that occurs years or decades in the future (Holmes et al, 1999). Lastly, a high level of risk perception is not an entirely ideal scenario either. Nielsen et al (2013) found that workers that operate in safety critical organisations and are surrounded by a persistent intimidation of physical danger experience high levels of stress that eventuate in negative physical, psychological and behavioural changes.

2. Current Practices

Currently in most high-risk industries requiring the implementation of an occupational safety and health management system, such as construction, mining and oil & gas, organisations operate in strict client/contractor relationships. The client, usually a large organisation, has the necessary resources to develop, implement and maintain a robust occupational safety and health management system that it rightfully requests its contractors to mimic or adopt in order to win project work, these processes are then passed down through the contracting chain.

The key issue in this scenario in regards to risk management is that the client organisation usually maintains a rather bureaucratic and impersonal occupational safety and health management system. For the smaller contracting organisation, this becomes a cumbersome process and further dehumanises the management of occupational safety through excessive forms, checklists and other processes that can otherwise be accounted for in a dynamic manner and through personal interaction if it were not for the need to record events as evidence for auditing purposes (Blewett & O'Keefe, 2011). Thus, essential processes that are traditionally used to manage risk become ineffective and ritualistic (Eakin, Champoux, & MacEachen, 2010) in the sense that they are impersonal paper processes that are perceived as a barrier to undertaking actual work and thus have no connection or meaning to the worker. Because of this disconnect, the perception of the risks that workplace hazards present is greatly reduced (Blewett & O'Keefe, 2011).

Methods exist to cope with this management system dissonance through the implementation of dynamic initiatives that seek to engage the worker and assign ownership (Blewett & O'Keefe, 2011). Borys, (2012) suggests initiatives that involve greater social interactions within the workforce encourage greater discussion about the work being done and lowers the authoritative barriers associated with completion of mandatory forms. However, implementation of these creative initiatives largely hinges on the availability of financial, human and educational resources However, many organisations remain in a somewhat detrimental perpetual cycle where the lack of financial resources prohibits the attainment of human and educational resources that are necessary to manage risk appropriate initiatives. This results in their perception of the risks encountered in their work environment to be either too low, or in the worst case, unrecognised.

Conversely, in many situations the operational parameters requested by the large client organisations are often overtly restrictive and do not allow enough freedom for the subcontracting organisation to develop its own relevant methods of recognising and perceiving risk (Manu et al, 2013). Furthermore, the subcontracting business model itself, which in turn is promoted by the client, further compromises OHS due to it being a payment-by-results model whereby work is won and payment received largely based on the amount of work done. This results in the workers pushing themselves hard, working longer hours and neglecting safety where production may be impeded (Chiang, 2009). The aforementioned issues can be treated through inter-organisational learning, allowing for a greater understanding and flow of ideas to travel upwards and downwards through the contracting chain. However this is influenced by time and resource availability (Manu et al, 2013).

One particular resource is the dedicated occupational health and safety (OHS) professional that has been tasked with the management of risk for their organisation. It is essential that this individual possess the correct tools, attitude and knowledge to advise at the design, management and at site levels (Budworth, 2005). However, the profession itself is largely varied (Provan & Pryor, 2019) and because it requires applicable knowledge from the health, hygiene, ergonomics, psychology, communications and engineering fields, to name a few (Budworth, 2005), effective candidates can be difficult to source. As educational standards for the profession are being established, it can be suggested that focus on intangible factors, such as perception of risk, may not receive the necessary attention within OHS management systems for a while yet.

Perceptions of risk is highly subjective and based on an individual's experiences or their goals and objectives. These subjective evaluations can impact the risk management process within an organisation, as well as the behavioural standards that are required to maintain a level of safety. This study explores how perception of risk influences safe behaviour and concludes with practical

recommendations for initiatives to control perceptions of risk. A key outcome of this research will be the development of a framework that can be used by OHS professionals for risk communication and risk management. This research will be conducted as review of published literature.

The research parameters were initially set to concentrate on studies conducted within the previous 20 years and located in developed economies, where the tolerance to risk is lower and a high regard is placed on safety. It was estimated that a high amount of progressive research would be undertaken in such economies where the OHS discipline is a fully-fledged and respected profession.

The literature research was divided into three sections, these being:
1. Correlation between risk perception and safe behaviour.
2. Barriers to safe behaviour.
3. Practical approaches to control perception of risk.

3. Research Aim and Objectives

The research aim was to examine and compile the ways in which perception of risk affects the traditional risk management process within an organisational environment. The research objectives to facilitate achieving the aim were to:
1. *Determine the correlation between risk perception and safe behaviour*
2. *Discuss practical applications and initiatives that can be implemented within an organisation to manage risk-taking behaviour and outline effective methods to increase initiative uptake.*

4. Literature Review Methodology

The search was limited to full text English professional safety and peer reviewed scholarly journals published between the years 1994 and 2019. Studies were identified through a systematic review of the literature available on Science Direct, ProQuest and Emerald.

An initial aim of the literature review was to find 20 relevant studies for each research objective in order to ensure that a sufficient amount of literature was reviewed. A search was conducted using the Science Direct database as the primary database for the research objectives using the following terms:
* Risk perception safe behaviour.
* Barriers to safe behaviour.

The search yielded 42,511 and 59,195 results respectively with a total of 42 suitable for use in this review. A second search using the ProQuest database. yielded 373,162 and 347,680 results respectively with 18 suitable articles. Finally, the Emerald database resulted in 20 suitable articles out of 8,917 and 6,878 results respectively, again using the above search phrases. Out of the total of 80 articles found that established a link to the topic, 54 of these publications are cited in this review, 33 of the cited publications are research studies, 5 are comprehensive literature reviews and 17 are commentaries relating to the perception of risk and risk management in the workplace.

5. Influence of Risk Perception on Safe Behaviour

The literature review explored the ways in which risk perception is shown to alter safe behaviour, either within a worker at the frontline or within management level personnel, after being influenced by one or more of the explored factors that can alter perception of risk.

Understanding how perception of risk and the way it can be manipulated should be seen as an essential factor in the risk management process because the relationship between safe behaviour and perception of risk is one of influence. The way a risk is perceived, resulting in an either high or low level of awareness, has a direct influence on the decision that an individual will make (Mohamed, Ali & Tan, 2009).

This can be shown by a study that found that the same activity undertaken for personal and professional purposes could elicit differing levels of safe behaviour. Mitchell, Bambach & Friswell (2014) found that individuals whose profession entails driving engage in greater safe behaviour, such as wearing seatbelts and

obeying local speed limits, than when driving for personal purposes. This was largely due to the individuals exhibiting higher levels of motivation to conform to workplace practices and methods of operation because of the perceived heightened risk of their work activity. However, Tunnicliff et al (2012) shows that individuals whose attitude involves sensation-seeking elements, thus perceiving risk highly yet exhibiting arousal as a result, were accurately predicted to undertake high-risk behaviours.

Whilst more difficult to manipulate, sensation-seeking behaviours can be controlled through the implementation of an effective and positive safety culture within the organisation. The above study relating to safe driving behaviours when undertaken for work purposes exhibits a perfect example where the workplace culture influences the perception of associated risk, but also acts to influence the wanted safe behaviours within the individual when factors relating to conformance with the greater work group are bought into the context (Mitchell, Bambach & Friswell, 2014). Similarly, workplace culture works to manage sensation-seeking behaviour by motivating safe behaviour in those surrounding the individual by increasing knowledge and fostering discourse through the application of supportive leadership and behavioural incentives (Neal & Griffin, 2002; Dilley & Kleiner, 1996). Once the sensation-seeking behaviour is regarded as unwanted within the workgroup, the individual's perception is also changed in an effort to avoid being shunned (Höpfl, 1994).

Conversely, a poor workplace culture, whilst widely seen to not directly relate to increases in incidents (Neal & Griffin, 2002; Dilley & Kleiner, 1996; Dester & Blockely, 1995), can be self-perpetuating and self-influencing by reinforcing unsafe behaviours due to a lack of any corrective input. This is highly precarious within the organisational environment, as not only does unsafe behaviour lessen the perception of risk encountered within the workplace, but also directly relates to incident increases (Dilley & Kleiner, 1996; Dester & Blockely, 1995).

Another cultural factor that lessens the perception of risk within the work environment and acts as a barrier towards safe behaviour is acceptance of risk, which turns into a sense of risk normalisation within the organisation. Whilst regular exposure to risk is an external factor that influences risk perception, and has been shown to have both positive and negative results, being encouraging awareness and preparedness (van Manen, 2012; Kern et al, 2014; Caponecchia & Shiels, 2011), and being a source of stress and psychosocial hazards (Nielsen et al, 2013; Tobin et al, 2011; Vazquez, 2001). However, a result of constant exposure over time is shown to reduce the developed perception of risk, level out the psychosocial impacts and result in a sense of acceptance that eventually results in individuals becoming accustomed to it and reduces implementing any associated safe behaviour controls (Størseth, Hauge, Tinmannsvik, 2014). This is highly evident in high-risk industries, such as underground mining, where there is a constant state of awareness and alarm due to the large amount of activity and varied plant and mobile equipment in use (Badri, Nadeau & Gbodossou, 2013; Hollnagel, 2008). This results in a continuous effort to maintain a sense of awareness within the workforce to maintain an appropriate level of risk perception that in turn encourages the correct safe behaviours (Badri, Nadeau & Gbodossou, 2013).

An effective method of managing risk acceptance is shown to be the promotion and implementation of groupthink processes, such as risk assessment workshops that include multiple hierarchical levels of an organisation, in order to lower cognitive biases that have been developed through internal and external factors of risk perception (Houghton et al, 2000). Houghton et al (2000) shows that these processes are effective in reducing the sense of overconfidence regarding an encountered risk within in an individual when they are exposed to others, as it encourages natural

human instinct to conform (Mitchell, Bambach & Friswell, 2014), thus promoting safe behaviour. However, negative aspects of groupthink processes include a potential in the increase of the illusion of control through belief in small numbers (Houghton et al, 2000). This is where information based on small or insufficient data is regarded as an accurate reflection of the greater issue, encouraging the group to believe that current organisational controls are capable of management. Whilst these are serious concerns, they are easily subverted through increased education regarding the issue and the engagement of external professionals that are not acquainted with the organisation, and can thus provide an enhanced perspective on the system (Houghton et al, 2000; Höpfl, 1994).

Lastly, perception of risk can subvert safe behaviour through the personal goals of workers and managers as well as organisational pressures that they may encounter. Frick (2011) shows that worker and management personnel that operate within an established OHS management system are likely to subvert its initiatives if their reputation may enhanced through reporting favourable key performance indicator (KPI) data. This may involve not reporting a particular incident or unidentified risk, or in the worst case modifying data. Furthermore, this type of behaviour is also shown to be attributed to pressure that may be placed on workers to reach a particular organisation goal (Idris et al, 2012). These issues likely result in the organisation's overall perception of the risks encountered in its operational environment being skewed due to inappropriate worker behaviour, which in turn results in unsafe behaviours throughout the organisation (Frick, 2011).

The perception of a risk has a seemingly direct influence on whether a worker will act in safe or unsafe manner when confronted with the risk. The following section outlines potential approaches and initiatives that have been used in published studies to manage risk perception and promote associated safe behaviours.

6. Practical Approaches & Initiatives to Manage Risk Perception

This section outlines potential management strategies to mitigate the effect of inadequate risk perception within individuals as well as the associated barriers that may prohibit safe behaviour. The studies chosen for review in this section do not directly relate to the management of risk perception, but instead describe, or present evidence, of how a particular management initiative has been successful in dealing with an issue that has been identified to be presented by a factor that influences risk perception. The initiatives themselves are able to be applied to small, medium and large organisations and include strategies for frontline workers and management personnel.

6.1 Increase Training

The dissemination of information is a well-known and widely used method of improving or modifying an individual's behaviour (Lingard, 2002). Lingard (2002) found that the simple act of administering training courses resulted in an increase in the realisation of the individual's own behaviour as a major factor in an event as well as increasing willingness and confidence to undertake related tasks in the correct manner.

Both Arezes & Miguel (2005) and Elias & Shiftan (2012) show that training directly contributes to behaviour modification by presenting both positive affect and negative affect scenarios, simple methods of achieving the positive affect and giving the individuals the freedom to determine the preferred course of action, which mostly resulted in the preferred positive affect being chosen and utilised. These principles can be directly applied in regard to risk perception, as it has been shown throughout this literature review that the majority of issues have largely involved the lack of information regarding the risk.

6.2 Increase Manager's Exposure to OHS Risk

Increasing exposure to a risk differs to increasing training as it intends to expose the effects and consequences of a risk instead of disseminating information on

how to correctly undertake tasks that manage the risk. Therefore, this initiative is directly aimed at management level personnel as their roles are located far from the impacts of the risk within the organisation and thus their ability to correctly perceive its impact is compromised (Masi & Cagno, 2014). The intention behind increased exposure is to increase the accuracy of their risk management planning strategies and to find value in the integration of OHS to the wider organisational management system (Bhattacharya & Tang, 2013). A likely method of achieving this is through greater and regular presence on work sites, interaction with the work group and focusing on the significance of the input from middle managers, as they are continuously interacting with frontline personnel and are therefore exposed to their work environment as well as their concerns (Bhattacharya & Tang, 2013).

6.3 Manage Optimism Bias through Case Studies

Optimism bias is the sense that causes an individual to perceive that they are in some way immune to extraordinary events occurring to them (Caponecchia & Shiels, 2011). Caponecchia & Shiels (2011) shows that optimism bias may be present in significant levels within an organisation and that it likely develops as a result of risk normalisation. Managing this is essential as it can lead to complacency, which in turn leads to unsafe behaviour (Hopkins, 2006) and thereby completes the incident causal chain. By exposing personnel to relevant internal, or external but industry related, examples of how the risk has eventuated to an incident could serve as a reiterating mechanism that acts to maintain the worker's perception of that particular (Hopkins, 2006).

6.4 Increase Stakeholder Collaboration and Community Involvement

Lehtiranta (2014) and Fowler & Fowler (2010) showed how greater investor and stakeholder involvement could positively affect the way in which an organisation perceives risk. Thus it can be deduced that implementing initiatives, such as consultation on decisions through town hall

meetings, that foster these aspects, would be conducive to maintaining an appropriate perception of risk. The key reason for this is again largely to do with information flow, as greater collaboration and involvement further exposes decision makers to the perspectives and concerns of those with a stake in the organisation and how associated risks may affect them (Lazarevic, Perry & Ranjan, 2007). Furthermore, the group of stakeholders can also be widened to include collaboration with unions and regulatory bodies to allow for the entry of information and reasoning from a rule-making perspective (Lazarevic, Perry & Ranjan, 2007; Marsh et al, 1995).

6.5 Increase Social Interaction With in the Organisation

Increasing work related social interaction within the organisation amongst the work group, as well as between workers and managers, is shown to promote safe behaviour (Borys, 2012), as it is a largely an informal process that workers are not likely to exhibit natural rebellion towards. Whilst a key issue remains regarding documenting the interactions and the transfer of information for system management purposes, greater focus could be placed on other metrics, such as incentives reflecting reduced incident rates for senior field personnel (Miozza and Wyld, 2002), instead of ensuring forms and action registers are completed to measure performance. Lastly, Borys, (2012) shows that by giving ownership to the workforce and trusting an organic hazard management process to take place transfers safe methods of work that are not available to administrative personnel due to lack of field exposure, making this a potentially powerful tool if a mechanism to communicate this upwards is also implemented.

6.6 Remove OHS Impracticalities

In an extension of the above, removing OHS impracticalities for the frontline workforce, such as writing out safe work method statements (SWMS) for regular tasks each time prior commencing work, promotes a more positive attitude towards safety and in turn the worker's perception of the risk (Blewett & O'Keefe, 2011).

Borys (2012) outlines the drastic difference between the content in a SWMS and how the work is actually undertaken on a construction site, stating that both methods are equally safe as workers intrinsically look after their wellbeing, and that SWMS should only be used for irregular tasks as guidance for workers. Additionally, Blewett & O'Keefe, (2011) argues that the process of auditing actually hinders work processes as personnel with safety related KPIs seek to simply complete the process rather than undertake it with care. Thus, it can be inferred that by reducing the impact of OHS management system formalities, workers would be more inclined to undertake their task as per safe work guidelines with a positive attitude instead of viewing it a barrier to conducting their work.

6.7 Manage Perception of OHS Management Systems as a Necessity Rather than a Luxury

This initiative is largely aimed at OHS professionals and industry. By changing the perception of OHS management systems from an optional performance upgrade to an essential part that is required for operation would allow simpler and easier integration into the management system and organisational culture (Manu et al, 2013), thereby allowing for the perception of risks to develop naturally and accurately. Acquiring certification for a safety management system needs to be regarded as an essential competitive advantage during times of volatility, not only because it looks admirable to client organisations, but also because a functioning system will positively affect risk perception through the development of a safety focused workplace culture (Fernández-Muñiz, Montes-Peón & Vázquez-Ordás, 2012). Thus, by increasing interaction internally and externally within and organisation, increasing efficiencies of the OHS management system and managing risk related education and exposure for both managers and workers, an organisation can effectively reduce the impact of unfavourable risk perception and promote safe behaviours within the workforce. The following figure is a management framework that has resulted from the exploration of this review's objectives. The framework outlines the preceding sections and concisely presents the manner in which various factors interact and influence each other, and in turn affect perception of risk within an organisation. This tool is intended to be a starting point for further research into the subject matter and the beginning of a potentially essential tool for risk management at a professional level.
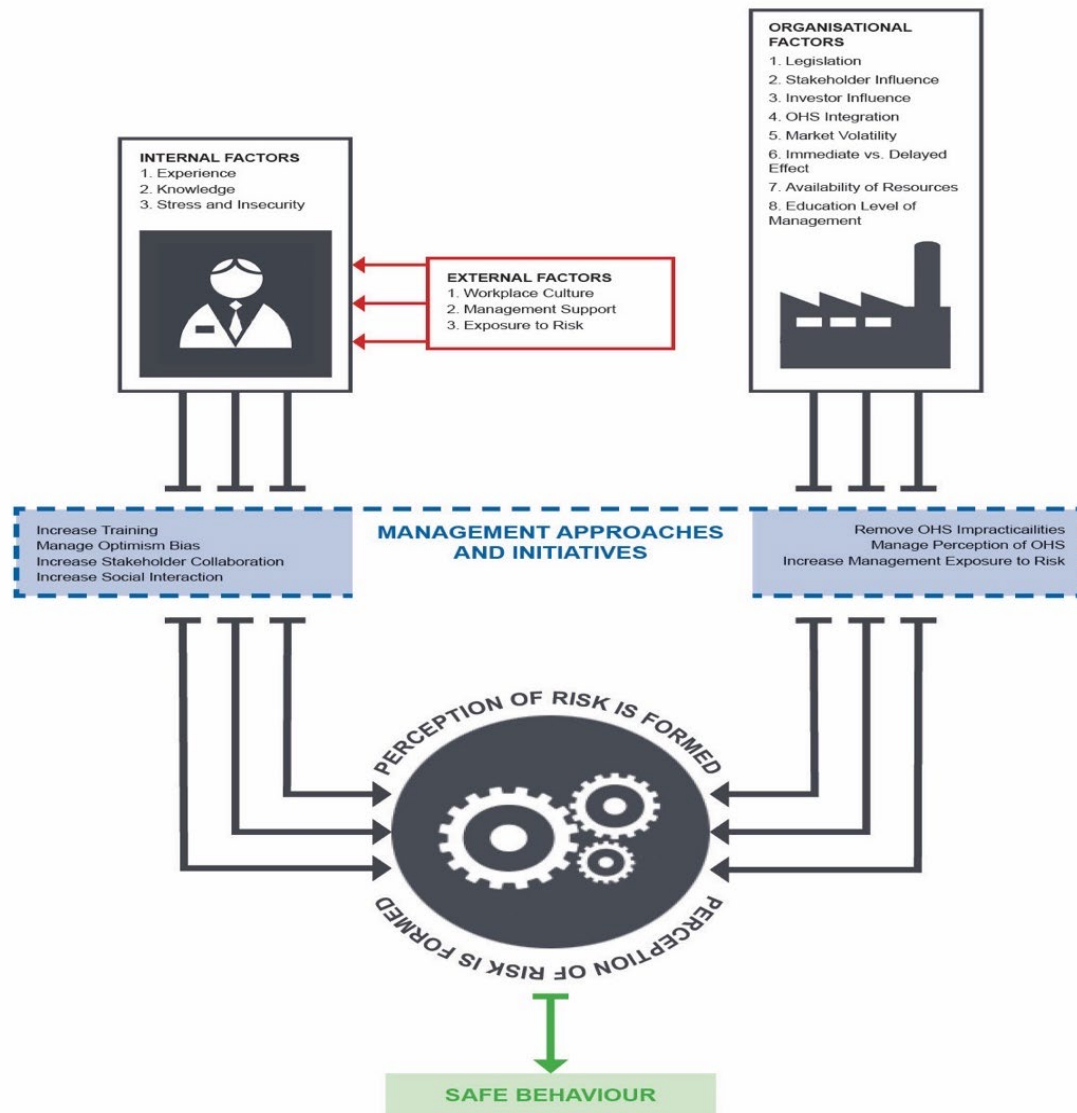
Figure 1 – Risk Perception Management Framework.

6. Discussion

With the information resulting from this literature review, combined with the risk perception factors described by Sarajlic & Jansz (2020), this discussion is aimed towards methods of implementation and associated logistics. A focus had been placed on the differences between small, medium and larger organisations due to the major differences in how the OHS management system functions within the different organisation sizes. Similarly, in the implementation of the above practical approaches and initiatives, it should be noted that a small and medium enterprises would be more capable of implementing the more organic and people-based approaches, but would not have the capacity or the resources to undertake it with the required effort (Badri, Gbodossou & Nadeau, 2012).

Large organisations on the other hand would have the necessary resources, however the likely bureaucracy that is required to ensure base processes are properly undertaken would act as a barrier to many of these approaches (Badri, Gbodossou & Nadeau, 2012; Subramaniam et al, 2011). A possible solution would be a new approach to the traditional organisational structure that allows the greater organisation, or one office thereof, to be considered as multiple smaller and socially close-knit groups where greater interaction and associated flow of information is able to take place, such as can be seen with project offices that function as a separate arm of a larger organisation.

Another aspect of the implementation phase in managing worker perception of risk that must be taken into account is the intricacies involved in the management of internal factors that define risk perception. Whilst experience and exposure to risk can be managed within the organisation, internal stressors and insecurities are highly personal and are dependent upon the worker to ensure that these issues are surmounted (Wachinger et al, 2013; Bosak, Coetsee & Cullinane, 2013). In this sense, management of internal stressors and insecurities, and their effect on risk perception is similar to the management of fatigue. The organisation can allow enough rest time in between shifts, impart knowledge on best practice methods and adapt work process, but ultimately it is up to the worker to ensure that they use the time appropriately (Bosak, Coetsee & Cullinane, 2013).

Furthermore, worker personal goals and objectives must also be taken into account, as this is another internal factor that cannot be controlled by the organisation (Teo, Ling & Ong, 2005), yet has the power to affect operations due to employees inclined to take calculated risks in order to achieve a particular personal objective within their role.

7. Future Directions

As a literature review, this report forms a potential basis for a line of research that seems to remain unexplored within the OHS discipline. The next point in this research would be to further explore the factors influencing risk perception within a workplace and how exactly they function by undertaking a study. This should ideally compare workers that undertake high-risk work, such as construction or demolition, regularly with those operating in low-risk environments, such as dominantly white-collar workplaces. This would determine whether the information revealed through this literature review is accurate and could potentially reveal other unidentified issues or relationships between factors and how different environments may impact individuals.

This study would effectively lead in to the second phase of research where the approaches and initiatives are tested for efficacy by determining whether any relationships exist with the factors that influence risk perception and if they can be altered. Similar to the first phase, this should ideally be undertaken using two groups divided into multiple large organisations and multiple SMEs, in order to examine how employees and the organisation itself respond to the approaches and their requirements. Additionally, determining how the greater OHS management system is affected through the implementation of organic and people-based approaches that are removed from the traditional linear bureaucratic methods is essential in identifying if a level of disruption exists that would render the entire stream of research potentially inapplicable.

Lastly, the previous two studies should culminate into a final research study that determines whether incident rates within multiple types of organisations are shown to actually reduce by any meaningful rate if effective and proven methods of managing risk perception are implemented. This would validate risk perception as another aspect in the optimisation of an organisation's OHS management system. Throughout this process the framework presented as Figure 1 in this literature review must keep evolving to reflect the updated research being undertaken until it is an accurate and easily applied tool that can be used within an organisation.

8. Conclusions

This literature review built upon the literature review of *Jansz & Sarajlic (2020)* and aimed to examine the ways in which perception of risk can impact the traditional risk management process in the organisational environment.

Whilst the first review found internal and external factors that shape risk perception within and individual worker and those in leadership positions, this literature review defined associations between risk perception and how it impacts an individual's ability to behave in a safe

manner. This establishes a potential line for further research that can be used for risk management within the OHS discipline. The review was further supported through the examination of initiatives and approaches that have been proven through published studies that could potentially be applied to mitigate perceptions of risk based on further targeted research.

9. Recommendations

Noting that this literature review only goes so far as to outline current related research as a basis for further study, some recommendations can still be made for current practitioners in the OSH field.

Firstly, greater communication, support and involvement within the workforce, can act as the cornerstone of success in regards to any function or initiative within an organisation (Smallman, 1996). This should almost exclusively come from management in an effort to understand worker perspectives, ideally resulting with those experiencing the greatest exposure to a risk guiding the organisation with how it should be perceived. Alternatively, greater involvement and feedback can reassure the worker that their goals and objectives are either being achieved or realign them towards a path that will allow them to achieve their goals, thus adjusting their risk-taking behaviour (Saari, 1994; Mattson, Torbiörn & Hellgren, 2014).

Greater engagement and involvement also applies to the community that the organisation functions in. As has been shown (Fowler & Fowler, 2010), a closer relationship with the community allows managers to consider their choices with a wider scope, thus perceiving risks differently. This especially applies for those managing organisations that impact or depend upon the local environment in some way.

Lastly, maintaining training initiatives and implementing additional approaches where inexperienced workers are paired with those undertaking more high-risk and complex work for a period would not only mitigate sensation seeking behaviours (Weber & Milliman, 1997), but also work to give employees greater exposure and

understanding of the risks associated with their roles (Dickson et al, 2004; Weber & Milliman, 1997). This approach should also be applied to management personnel, whereby regular exposure to the risks experienced by the frontline workforce can act to enable managers to better perceive the work environment they operate in and thus make better decisions (Dickson et al, 2004).

10. Research Significance

This research has identified that the management of risk perception has the potential to present a new and deeper tier of understanding worker motivations within various levels of an organisation and how risk perception has the capacity to affect the organisational direction within small, medium and large organisations. It has emphasised the effects of risk perception and how perception can act as a barrier to safe behaviour. A range of potential practical approaches and initiatives to manage risk perception have been identified. Whilst it is not intended for this research to provide a widely used tool for risk management within the workplace, its significance lies in establishing a foundation for further and more specific exploration of worker and organisational risk perception and appropriate methods of management, with the possibility that it would add another dimension to the risk management sphere.

References

Arezes, P.M. & Miguel. A.S. (2005). Risk perception and safety behaviour: A study in an occupational environment. *Safety Science. 46* (2008). 900-907. DOI:10.1016/j.ssci.2007.11.008

Badri, A., Gbodossou, A. & Nadeau, S. (2012) Occupational health and safety risks: Towards the integration into project management. *Safety Science.* 50 (2012). 190-198. DOI:10.1016/j.ssci.2011.08.008

Badri, A., Nadeau, S. & Gbodossou, A. (2013) A new practical approach to risk management for underground mining project in Quebec. *Journal of Loss Prevention in the Process Industries.* 26 (2013). 1145-1158. DOI:10.1016/j.jlp.2013.04.014

Bhattacharya, S. & Tang, L. (2013) Middle managers' role in safeguarding OHS: The

case of the shipping industry. *Safety Science. 51* (2013). 63-68. DOI:10.1016/j.ssci.2012.05.015

Blewett, V. & O'Keeffe, V. (2011) Weighing the pig never made it heavier: Auditing OHS, social auditing as verification of process in Australia. *Safety Science. 49* (2011). 1014-1021. DOI:10.1016/j.ssci.2010.12.010

Borys, D. (2012). The role of safe work method statements in the Australian construction industry. *Safety Science. 50* (2012). 210-220. DOI:10.1016/j.ssci.2011.08.01

Bosak, J., Coetsee, W.J. & Cullinane, S.J. (2013) Safety climate dimensions as predictors for risk behavior. *Accident Analysis and Prevention.* 55 (2013). 256-264. DOI:10.1016/j.aap.2013.02.022

Budworth, N. (2005) The eight habits of effective safety behavior. *The Safety and Health Practitioner. 23* (2005). 25

Caponecchia, C. & Shiels. I. (2011) Perceptions of personal vulnerability to workplace hazards in the Australian construction industry. *Journal of Safety Research. 42* (2011). 253-258. DOI:10.1016/j.jsr.2011.06.006

Chiang, Y. (2009). Subcontracting and its ramifications: A survey of the building industry in Hong Kong. *International Journal of Project Management.* 27(2009). 80–88. DOI: 10.1016/j.ijproman.2008.01.005

Dester, W.S. & Blockley, D.I. (1995) Safety – Behavior and culture in construction. *Engineering, Construction and Architectural Management. 2* (1995). 17-26. DOI:10.1108/eb021000

Dickson, G.C.A., Price, L., Maclaren, W.M. & Stein, W.M. (2004) Perception of risk: a study of A&E nurses and NHS managers. *Journal of Health Organisation and Management.* 18 (5). 308-320. DOI:10.1108/14777260410560857

Dilley, H. & Kleiner, B.H. (1996) Creating a culture of safety. *Work Study. 45* (3). 5-8. DOI:10.1108/00438029610115451

Eakin, J.M., Champoux, D. & MacEachen, E. (2010) Health and safety in small workplaces: Refocusing upstream. *Canadian Journal of Public Health. 101* (2010). 529-533.

Elias, W. & Shiftan. Y. (2012) The influence of individual's risk perception and attitudes on travel behavior. *Transportation Research Part A. 46* (2012). 1241-1251. DOI:10.1016/j.tra.2012.05.013

Fernández-Muñiz, B., Montes-Peón, J.M. & Vázquez-Ordás, C.J. (2012) Occupational

risk management under the OHSAS 18001 standard: Analysis of perceptions and attitudes of certified firms. *Journal of Cleaner Production. 24* (2012). 36-47. DOI:10.1016/j.jclepro.2011.11.008

Fowler, S.W. & Fowler. K. (2010) Risk perception, safety behaviour, employment precarity and community attachment: the case of Newfoundland and Labrador fibreglass boatbuilding workers. *Policy and Practice in Health and Safety. 8* (2010). 43-60.

Frick, K. (2011) Worker influence on voluntary OHS management systems – A review of its ends and means. *Safety Science. 49* (2011). 974-987.

Haase, C.M. & Silbereisen, R.K. (2011) Effects of positive affect on risk perceptions in adolescence and young adulthood. *Journal of Adolescence. 34* (2011). 29-37. DOI:10.1016/j.adolescence.2010.03.004

Holmes, N., Lingard, H., Yesilyurt, Z. & De Munk, F. (1999). An exploratory study of meanings of risk control for long term and acute effect occupational health and safety risks in small business construction firms. *Journal of Safety Research.* 30 (4). 251-261.

Hollnagel, E. (2008). Risk + barriers = safety? *Safety Science.* 46 (2008). 221-229. DOI:10.1016/j.scci.2007.06.028

Höpfl, H. (1994). Organizational transformation and the commitment to safety. *Disaster Prevention and Management.* 3 (3). 49-58. DOI:10.1108/09653569410065010

Hopkins, A. (2006) What are we to make of safe behavior programs. *Safety Science.* 44 (2006). 583-597. DOI:10.1016/j.ssci.2006.01.001

Houghton, S.M., Simon, M., Aquino, K. & Goldberg, C.B. (2000). No safety in numbers: Persistance of biases and the effects on team risk perceptions and team decision making. *Group and Organisational Management.* 25 (4). 325-353.

Idris, M.A., Dollard, M.F., Coward, J. & Dormann, C. (2012) Psycho social safety climate: Conceptual distinctiveness and effect on job demands and worker psychological health. *Safety Science. 50* (2012). 19-28. DOI:10.1016/j.ssci.2011.06.005

Sarajlic, A. & Jansz, J. (2020) A review of the perception of risk at the individual level and the organizational level in the workplace. *World Safety Journal. 24(*1), 24-32.

Kern, L., Geneau, A., Laforest, S., Dumas, A., Tremblay, B., Goulet, C., Lepage, S. & Barnett, T.A. (2014) Risk perception and risk-taking among skateboarders. *Safety Science. 62* (2014). 370-375. DOI:10.1016/j.ssci.2013.08.009

Koh, P.P., Wong, Y.D. & Chandrasekar, P. (2014) Safety evaluation of pedestrian behaviour and violations at signalized pedestrian crossings. *Safety Science. 70* (2014). 143-152. DOI:10.1016/j.ssci.2014.05.010

Krallis, D & Csontos, A. (n.d.) From Risk Perception to Safe Behaviour. Retrieved from *https://www.sia.org.au*

Lazarevic, S.P., Perry, M. & Ranjan, R. (2007) Improving the Occupational Health and Safety Measures in the Australian Construction Industry *Zagreb International Review of Economics and Business.* 10 (2). 17-34.

Lehtiranta, L. (2014) Risk perceptions and approaches in multi-organizations: A research review 2000–2012. *International Journal of Project Management. 32* (2014). 640-653. DOI:10.1016/j.ijproman.2013.09.002

Lingard, H. (2002) The effect of first aid training on Australian construction workers' occupational health and safety motivation and risk control behavior. *Journal of Safety Research. 33* (2012). 209-230. DOI:10.1016/j.tra.2012.05.013

Manu, P., Ankrah, N., Proverbs, D. & Suresh, S. (2013) Mitigating the health and safety influence of subcontracting in construction: The approach of main contractors. *International Journal of Project Management. 31* (2013). 1017-1026. DOI:10.1016/j.ijproman.2012.11.011

Marsh, T.W., Roberston, I.T., Duff, A.R., Phillips, R.A., Copper, M.D. & Weyman, A. (1995) Improving safety behavior using goal setting and feedback. *Leadership and Organisation development Journal.* 16 (1). 5-12.

Masi, D. & Cagno, E. (2014) Barriers to OHS interventions in Small and Medium-sized Enterprises. *Safety Science.* (2014). DOI:10.1016/j.ssci.2014.05.020

Mattson, M. Torbiörn, I. & Hellgren, J. (2014) Effects of staff bonus systems on safety behaviors. *Human Resource Management Review. 24* (2014). 17-30. DOI:10.1016/j.hrmr.2013.08.012

Miozza, M.L. & Wyld, D.C. (2002) The carrot of the soft stick: The perspective of American safety professionals on behavior and incentive based protection programmes. *Management Research News.* 25 (2002). 23-41

Mitchell, R.J., Bambach, M.R. & Friswell, R. (2014) Work and non-work-related vehicle crashes: The contribution of risky driving practices. *Safety Science. 68* (2014). 65-72. DOI:10.1016/j.ssci.2014.02.0125

Mitchell, S.J. & Braithwaite, G.R. (2008) Perceptions of safety and offshore helicopter travel. *International Journal of Energy Sector Management. 2* (4). 479-498. DOI:10.1016/17506220810919036

Mohamed, S., Ali, T.H. & Tam, W.Y.V. (2009) National culture and safe work behaviour of construction workers in Pakistan. *Safety Science. 47* (2009). 29-35. DOI:10.1016/j.ssci.2008.01.003

Neal, A. & Griffin, M.A. (2002) Safety climate and safety behaviour. *Australian Journal of Management. 27* (2002). 67-75

Nielsen, M.B., Glasø, L., Matthiesen, S.B., Eid, J. & Einarsen. S. (2013) Bullying and risk: Perception as health hazards on oil rigs. *Journal of Managerial Psychology. 28* (04). 367-383. DOI:10.1108/JMP-12-2012-0395

Provan, D.J. & Pryor, P. (2019) Emergence of the occupational health and safety profession in Australia. *Safety Science. 117* (2019). 428-436. DOI:10.1016/j.ssci.2019.04.036

Saari, J. (1994) When does behavior modification prevent accidents. *Leadership and organisational development. 15* (5). 11-15. DOI:10.1108/ 01437739410059926

Smallman, C. (1996) Risk and organizational behaviour: A research model. *Disaster Prevention and Management: An International Journal. 5* (2). 12-26. DOI: 10.1108/09653569610112880

Størseth, F., Hauge, S. & Tinmannsvik, R.K. (2014) Safety barriers: Organisational potential and forces of psychology. *Journal of Loss Prevention in the Process Industries. 31* (2014). 50-55. DOI:10.1016/j.jlp.2014.06.006

Subramaniam, N., Collier, P., Phang, M. & Burke, G. (2011) The effects of perceived business uncertainty, external consultants and risk management on organisational outcomes. *Journal of Accounting & Organisational Change. 7* (2). 132-157. DOI:10.1108/18325911111139671

Teo, E.A.I., Ling, F.Y.Y. & Ong, D.S.Y. (2005) Fostering safe work behavior in workers at construction sites. *Engineering, Construction and Architectural Management.* 12 (4). 410-422. DOI:10.1108/09699980510608848

Tobin, G.A., Whiteford, L.M., Jones, E.C., Murphy, A.D., Garren, S.J. & Padros, C.V.

(2011) The role of individual well-being in risk perception and evacuation for chronic vs. acute natural hazards in Mexico. *Applied Geography. 31* (2011). 700-711. DOI:10.1016/j.apgeog.2010.12.008

Tunnicliff, D.J., Watson, B.C., White, K.M., Hyde, M.K., Schonfeld, C.C. & Wishart, D.E. (2012) Understanding the factors influencing safe and unsafe motorcycle rider intentions. *Accident Analysis and Prevention.* 49 (2012). 133-141. DOI:10.1016/j.aap.2011.03.012

Van Manen, S.M. (2014) Hazard and risk perception at Turrialba volcano (Costa Rica); Implications for disaster risk management. *Applied Geography. 50* (2014). 63-73. DOI:10.1016/j.apgeog.2014.02.004

Vazquez, E.L. (2001) Risk perception interactions in stress and coping facing extreme risks. *Environmental Management and Health. 12* (2). 122-133. DOI:10.1108/09566160110389889

Wachinger, G., Renn, O., Begg, C. & Kuhlicke, C. (2013) The risk perception paradox: Implications for governance and communication of natural hazards. *Risk Analysis.* 33 (6). 1049-1065. DOI:10.1111/j.1539-6924.2012.01942.x

Weber, E.U. & Milliman, R.A. (1997) Perceived risk attitudes: Relating risk perception to risky choice. *Management Science.* 43 (2). 123-144

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Safety Culture and Climate: A Closer Look at Theory and Practice.

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Abstract

Researchers and practitioners have been seeking information on ways to improve their safety culture and climate and reduce workplace safety and health loss experience. This article reports an exploration of safety culture, climate, the dominant theories and practice strategies found in published literature. Models and other statistical methods are included to quantify and explain safety culture and climate in a wide range of industries. Qualitative methods, such as interviews and case studies are included to explain and further understand safety culture and climate. The authors have found that there are various methods used to confirm the presence and/or absence of a positive safety culture and climate and the impact of effective interventions. Common indicators identified were management commitment to safety, organizational learning, and employee engagement but, there are other considerations that must be accounted for in developing safety culture and climate, such as differing national cultures, change, and resistance.

Key Words: Safety Culture. Safety Climate. Worker Health. Injury Prevention.

Introduction and Scope of Work

Throughout the organizational safety culture literature, the concept of safety culture has been defined in a variety of ways. Guldenmund (2000, p.251) defined safety culture as "those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk." He et al. (2012, p. 246) proposed that "safety culture is the sum of a series of concepts, that is, safety culture is the ideas of safety management." Many researchers believe that reduction in injury and accidents is equivalent to establishing a positive safety culture (Christian et al. 2009; Luria 2010; Wachter and Yorio 2014). Similar to its definition, there has been little consensus on the different indicators of safety culture. Often researchers choose the dimensions they want to study through their own experiences or through a literature review (Guldenmund 2000). Consequently, Guldenmund (2000, p. 216) asserted that "the concept [of safety culture] still has not advanced beyond its first developmental stages." This is in accordance with Cooper and Phillips (2004), who argued that safety culture and climate research has a long way to go before it can be beneficial to industry and employees. Despite these assertions, researchers appear to be making progress in this field and have readily applied their findings to industry (Luria and Rafaeli 2008; Rosso et al. 2019; Sanne 2008; Zwetsloot et al. 2017).

The distinction between safety climate and safety culture has been a heated subject of debate in the organizational safety culture and climate literature. Similar to safety culture, Williamson et al. (1997, p. 17) argued that "there has been so little consensus about the safety climate concept and its dimensions." However, Guldenmund (2000) asserted that the distinction between safety culture and safety climate is that safety climate encompasses employee attitudes towards safety while safety culture encompasses the basic assumptions, convictions, and dogmas underlying

employee attitudes. As can be seen in Table 1, there are several definitions of safety culture and safety climate and there appeared to be no clear distinction between the two concepts.

In the safety culture and safety climate literature, there was no consensus on how to achieve a safety culture or safety climate. In fact, Shi and Shiichiro (2012, p. 536) argued that safety culture "contains too abstract elements," and "no way is found to establish it in a specific manner in an organization." Stiles et al. (2018) wrote that organizational safety culture can be achieved only if proper safety management systems (SMS) are in place and considerable focus is given to the improvement of safe behaviors and organizational culture. Wachter and Yorio (2014) argued that employee engagement and good SMS can lead to a positive organizational safety culture. However, Vredenburgh (2002) stated that developing proactive practices in tandem with good management practices, such as management commitment, rewards, communication and feedback, selection, training, and participation, can lead to a positive safety culture. Zwetsloot et al. (2017) asserted that there is no single way to achieve a zero accident vision (ZAV); ZAV are popular among organizations that are seeking to improve their organizational safety cultures. In keeping a ZAV sustainable, Zwetsloot et al. (2017) recommended that safety commitment at all levels of workers is imperative.

Although there is little consensus on several elements of safety culture and climate, there appeared to be some consensus on others. For instance, safety culture is an aspect of organizational culture (Richter and Koch 2004). Safety culture is a construct, is relatively stable, is multi-dimensional, is shared by groups of workers, consists of various aspects, constitutes practices, and is functional (Cooper et al. 2019; Guldenmund 2000; Parker et al. 2006; Richter and Koch 2004). Safety culture influences both personnel and process safety (Mentzer et al. 2014). In addition, the development of a

positive safety culture must be continual (Reason 2000). Therefore, considerable attention, time, people, money, and other resources are required to achieve a strong, positive organizational safety culture (Shi and Shiichiro 2012; Stiles et al. 2018).

From their bibliometric analysis of safety culture research, Nunen et al. (2018) found that there has been a movement away from organizational safety culture research towards patient safety culture research. This does not mean that organizational safety culture is of lesser importance or that organizational safety culture is not being studied anymore. Potentially in the future, the concept of organizational safety culture will be applied to other areas. Recently, many researchers and the International Labor Organization have been proposing the concept of a preventative culture, where everyone has the right to a safe work environment (Kim et al. 2016). A preventative culture occurs on the national level and umbrellas both work and non-work life. Therefore, for an effective preventative culture to exist, it must involve workers, organizations, and the government at all levels. In contrast to an organizational safety culture, which hopes to protect health, a prevention culture focuses on both the protection and promotion of health (Kim et al. 2016).

In this exploratory literature review, the authors present findings on safety culture and climate models, safety culture and climate measurement, indicators of safety culture and climate, and other considerations for developing an organizational safety culture. Safety culture and safety climate are sometimes used interchangeably throughout this literature review because of the nature of the references cited. The following relationship can help put safety climate and safety culture into context: safety climate is a snapshot of the underlying organizational safety culture, where the culmination of these snapshots is organizational safety culture (Flin et al. 2000).

Table 1. Definitions of Safety Culture and Climate[*]

Reference	Definition of Safety Culture/Climate
Zohar (1980)	A summary of molar perceptions that employees share about their work environments (safety climate)
Glennon (1982a,b)	Employees' perceptions of the many characteristics of their organisation that have a direct impact upon their behaviour to reduce or eliminate danger (safety climate) and, safety climate is a special kind of organisational climate
Brown and Holmes (1986)	A set of perceptions or beliefs held by an individual and/or group about a particular entity (safety climate)
Lutness (1987)	Not explicitly stated (safety climate)
Cox and Cox (1991)	Safety cultures reflect the attitudes, beliefs, perceptions, and values that employees share in relation to safety (safety culture)
Dedobbeleer and Béland (1991)	Molar perceptions people have of their work settings (safety climate)
International Safety Advisory Group (1991)	Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance (safety culture)
Pidgeon (1991)	The set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimising the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious (safety culture)
Ostrom et al. (1993)	The concept that the organisation's beliefs and attitudes, manifested in actions, policies, and procedures, affect its safety performance (safety culture)
Safety Research Unit (1993)	Not explicitly stated (safety climate)
Cooper and Philips (1994)	Safety climate is concerned with the shared perceptions and beliefs that workers hold regarding safety in their work place (safety climate)
Geller (1994)	In a total safety culture (TSC), everyone feels responsible for safety and pursues it on a daily basis (safety culture)
Niskanen (1994)	Safety climate refers to a set of attributes that can be perceived about particular work organisations and which may be induced by the policies and practices that those organisations impose upon their workers and supervisors (safety climate)
Coyle et al. (1995)	The objective measurement of attitudes and perceptions toward occupational health and safety issues (safety climate)
Berends (1996)	The collective mental programming towards safety of a group of organisation members (safety culture)
Lee (1996)	The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, and organisation's health and safety management (safety culture)

Cabrera et al. (1997)	The shared perceptions of organisational members about their work environment and, more precisely, about their organisational safety policies (safety climate)
Williamson et al. (1997)	Safety climate is a summary concept describing the safety ethic in an organisation or workplace which is reflected in employees' beliefs about safety (safety climate)

Safety Culture and Climate Models

There were several safety culture and climate models presented in the safety and health literature that demonstrated relationships with various safety outcomes. Safety outcomes included injury, illness, accidents, near-misses, violations, and positive safety behaviors (Christian et al. 2009; Fogarty and Shaw 2010; Neal et al. 2000; Parker et al. 2006; Sinclair et al. 2010). The author of this paper classified the models based on positive and negative safety outcomes. Positive safety outcomes included positive safety behaviors while negative safety outcomes included injury, illness, accidents, near-misses, and violations. Some safety culture and climate models included both positive and negative outcomes or could not be classified as negative or positive safety outcomes, so they were classified as overarching safety culture and climate models.

Models Leading to Positive Safety Outcomes

There are two classifications of safety culture: safety commitment culture and safety compliance culture (Luria and Rafaeli 2008). Leaders who sincerely want employees to be safe demonstrate safety commitment and create a positive safety commitment culture. These leaders care about employees before safety compliance. On the other hand, leaders who want to be in compliance and create a "law-abiding organization" demonstrate safety compliance. These leaders foster a safety compliance culture. Researchers have shown that strong organizational safety cultures

were most prominent in organizations where safety commitment is the focus. In other words, safety culture is not the product of an organization focused only on compliance. The safety commitment and safety compliance cultures of an organization can influence employee safety behavior and performance (Luria and Rafaeli 2008; Neal et al. 2000). Chen and Chen (2014), Neal et al. (2000), and Griffin and Neal (2000) explained that employee safety behavior is composed of safety compliance and safety participation; some researchers use the term proactive behavior instead of safety participation (Fugas et al. 2012). Safety compliance involves the safety of workers' core tasks and occurs at the individual level. Safety participation is when workers engage in extra activities and support an environment of safety. Safety participation occurs at the group level (Chen and Chen 2014). It would make sense that safety compliance behaviors are more prevalent in safety compliance cultures and safety participation behaviors are more prevalent in safety commitment cultures. As can be seen in Figure 1, Neal et al. (2000) proposed a model for how organizational safety climate led to safety compliance and safety participation behaviors. The survey responses from Australian hospital workers supported this model (Neal et al. 2000). Overall, organizations that promote a culture of safety commitment tend to reap the benefits of having a strong, positive safety culture (Luria and Rafaeli 2008).

Figure 1. Safety Climate, Safety Compliance, and Safety Participation Model
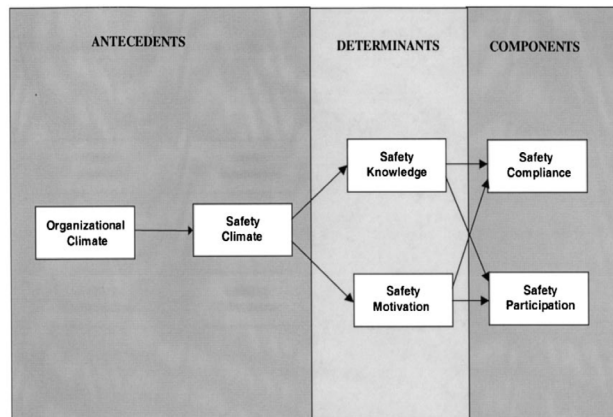
Note. From "The impact of organizational climate on safety climate and Individual Behavior" *(p. 103)* by A. Neal, M. Griffin & P. Hart, 2000, *Safety Science 34*:99–109; doi:10.1016/s0925-7535(00)00008-4. Copyright 2000 Elsevier.

Organizational safety cultures can develop over time to have a strong, positive safety cultures. As supported by Parker et al. (2006) and Kim et al. (2016), safety culture development — from a poor, negative safety culture to a strong, positive safety culture — can be divided into five stages: pathological, reactive, calculative, proactive, and generative. Overall, pathological safety cultures are negative safety cultures while generative safety cultures are strong, positive safety cultures (Parker et al. 2006). Descriptions of each safety culture development stage is as follows (see Parker et al. 2006 and Kim et al. 2016 for further descriptions):

Pathological safety culture stage: characterized by employees at all levels not caring about safety.

Reactive safety culture stage: characterized by employees caring about safety only after safety incidents have happened.

Calculative safety culture stage: characterized by having safety systems in place, such as safety management systems.

*Proactive safety culture stage:* characterized by employees avoiding safety problems in advance.

Generative safety culture stage: characterized by all employees trying to fix safety problems in advance before incidents or accidents happen.

Models Leading to Negative Safety Outcomes

Several researchers have created safety culture and climate models that demonstrate the relationship between safety culture and climate and negative safety outcomes, such as injury, illness, accidents, near misses, and safety violations. Researchers have readily applied these models because injury, illness, accidents, and violations are sometimes easier to measure compared to positive safety outcomes, which tend to be more secretive (Cox and Flin 1998; Reason 2000). Even so, there has been some controversy as to whether injury, illness, accidents, and violations are valid for measuring safety culture and climate (Cooper et al. 2019; Cox and Flin 1998; Reason 2000; Sanne 2008; Williamson 2013). One issue could be that there is low reporting of workplace injuries, illnesses, accidents, near misses, and violations. Low rates of these measures can be a false reality of organizational safety culture (Cox and Flin 1998; Williamson 2013).

Fogarty and Shaw (2010) proposed a safety climate model that related safety attitudes and violations. The researchers' revised model can be seen in Figure 2. The researcher's revised model supported the data collected from aircraft maintenance workers.

Figure 2. Safety Climate and Violations Model
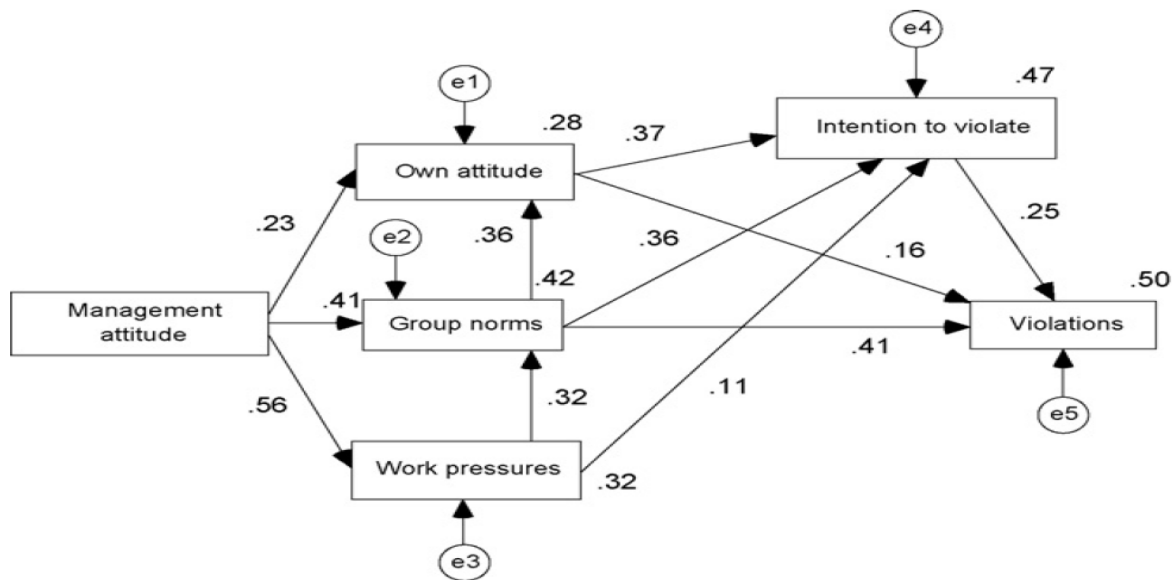
Christian et al. (2009) proposed a safety climate model that related safety climate to accidents and injuries. This model is shown in Figure 3. The researchers tested the applicability of the model using a meta-analysis of the safety literature. Overall, the meta-analysis data supported the path model (Christian et al. 2009).

**Figure 3**. **Safety Climate, Accidents, and Injuries Model (Christian et al. 2009)** *
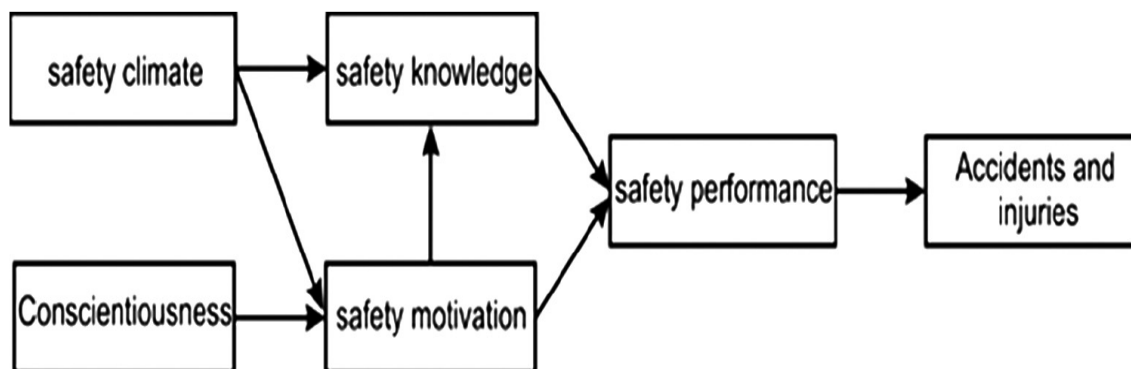
Overarching Safety Culture and Climate Models

According to Cooper (2000), an all-encompassing model for representing safety culture may be the reciprocal model, which draws from the principles of Bandura's Social Cognitive Theory (SCT). SCT is based upon the following notion: "an individual's internal psychological factors, the environment they are in and the behavior they engage in, all operate as interacting determinants that influence each other bi-directionally" (Cooper 2000). As proposed by the researcher, the pros of applying SCT include triangulation, capture of safety culture's dynamic nature, incorporation of goal-setting, and encompassment of other researchers' models. For the latter, Cooper analyzed the applicability of the reciprocal model to other safety culture models. It appeared that the reciprocal model would capture the models proposed by the following researchers: Schein, Glendon and Stanton, Guldenmund, Hofstede, Johnson, Buchan, Geller, and Reason. Cooper's original reciprocal model of safety culture is presented in Figure 4. Cooper's model was revised in 2016 to clarify the pathways (Cooper 2016). The revised model is presented in Figure 4.

Figure 4. Reciprocal Model of Safety Culture
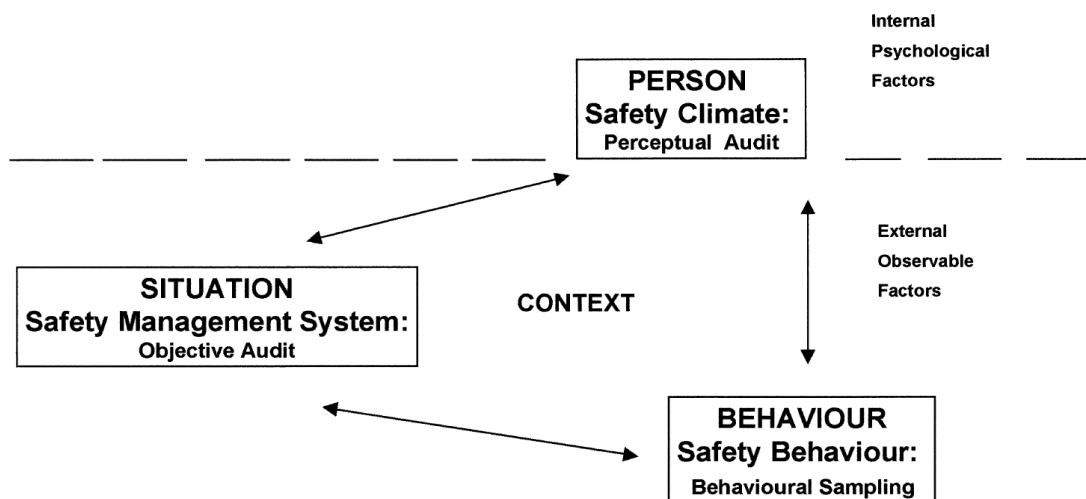
Note. From "Towards a model of safety culture" (p. 119) by M. Cooper, 2000, Safety Science 36:111–136; doi:10.1016/s0925-7535(00)00035-7. Copyright 2000 Elsevier

Figure 5. Revised Reciprocal Model of Safety Culture
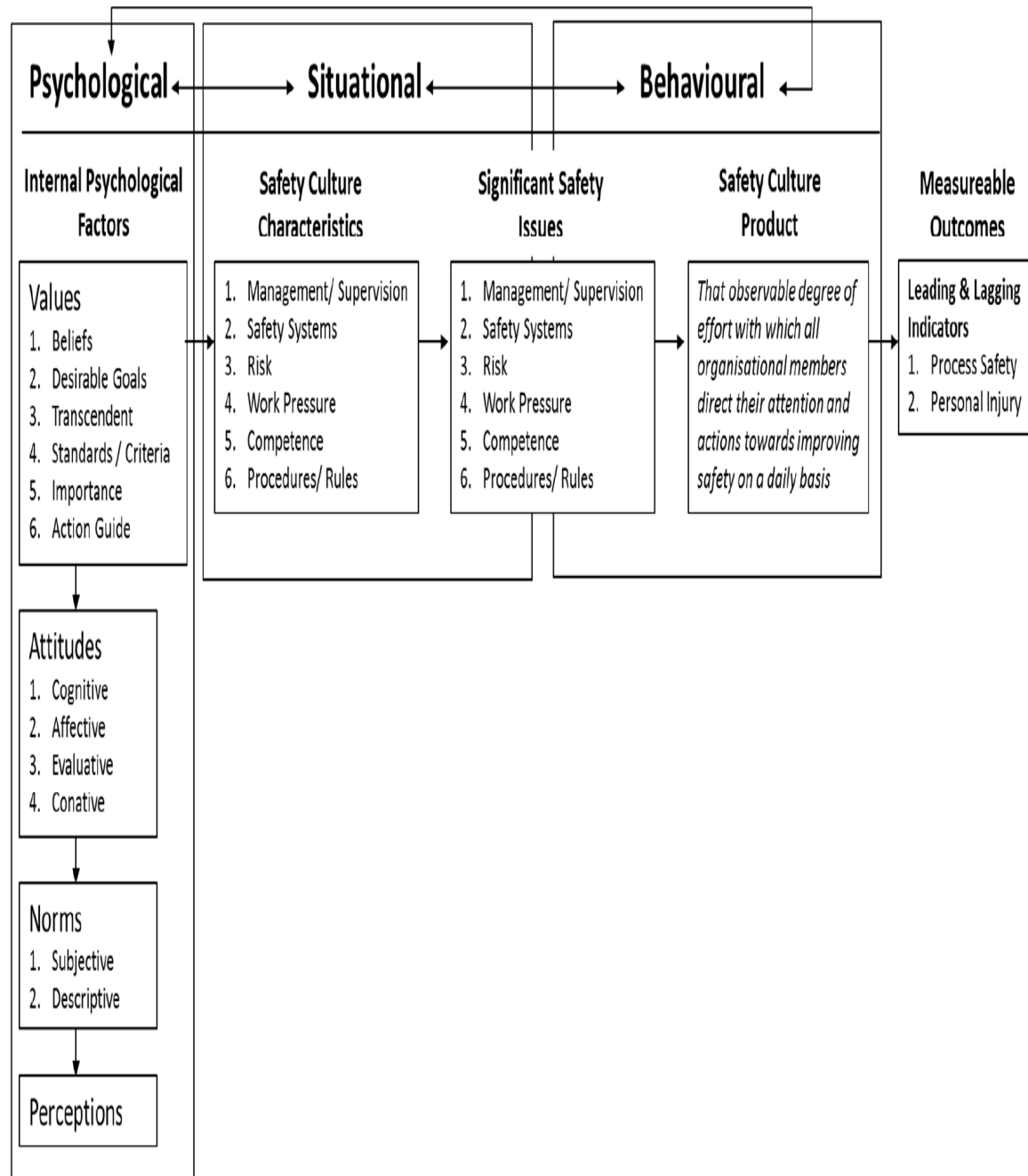
Note. From "Navigating the safety culture construct: a review of the evidence" (p. 16) by D. Cooper, 2016, (http://bsms-inc.com/articles/safety_culture_review.pdf). Copyright 2016 Dr Dominic Cooper.

Vierendeels et al. (2018) proposed The Egg Aggregated Model (TEAM) as a safety culture model. The researchers combined several models to arrive at TEAM. Models incorporated into TEAM included those from the National Safety Council, Geller, Cooper, Reniers, Griffin and Neal, Christian, Flin, Reason, Ajzen, and Fugas. TEAM emphasizes the cyclic relationship between the technological, organizational, and human domains.

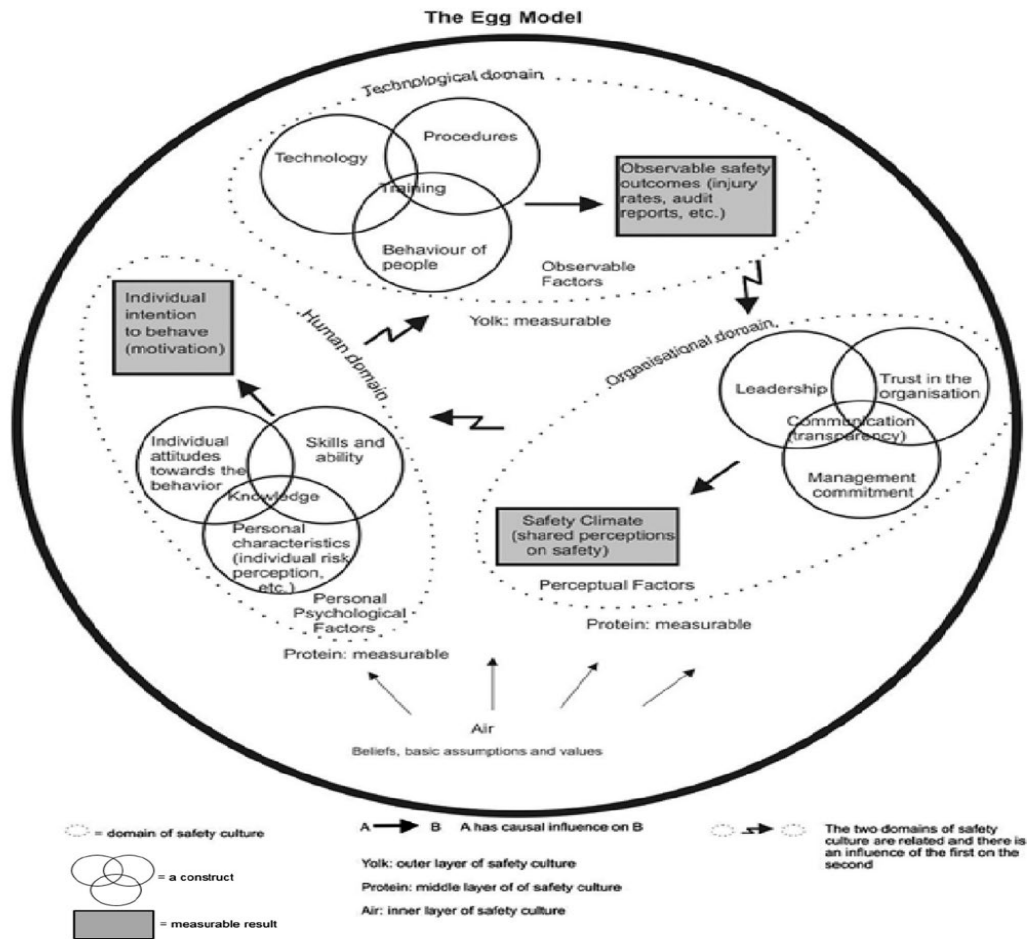**Figure 6. Measuring Safety Culture and Climate**

Fig. 17. The Egg Aggregated Model of safety culture.

Note. From "An integrative conceptual framework for safety culture: The Egg Aggregated Model (TEAM) of safety culture" (p. 337) by G. Vierendeels, G. Reniers, K. Nunen & K. Ponnet, 2018, *Safety Science 103:*323–339; doi:10.1016/j.ssci.2017.12.021. Copyright 2018 Elsevier.

Because of the differences between safety culture and safety climate (Flin et al. 2000; Guldenmund 2000; Williamson 1997), there are different methods for measuring both constructs. Following are some common methods for measuring safety culture and safety climate.

Measuring Safety Culture

In many research papers, researchers supported safety climate measures as a means of inferring the underlying organizational safety culture (Cooper 2000; Cox and Flin 1998; He et al. 2012; Mearns and Yule 2009; Shi and Shiichiro 2012). However, there are alternatives to measuring safety culture.

These alternatives include review of all relevant safety data, case studies, comparative studies, psychometric surveys, radar charts, assessment trees, and maturity models. The latter three methods were proposed relatively recently while the former four methods were proposed earlier in the safety culture and climate literature.

In accordance with the reciprocal model of safety culture, Cooper (2000) argued that psychological, environmental, and behavioral aspects must all be measured in order to measure safety culture. Cooper's models of safety culture were discussed

previously and are presented in Figure 4 and Figure 5 of this review. The psychological aspect can be measured through safety climate questionnaires, group interviews, discussion groups, archival data, and document analyses. The behavioral aspects of safety culture can be measured via peer observations and self-report measures and outcomes, such as accidents and near-misses. Situational aspects of safety culture can be measured by policies, standard operating procedures, management systems, control systems, communication flows, and workflow systems as well as environmental conditions such as noise, light, and heat. By integrating all these measures together, especially over time, a comprehensive picture of organizational safety culture can be achieved.

Cox and Flin (1998) asserted that one can measure safety culture through case studies, comparative studies, and psychometric surveys:

Case studies involved conducting interviews and observations to capture the qualitative state of an organization.
- Crisis-prone organizations (indicators of poor safety culture): rigid perceptions, decoy problems, organization exclusivity, information difficulties, violations, failure to recognize emergent danger, and huge financial losses.
- Organizations experiencing change (indicators of strong safety culture): commitment, priority of safety, communication, and employee involvement.
- High reliability organizations (indicators of strong safety culture): safety as a primary goal, decentralized authority, systems redundancy, organizational

learning, and senior management commitment.

Comparison studies involved comparing the safety situations of different departments or organizations. Comparisons may be made with respect to injury and accident rates and/or the workplace hazard environment. These studies may be limited or biased by the content or amount of reported observations. Another limitation of comparative studies is generalizability to other populations.

Psychometric surveys (or safety condition monitoring) involved administering surveys to organizations over time to see if opinions and attitudes on safety changed. These surveys can be used as an indicator of organizational health.

Like psychometric surveys proposed by Cox and Flin (1998), Shi and Shiichiro (2012) discovered a way of visualizing safety culture. The researchers visualized safety culture via a radar chart with ten different areas: safety statement; safety and productivity; rules and documentation; responsibility, authority, and roles; troubleshooting; education, and training; information channel and communication; working conditions; institution and activities; and cooperation with outsiders. If these areas are measured from different levels of workers — managers, supervisors, and operators — one can identify safety gaps among the levels, as can be seen in Figure 7. If these perspectives are measured over time, this method not only shows development of a safety culture, but can help an organization progress in safety and health (Shi and Shiichiro 2012).

Figure 7. Safety Culture Radar Chart
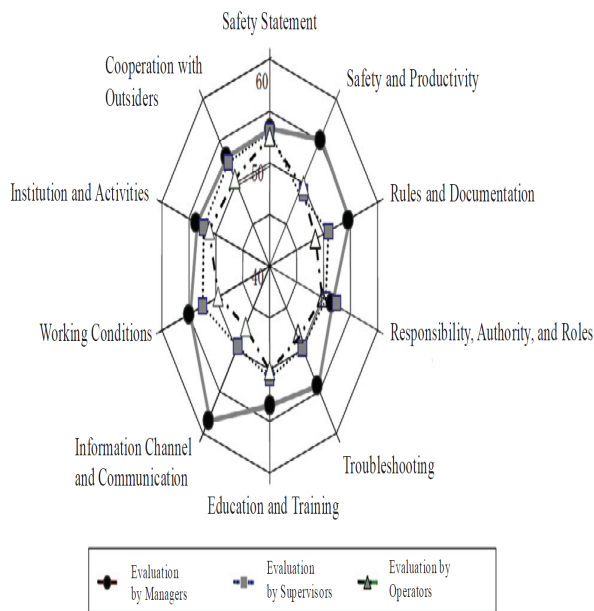
Note. From "Study on the strategies for developing a safety culture in industrial organizations" (p. 537) by G. Shi & I Shiichiro I. 2012. *Procedia Engineering 43*:535–541; doi:10.1016/j.proeng.2012.08.093. Copyright 2012 Elsevier.

Warszawska and Kraslawski (2016) proposed the assessment tree method (ATM) as a method of measuring safety culture in a university population. ATM is versatile in that it can be conducted in groups or with individuals. Depending on how the individuals or groups respond to a series of questions, they are navigated through a tree of more questions. This brings the group or individual to a unique safety culture score. In this study, the researchers analyzed several safety culture aspects including awareness; knowledge and skills; management commitment; monitoring, control, and supervision; continuous improvement; and flow of information. The researchers emphasized that different safety culture aspects could be measured if questions aiming to measure these different aspects were asked of participants. If this method were conducted over time, a qualitative and quantitative measure of safety culture could be obtained.

Finally, via their literature review of over forty articles, Filho and Waterson (2018) found that maturity models were a relatively popular method of measuring safety culture. Maturity models involved characterizing an organization based on the five stages of safety culture development: pathological, reactive, calculative, proactive, and generative (Parker et al. 2006; Filho and Waterson 2018). Such a measurement, especially if obtained over time, can help an organization understand its progress in the direction of a strong, positive safety culture (Filho and Waterson 2018).

Measuring Safety Climate
In the safety and health literature, a widely accepted method for assessing safety climate is cross-sectional studies (Ajslev et al. 2017; Cooper and Phillips 2004; Dedobbeleer and Béland F 1991; Williamson et al. 1997). Below are some examples of safety climate studies from the literature.

Dedobbeleer and Béland (1991) administered a questionnaire to Maryland nonresidential construction workers. The purpose of the researchers' study was to determine if Brown and Holmes' three-factor model of safety climate applied to their study sample. The Brown and Holmes model included dimensions on management concerns, management safety activities, and employee risk perception. Although the researchers found that a two-factor model was more fitting of their data, the researchers found that their data supported Brown and Holmes' safety climate model. The researchers' reduced two-factor model included dimensions on management commitment and worker involvement. Therefore, in the sample of construction workers, management commitment to safety and worker involvement in safety supported a positive safety climate.

Williamson et al. (1997) identified five main factors in measuring safety climate in their questionnaire, which was administered to behavior, positive safety practices, risk justification, fatalism, and optimism. Personal motivation promoted safe behavior in individuals. Positive safety practices involved workplace safety activities. Risk justification was the reason for working unsafely and/or taking risks. Fatalism was lack of control in working safely. And, optimism involved the individuals' viewpoints on their risk for accidents. Overall, the researchers found that individuals who perceived hazards at work would depend on their personal motivation for safety, their experiences with safety practices, their justification of safe work conditions, and their optimism about personal risk in order to work safely. Of the factors, the strongest factor for strong safety climate was personal motivation for safety.

Cooper and Phillips (2004) administered a safety climate survey to manufacturing workers before and after a behavioral safety initiative. The safety climate survey included measures on employee safety perceptions and the status of the safety officer. The behavioral safety initiative involved workers evaluating their co-workers safe behaviors each day and reporting the percent of these observed behaviors that were safe. Overall, the researchers found that the relationship between safety climate and safety behaviors is complex. Also, safety training was a predictor for actual employee safety behaviors.

Molenaar et al. (2009) studied corporate safety culture and safety performance in three construction companies based in Colorado. The sample population included field personnel, middle management, and upper management. There are two reasons why this study was included in this section instead of the measurement of safety culture section of this review. First, because the researchers administered their survey once, a better term for corporate safety culture is corporate safety climate. Second, corporate safety

light manufacturing and outdoor workers. The factors were personal motivation for safe

climate is synonymous with organizational safety climate. In their study, the researchers found that five distinct variables described organizational safety climate. These variables are company safety commitment, safety incentives, subcontractor involvement, safety accountability and dedication, and disincentives for unsafe behaviors. The researchers found that these safety climate indicators could further predict organizational safety performance.

Ajslev et al. (2017) conducted a cross-sectional study on safety climate using Denmark national survey data. The five safety climate variables of interest were: ''Management ensures that everyone receives the necessary information on safety,'' ''Management encourages employees here to work in accordance with safety rules – even employees in decisions regarding safety,'' "Management involves employees in decisions regarding safety,'' ''We who work here help each other to work safely,'' and ''We who work here consider minor accidents as a normal part of our daily work.'' From their study, the researchers found that younger workers and women each had greater odds of experiencing safety climate problems. In addition, younger workers were more likely to experience injury while women workers were not. This may provide evidence that safety climate is a contributor to worker injuries and accidents.

Indicators of Safety Culture and Climate

The indicators of safety culture and safety climate presented in this review were based upon Mannan et al. (2013). It is important to note that these ten indicators do not exist separately. They all interact to create organizational safety culture and climate. Here, indicators are defined as aspects or factors that contribute to the presence or absence of a safety culture and climate. The ten factors that are characteristic of best-in-class (BIC) organizational safety cultures are,

in no order of importance:
* Management systems and leaders
* Organizational culture and values
* Goals, policies, and initiatives
* Organization and structure
* Employee engagement and behaviors
* Resource allocation and performance
  management
* Systems, standards, and processes
* Metrics and reporting
* Organizational learning
* Verification and audit.

Besides Mannan et al. (2013), there are several other researchers that have proposed indicators. As previously noted, many researchers freely chose their safety culture indicators and how many indicators they wanted to study (Guldenmund 2000). For example, He et al., proposed thirty two safety climate indicators (2012).

The indicators from Mannan et al. (2013) were used in this review because the indicators originated from studying many organizations over time that have BIC safety programs. More specifically, these indicators were determined through case and comparison studies, which are methods for rigorously evaluating safety culture (Cox and Flin 1998). In addition, other safety culture and climate researchers consensus on these indicators as well as similar indicators.

Management Systems and Leaders
In literature the most cited indicator of the presence of a strong safety culture is strong leadership commitment to safety. Mannan et al. (2013) asserted that strong leadership is the cornerstone of BIC safety management, especially in high reliability organizations (HROs). The rationale may be that workers look up to their leaders for safety commitment. Strong safety leadership is needed on all levels of management including the CEO, the board of directors, operations managers, and safety committees (Mannan et al. 2013). Zohar (1980) explained that the Chief Security Officer (CSO) tells one a lot about organizational safety culture. If the CSO is the CEO, then there is likely a good organizational safety culture at the organization. Further, Zohar argued that

organizations need management commitment to safety before they can implement safety regulations, poster campaigns, and departmental safety contests.

The following questions are explored in this section on management and safety:
* What type of leadership style, perspective, or commitment promotes safety culture?
* What do leaders do to promote safety culture?
* How does one measure management commitment to safety?
* What are the outcomes of management commitment or non-commitment to safety?
* What type of leadership style, perspective, or commitment promotes safety culture?

According to Fruhen et al. (2019), leaders can promote safety via affective, normative, and calculative workplace commitments. These different types of commitments to safety can influence how employees perceive their leaders' commitment to safety, and thus their own safety commitment. Affective commitment is defined as the "emotional and sometimes passionate sense of personal care for keeping individuals in and outside of the organization safe." Normative commitment to safety is the "moral obligation for safety as a core human and social value and as the right thing to strive for." Calculative commitment to safety is the "transactional or rational requirement to prioritize safety as an obligation to business survival as well as other external pressures." Through a literature search, the researchers pinpointed different kinds of methods in which leaders commit and demonstrate safety. These are communication, managerial participation, support and guidance, allocating resources, policies and decision making, and involving workers. The researchers found that there may be a link between management safety commitment demonstrations and affective and normative safety commitment types, but not calculative safety commitment. Also, normative and affective commitment were higher when the leaders perceived that their workplace had a positive safety climate.

In contrast, Shi and Shiichiro (2012) presented two perspectives of safety management that can hinder organizational safety culture: fatalists and responsibilism. Fatalists believe that nothing can be done to prevent injuries because people are error-prone. Responsibilism involves blaming individuals for accidents. The researchers asserted that, if workers are put under the right circumstances such as these negative leadership perspectives, workers will be more likely to experience accidents as a result of these circumstances.

Luria and Rafaeli (2008) asserted that transformational leaders are most indicative of the presence of an organizational safety culture. Transformational leadership is where leaders are stimulating, inspiring, and considerate. In addition, transformational leaders instill organizational values and culture into workers. In their study, the researchers found that there was a positive correlation between transformational leadership and the level of safety commitment in Israeli workers (2008). Similarly, in a US public transit agency, Jiang and Probst (2015) found that transformational leadership strengthened safety motivation, knowledge, and participation compared to passive leadership. Passive leadership is commonly referred to as absence of leadership. Chen and Chen (2014) argued that leadership styles that enhance organizational safety culture may vary by national culture. For instance, Chen and Chen found that morality leadership in Chinese aviation workers was related to safety behaviors. Morality leadership is characterized by leaders caring about the collective before themselves.

Likewise, Molnar et al. (2019) investigated the relationship between management leadership styles and minor and major injury rates via a longitudinal intervention study on a Swedish paper mill company. The types of leadership styles studied were transformational, transaction, and safety-specific leadership. The researchers found that safety-specific leadership encouraged workplace safety the most, transformational

leadership did not contribute as much to workplace safety, and transactional leadership was related to negative safety outcomes such as injury and fewer safety initiatives. Conversely, transformational and safety-specific leadership were not related to major or minor injuries. From these results, the researchers claimed that the relationship between leadership style and safety outcomes may be overrated. No matter the leadership style, leaders who are committed to safety can positively influence the safety behaviors of their subordinates. Therefore, in leadership training programs, it is important to stress the importance of workplace safety to all leaders.

What do leaders do to promote safety culture?

Managers that empower people "closest to the facts to make safety-enhancing decisions within their areas of authority" promote organizational safety culture (Mannan et al. 2013). Conversely, managers that provide mixed messages on the importance of safety can hinder the development of a strong safety culture and make workers feel that safety is not important. Therefore, it is important for leadership on all levels to be consistent with communicating safety messages. Management must also lead by example because workers look up to them for guidance. In putting this into action for enhancing safety culture, managers should be actively involved in safety initiatives that frontline workers are involved in, such as safety training and safety drills. This shows frontline workers that management promotes and is committed to safety at their organization.

After conducting a literature review, Stiles et al. (2018) arrived at nine different leadership actions that promoted an organizational culture of safety. They are:
* Safety as a top priority
* Demonstrable commitment to safety
* Increased visibility around safety
* Enabled safety reporting
* Workforce involvement
* Creation of an open and learning culture
* Provided recognition or good safety

performance
* Ensured effective communications
* Effective safety management arrangements.

In order for these leadership actions to be effective in encouraging safe employee behaviors, it is important that employees trust their leadership. Conchie et al. (2011) investigated the development of employee trust and distrust in safety leadership among UK construction organizations. Via a survey distributed to frontline workers, the researchers found that integrity and honesty were the most important factor that led to trust and distrust in leaders. In addition, leader ability and benevolence were the other main factors that contributed to employee trust and distrust in leadership. Consequently, to promote organizational safety culture, it is important that leaders establish their communications and safety initiatives on the major factors contributing to trust — integrity, ability, and benevolence.

Grill and Nielson (2019) sought to determine the direct and indirect actions construction site leaders took to show their commitments to safety. The researchers interviewed several Danish and Swedish construction site leaders using the critical incident technique. Incidents identified by the site leader were grouped into four domains. The domains were direct-positive, direct-negative, indirect-positive, and indirect-negative. Direct meant that the leader took direct action to demonstrate commitment to safety. Indirect meant that the leader took indirect action to demonstrate commitment to safety. Positive meant that the leader took action that promoted safety. And, negative meant that the leader took action that impeded safety. Below are examples from the researchers' study that were classified into the four domains:
* *Direct-positive:* Positive role-modeling, safety introductions, correcting safety risks
* *Direct-negative:* Negative role-modeling, lack of supervision, knowingly exposing workers to risks
* *Indirect-positive:* Planning safe work procedures, planning physical layout of the worksite, ensuring that safety aids and resources are available
* *Indirect-negative:* Insufficient planning, failure to provide safety aids and resources

From their research, Grill and Nielson (2019) proposed that leaders should be trained to become safety leaders. Training should cover leader responsibilities, effective communication strategies, risk assessments, monitoring, and how to provide employees with feedback.

As a specific application of leadership involvement in safety, Rosso et al. (2019) discussed an organizational lab visit program, which fostered workforce involvement, a learning culture, and commitment to safety. The lab visit program engaged senior leaders in discussion with laboratory occupants about different kinds of safety topics and/or issues. The mission of this program was to foster one-on-one safety discussions, correct clutter, help in PPE selection, talk about chemical safety, talk about instrument and equipment setup, talk about waste handling safety, observe egress to safety shower and eyewash, and seek occupant safety concerns. Feedback from these safety discussions was collected by the organization's safety culture team to determine improvements to the program and correct safety concerns. From analyzing the program from 2013 to 2018, there were fewer safety concerns regarding clutter, egress, PPE, and equipment setup. As the program evolves, the authors noted that new safety initiatives will be added to the program.

Measuring management commitment to safety?

Fruhen et al. (2013) set out to measure two aviation organization's leadership commitment to safety. They measured commitment to safety through interviews with leaders, where the safety artifact of interest was linguistics. Therefore, content-based analyses and linguistic analyses using the Leximancer were used to measure the leaders' commitment to safety. The analyses revealed how leaders perceived safety at their

organization subconsciously and consciously. The analyses also revealed what leaders focused on when attempting to change the organization's safety culture. The leaders' responses were classified according to the elements of safety culture to determine the strong and weak points. Overall, from management's responses, it was determined that both of the organizations showed a great just culture for safety (Fruhen et al. 2013). A just culture for safety is where employees feel that safety is encouraged and employees know the line between safe and unsafe behaviors (Reason 2000).

Likewise, in the UK rail construction industry, Stiles et al. (2018) conducted interviews with senior management to understand leadership attitudes towards safety. From their responses, the researchers conducted thematic analyses on the interview content. The researchers found that there were many interventions leadership took to develop organizational safety culture. Some of the interventions included site safety tours, workforce engagement sessions, safety briefings, reward schemes, smart safety communications, and site safety audits.

What are outcomes of management commitment, or non-commitment, to safety?

Yanar et al. (2019) asserted that occupational health and safety vulnerability and poor management were associated with increased risk for worker injury and illness. Occupational health and safety vulnerability is defined as worker susceptibility to injury and/or illness and absence of power to reduce occupational hazards. The researchers found that vulnerable populations with poor management were four times more likely to report injury or illness than those that were not vulnerable and received good supervisor support. Also, the researchers asserted that a supervisor who supported safety will decrease the risk of workplace injury and illness in both vulnerable and non-vulnerable populations. This study showed the importance of management safety commitment for reduction of occupational illness and injury. Similarly, Sheehan et al.

(2016) found that management — especially middle management — mediated the relationship between leading and lagging indicators of occupational health and safety in several Australian industries. In other words, management can influence employee safety outcomes.

Griffin and Hu (2013) investigated the link between safety leadership behaviors, safety compliance, and safety commitment in Australian employees. The safety leadership behaviors of interest were safety monitoring, inspiring, and learning. The researchers found that leadership safety inspiring predicted safety participation in employees while leadership safety monitoring predicted safety compliance in employees. The researchers asserted that safety learning mediated these relationships. Overall, the researchers found the relationship between safety learning, safety monitoring, and safety compliance to be of particular interest because this relationship is not emphasized in the literature as much as that of safety inspiring. The researchers argued that it is important for safety monitoring to be undergone in learning organizations. In order to make safety monitoring effective and create employee buy-in, this leadership activity must feel less intimidating for employees.

Michael et al. (2005) explored non-safety outcomes that resulted from management commitment to safety in a sample of US wood manufacturing employees. The researchers argued that non-safety outcomes included work-related attitudes, behaviors, and on-the-job performance. These outcomes occur because employees want their employer to reciprocate treatment. An example of work-related attitude is work commitment and examples of behaviors include withdrawal, daydreaming, tardiness, and absenteeism. To determine if these non-safety outcomes were valid, the researchers administered questionnaires to employees. The researchers found that work-related attitudes, job performance, and behaviors were all related to management commitment to safety. Therefore, it is important for

management to care about safety for business and productivity reasons.

Organizational Culture and Values

In order to create an organizational safety culture, Mannan et al. (2013) argued that safety standards should be high and safety should be valued and respected throughout the organization. For this to occur, there must be buy-in, responsibility, and accountability to these values at all levels of workers. Also, safety accomplishments should be praised as much as a business success (Mannan et al. 2013; Mentzer et al. 2014). Safety cannot be claimed as a priority of an organization. It must be deemed a core value, where other operations cannot happen without safety (Mentzer et al. 2014).

Colley et al. (2013) examined the relationship between perceived organizational values and organizational safety in high-risk industries. The survey responses of the participating individuals were classified into four profiles based on the Competing Values Framework: internal process, internal process-rational goal, human relations-rational goal, and human relations. The internal process profile was characterized by the organization valuing processes and procedures. The internal-process-rational goal profile was characterized by the organization valuing processes, procedures, and goal attainment. The human relations-rational goal profile was characterized by the organization valuing employee well-being. And, the human relations-rational goal profile was characterized by the organization valuing employee well-being and goal attainment. Overall, the researchers discovered that organizations that valued employee well-being appeared to have stronger safety climates and less incidents. Also, organizations that valued processes and procedures appeared to have weaker safety climates and more incidents. Therefore, organizational values were related to safety climate and safety outcomes.

Díaz-Cabrera et al. (2007) discussed a survey tool that measured organizational values of SMS to infer and measure organizational safety culture. Similar to Colley et al. (2013), Díaz-Cabrera et al. (2007) evaluated their tool against the four profiles of the Competing Values Framework, but Díaz-Cabrera et al. found that their tool did not apply. Instead, the researchers' tool identified six unique profiles or factors of organizational values of SMS: company values, leadership styles, motivation, training, downward communication, and usage of accident information. The researchers found that many of the organizations possessed multiple organizational values of SMS, which could help the organizations be successful in developing a safety culture.

It is important to note that organizational culture is further composed of group cultures. Zohar and Luria (2005) studied the relationships between organizational safety climate, group safety climate, and safety behaviors in production workers. The researchers asked pointed questions about employee perceptions of organizational safety climate and group safety climate via a questionnaire. Three months after the completion of the questionnaire, the researchers conducted observational studies of employee safety behaviors. The researchers found that organizational and group safety climate were aligned. This means that organizational climate could predict group safety climate and group safety climate could predict employee safety behavior. In addition, there was variation in group safety climate, which meant that different groups had different perspectives on safety. These differences in safety perspective are most likely attributed to the differences in management commitment to safety. In accordance with Zohar and Luria (2005), Huang et al. (2012) also found that restaurant employees had shared perceptions of their management's commitment to safety at the group-level of safety climate.

Goals, Initiatives, and Policies

According to Mannan et al. (2013), organizations with BIC safety cultures set goals, policies, and initiatives for safety. It is crucial that people throughout the

organization know about these policies, goals, and initiatives (Mentzer et al. 2014). For these goals to be effective and sustaining, there needs to be a consensus support from all workers (Mannan et al. 2013). Therefore, communication is integral for transmitting goals, initiatives, and policies throughout an organization. With respect to communication, middle management most likely has the greatest responsibility because they must receive messages from top management and communicate these messages to lower management and frontline workers. A common goal in organizations with strong safety cultures is to set zero incident visions. Visions along these lines include: "Nobody gets hurt," "Goal zero," "Zero is attainable," and "Zero Harm" (Mannan et al. 2013; Zwetsloot et al. 2017).

According to Zwetsloot et al. (2017), many organizations are undergoing the zero accident vision (ZAV). This vision does not necessarily try to meet zero incidents, but emphasizes making work safe. There appear to be many benefits to ZAV. First, ZAV clearly provides commitment to safety from the top-down. Second, because of the misson's conciseness, ZAV makes it easier to communicate the mission consistently to all employees; this makes it more likely for the ZAV to be shared among all workers. Third, ZAV organizations place importance on learning from past experiences, safety actions, incidents, and other events; this can help ZAV organizations prevent future incidents from occurring. Overall, from researching twenty seven ZAV organizations in Europe, the researchers found that most of the ZAV organizations had high organizational and individual commitment to safety while safety resilience and communication were relatively low. This suggests that all organizations, including ZAV organizations, are on a continuous mission to achieving safety in the workplace.

Reason (2000) argued against target zero or the ZAV. ZAV may create the impression that, once an organization reaches zero incidents in a period of time, that safety culture is forever achieved and the safety war

is over. This is not the case. The researcher asserted that the safety war is more like an "endless guerilla warfare," where the organization is constantly working towards safety. The guerilla warfare analogy is also applicable because hazards likely do not go away as they are controlled. Because this truth on safety may be disheartening, the researcher proposed that safety engagement could still occur by addressing safety in terms of production.

Organization and Structure

Embedding safety experts in departments while also having a separate safety department is indicative of a good organizational safety culture (Mannan et al. 2013). Having people dedicated to safety within a department helps hold everyone accountable for safety. Having a dedicated safety department helps provide safety connections throughout the organization as well as throughout higher leadership. Organizations with good safety culture provide many lines of reporting to safety professionals. For example, a safety professional may report to a departmental manager, a safety manager, and a manager from another organizational location. This enhances the communication of safety issues throughout the organization even when the organization spans many locations.

In some industries, worker unions contribute to organizations by advocating for worker rights and safety. Researchers have found that there may be a relationship between union values and safety climate. For example, Sinclair et al. (2010) examined the relationship between mid-western U.S.A. retail union values, perceived safety climate, and safety outcomes. From a questionnaire, the researchers discovered that union workers who perceived that their union valued safety viewed their workplaces as safer. In addition, these union workers thought that their safety training was sufficient and that top management and their immediate supervisor valued safety. Therefore, when considering an organization's safety climate, it is crucial to consider not only management commitment to safety, but union

commitment to safety. Kawakami et al. (2004) encouraged the Participation-Oriented Safety Improvements by Trade Union Initiative (POSITIVE) to enhance union commitment to safety. The POSITIVE program was established in Pakistan and is now popular in Asia. The program involved an action-checklist, a participatory training program, and a follow-up of achievements. The action-checklist consisted of forty six safety items. These action items were presented to workers in a training program and discussions ensued to determine the action items of greatest priority and how these action items would be achieved. After this training program, the workers considered the action items of greatest priority and solved various workplace safety and health issues using low cost means. A follow-up workshop was then conducted to determine the effectiveness and achievements of the program. In one workshop, a total of seventy four safety and health improvements were noted. Potentially, such a program could be applied to other unions worldwide to empower union workers and create union commitment to safety.

Another organization and structure factor may be company size. Guo et al. (2018) explored the relationship between company size and New Zealand construction worker responses to a safety climate survey. The researchers found that workers from small and large construction companies perceived the survey in a similar manner. Because of this, the worker responses from both small and large construction companies supported the researchers' safety climate model. The researchers concluded that their safety climate survey could be administered to small and large construction companies to measure safety climate. Perhaps the relationship between company size and safety climate survey is present in other industries and organizations. If this were the case, then safety climate surveys administered to one organization could be applicable to similar organizations of similar or different organizational sizes.

Further, group size may have interesting interactions with safety climate and culture. Huang et al. (2017) aimed to measure the group-level safety culture and organizational safety culture in truck drivers, which are a form of lone workers. The researchers defined organizational safety cultures as "employee perceptions of top management's commitment and prioritization of safety" and group-level safety culture as "employee's perceptions of direct supervisor's commitment to and prioritization of safety." Overall, the researchers found that organizational safety culture and group-level safety culture were correlated, but were not the same measure. The researchers noted that, in the presence of low organizational safety culture, group-level safety culture could compensate, and vice versa. They found that organizational safety culture had a greater effect than group-level safety culture. The perceptions in workers may differ due to environment and work context, symbolic interaction and sense making.

Employee Engagement and Behaviors

Workers — leaders, frontline workers, contractors — who are engaged in workplace safety will perform safer behaviors (Mannan et al. 2013). Employee engagement involves "treating workers fairly, encouraging employee participation in the safety systems, and providing open lines of communication across the organization." Employees should also be treated with respect after an incident to help improve safety, to retain commitment to safety, and to find the root cause of the incident. Overall, participation in safety systems should make workers feel like the safety system is not someone else's rules, but their own rules.

A significant part of employee engagement may be emotional safety culture and climate. According to Wang et al. (2017), emotional safety culture manifests care, understanding, motivation, and trust to organization members in order to foster organizational safety. Emotional safety culture functions to curb resistance, increase the magnitude of safety culture, increase productivity of the culture, and allow for breakthrough and

innovation. The researchers asserted that, without emotional safety culture, there is no organizational safety culture. The emotional need to love as well as the need to be loved mobilizes individuals to care about their own and others' safety. This need also dissuades individuals from following unsafe behaviors. Once this need is fulfilled, individuals need self-perfection of safety humanity and self-value to safety. Self-perfection of safety humanity is when workers abandon their unsafe ways towards safer behaviors and actions. The need for self-value to safety is when safety is automatically in the forefront of worker's minds to ensure the safety of individuals and organizations. The authors promoted development of emotional safety culture through various employee engagement activities, such as safety education, safety slogans, posters, safety culture walls, and rewards.

In this section on employee engagement, the following concepts will be explored:
* What does employee safety engagement look like?
* How is employee safety engagement encouraged?

What does employee safety engagement look like?

There are many ways to engage workers in safety. A common way to foster participation in safety systems is through a joint safety committee consisting of both leaders and frontline workers (Mannan et al. 2013). In addition, Zwetsloot et al. (2017) asserted that many ZAV organizations allow employees at all levels to submit proposals for safety improvements. Zwetsloot et al. (2017) recommended ZAV leaders to ask employees questions rather than giving answers, which could empower safe thinking in employees. According to Park and Khai (2015), a way to engage workers with respect to safety can be conferences. According to Mentzer et al. (2014), creating safety awareness in employees can enhance employee engagement in safety. Safety awareness involves employees being able to recognize the hazards around them. Methods to get employees more safety-aware include daily safety talks, hazard hunts where employees are encouraged to find workplace hazards, and safety artifacts (Mentzer et al. 2014).

Luria and Rafaeli (2008) reported that safety artifacts are anything in the workplace and environment that communicate safety to employees. Safety artifacts include safety signs, safety training manuals, PPE, and design of the workplace. Additional safety artifacts include safety briefings, newsletters, info screens, videos, safety days and events, monthly safety themes, and mobile apps (Zwetsloot et al. 2017). Like a Rorschach inkblot test, workplace safety artifacts communicate the organization's commitment and compliance to safety to employees (Luria and Rafaeli 2008). In other words, safety artifacts are symbols of safety culture and safety climate. Luria and Rafaeli qualitatively and quantitatively assessed safety climate based on employee perceptions of safety signs. The researchers measured safety climate via their own Safety Artifact Interpretation assessment tool and found that departments with a high safety climate viewed the safety signs as a culture of commitment to safety. Conversely, departments with low safety climate viewed safety signs as a culture of compliance to safety. Therefore, in the creation of safety artifacts, it is important to consider the messages employees could perceive from the safety artifacts to maximize employee safety engagement.

How is employee safety engagement encouraged?

Employee engagement in safety can be encouraged through performance management, where individuals receive compensation and/or awards for their commitment to safety. Because of the nature of awards, it might be best to encourage safety through peer influence, positive feedback, and recognition (Mannan et al. 2013). There must also be procedures in place to dissuade employees from working unsafely, including disciplinary actions and termination.

Potentially, employee engagement can be

encouraged by influencing employee safety motivation. Hedlund et al. (2016) proposed six types of interventions that can be used to enhance safety motivation in the workplace. The six interventions were effective workplaces, systematic work environment management, Picture Mix Exposure (PIMEX) discussions and improvements, computer-screen work education, occupational health activities, and PIMEX-based education. Safety motivation is defined as, "an individual's willingness to exert effort to enact safety behaviors and the valence associated with those behaviors" (Neal and Griffin 2006). With increased motivation for safety, there is an increase in safety behavior and an increase in employee safety engagement, which can result in safer workplaces. Hedlund et al. (2016) and Hedlund et al. (2010, p. 156) used the following three factors to explain safety motivation:

* *Perception of safety behavior* is the "perceptions of participation, compliance, and leadership regarding work environment improvements."
* *Intrinsic safety motivation* is the "individual's perception of the importance of resources, consultation, participation, and initiative in enterprises and safety improvements."
* *Perceptions of safety goal setting* is the "perceptions of how the organization sets goals and works systematically within the work environment."

In Hedlund et al. (2016), the types of interventions used for safety motivation were primary, secondary, and tertiary interventions.
* *Primary interventions* control the source of a work problem, usually at the group level.
* *Secondary interventions* support individual employees and how they manage their own occupational risk exposures.
* *Tertiary interventions* help employees that are experiencing safety issues.

The researchers found that the degree of participation, the number of occasions, the primary target group, and the decision maker of the intervention influenced safety motivation. Overall, safety motivation is enhanced by allowing for more participation, more occasions, having the target group be the employees and individual, and having the intervention come from management.

## Resource Allocation and Performance Management

It is very important to have enough resources to sustain safety programs into the long-term. If not, workers may perceive safety initiatives as programs of the month (Mannan et al. 2013). Therefore, it is important for resource decision-makers to care and value safety. In many cases, this could involve making managers accountable for safety. Managers should monitor the effectiveness of their programs and make improvements as necessary. In addition, workers should be able to provide input for improvement.

Schaufeli and Taris (2014) summarized the literature on the Job Demands-Resources (JD-R) model. Researchers use the JD-R model, which is shown in Figure 8 of this review, to explain the relationship between job demands, job resources, and worker health. Job demands are job aspects that require physical and mental effort of the worker. Job resources are job aspects that help the worker complete the job, reduce job demands by minimizing physical and mental effort, and encourage worker prospering and growth. The researchers articulated that a balance between job demands and resources is needed to sustain worker health. For instance, researchers have shown that lack of job resources can lead to worker exhaustion, unmotivation, disengagement, withdrawal, and burnout. In terms of safety, these attributes can lead to less safety commitment and compliance in the workplace. Conversely, sufficient job resources can lead to worker engagement, productivity, motivation, and innovativeness. Researchers have shown that adequate resources are related to fewer safety violations in the workplace. Therefore, providing workers with sufficient job resources can contribute to an overall productive and safe workplace. The researchers asserted that personal resources can also contribute to the balance

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of job demands and job resources. Personal resources are the psychological aspects that help workers to control their work situations and be resilient. A comprehensive list of job demands, job resources, personal resources, and outcomes are presented in Figure 8.

Figure 8. Updated JD-R Model
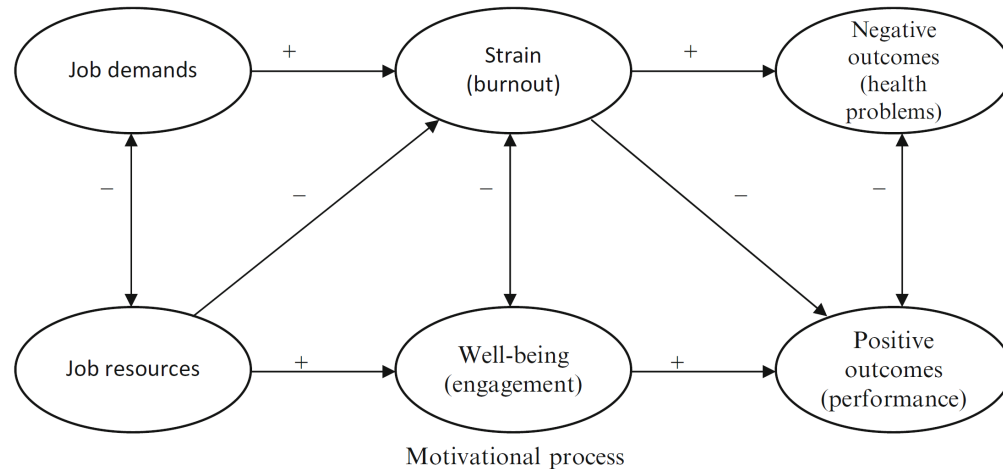
Note. From "A critical review of the job demands-resources model: Implications for improving work and health" (p. 46) by W. Schaufeli & T. Taris, 2014, *Bridging Occupational, Organizational and Public Health* 43–68; doi:10.1007/978-94-007-5640-3_4. Copyright 2014 Springer.

Pinion et al. (2017) explored the resource of job control and how job control can influence an employee's perception of management commitment to safety. Job control, in this sense, is defined as employees having time and resources to engage in safety. Through a survey, the researchers found that employee perceptions of management commitment to safety were related to the employee's level of job control in engineering, procurement, and construction companies. It is important to establish the importance of safety in all jobs, including those with low job control. To do this, more time must be given to employees to undertake safety roles. As a result, a strong, positive organizational safety culture can be developed.

Table 2. Comprehensive List of Job Demands, Job Resources, Personal Resources, and Outcomes

Job Demands
- Centralization
- Cognitive demands
- Complexity
- Computer problems
- Demanding contacts with patients
- Downsizing
- Emotional demands
- Emotional dissonance
- Interpersonal conflict
- Job insecurity
- Negative spillover from family to work
- Harassment by patients
- Performance demands
- Physical demands
- Problems planning
- Pupils' misbehavior
- Qualitative workload
- Reorganization
- Remuneration
- Responsibility
- Risks and hazards
- Role ambiguity
- Role conflict
- Sexual harassment
- Time pressure
- Unfavorable shift work schedule
- Unfavorable work conditions
- Work pressure
- Work-home conflict
- Work overload

Job resources
- Advancement
- Appreciation
- Autonomy
- Craftsmanship
- Financial rewards
- Goal clarity
- Information
- Innovative climate
- Job challenge
- Knowledge
- Leadership
- Opportunities for professional development
- Participation in decision making
- Performance feedback
- Positive spillover from family to work
- Professional pride
- Procedural fairness
- Positive patient contacts
- Quality of the relationship with the supervisor
- Safety climate
- Safety routine violations
- Social climate
- Social support from colleagues
- Social support from supervisor
- Skill utilization
- Strategic planning
- Supervisory coaching
- Task variety
- Team cohesion
- Team harmony
- Trust in management

Outcomes (negative)
- Absenteeism (self-report and company registered)
- Accidents and injuries
- Adverse events
- Depression
- Determination to continue
- Unsafe behaviors
- Negative work-home interference
- Physical ill health
- Psychosomatic health complaints
- Psychological strain (General Health Questionnaire, GHQ)
- Turnover intention

Outcomes (positive)
- Extra-role performance (self- or other-rated)
- Innovativeness
- In-role performance (self- or other-rated)
- Life satisfaction
- Organizational commitment
- Perceived health
- Positive work-home interference
- Service quality
- Team sales performance
- Workability
- Happiness

Personal resources
- Emotional and mental competencies
- Extraversion
- Hope
- Intrinsic motivation
- Low neuroticism
- Need satisfaction (autonomy, belongingness, competence)
- Optimism
- Organization-based self-esteem
- Regulatory focus (prevention and promotion focus
- Resilience
- Self-efficacy
- Value orientation (intrinsic and extrinsic values)

Note. Table from "A critical review of the job demands-resources model: Implications for improving work and health" (p. 64-65) by W. Schaufeli & T. Taris, 2014, *Bridging Occupational, Organizational and Public Health* 43–68; doi:10.1007/978-94-007-5640-3_4. Copyright 2014 Springer.

Systems, Standards, and Processes

It is important for all employees to comply

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with systems, standards, and processes in order to achieve an organizational safety culture (Mannan et al. 2013). These systems, standards, and processes are referred to as safety management systems (SMS). Employees should be conscientious in following SMS so as to avoid "shortcuts, embellishments, or unapproved deviations in work" (Mannan et al. 2013). The following items may contribute to compliance with systems, standards, and processes: no excessive overtime, quality job safety analyses (JSAs), presence of peer review programs where employees take responsibility for coworkers safety, and presence of a job rotation program to decrease monotony of work. Therefore, effective systems, standards, and processes minimize work complexity and risk for workers.

Likewise, Mentzer et al. (2014) proposed the following systems, standards, and processes that must be completed, revised, and trained periodically in order to sustain organizational safety culture:
* Risk assessments and JSAs
* Facility maintenance procedures
* Emergency plans
* Work permits, such as those for confined spaces

In some cases, employee's commitment to safety is dependent on the established systems, standards, and processes. For instance, Chen and Chen (2014) found that aviation pilots' safety participation was mostly attributed to the established SMS. In HROs, where there are high levels of individual self-efficacy and much attention to safety, it is very important to have accurate SMS in place. Conversely, Reason was concerned with the amount of safety systems, standards, and processes in such organizations (2000). Often, organizations that rely heavily on SMS have SMS that are inapplicable to certain work conditions and/or SMS that are unavailable. Further, such organizations may identify incorrect root causes for safety incidents. For example, an organization may attribute a safety incident to a worker not following procedures

when, in fact, the procedure was actually outdated. In addition, the Reason was concerned that SMS may create a false reality of the established safety defenses and may conceal workplace hazards. This may create safety complacency in workers. The researcher asserted that human variability, adaptability, and adjustments should be promoted. In other words, humans may be the best system safeguards in addition to SMS. Workers should be involved in safety to reduce their complacency and be preoccupied with the possibility of failure. According to the Swiss Cheese model of defenses, this, and the presence of positive safety culture, could reduce the amount of holes or active failures that could cause organizational or individual accidents.

Bottani et al. (2009) explored the performance differences between Italian manufacturing organizations that adopted and failed to adopt SMS. The researchers found that the organizations that adopted SMS had higher performance on all performance indicators compared to organizations that did not adopt SMS. The performance indicators included market share, quality of product delivered to customers, organization competitive position, employee average accidents, maintenance, lack of human errors, organizational coordination, and employee knowledge of risk factors. Therefore, it is important to establish SMS in the workplace for a variety of reasons while, according to Reason (2000), it is important for workers to be safeguards for systems, standards, and processes.

Metrics and Reporting
Metrics and reporting help leaders to make decisions for safety improvement, progress, and goal-setting. Many organizations with strong safety cultures use leading and lagging metrics to quantify safety culture. Lagging metrics include injury and accident reports as well as OSHA recordable data. It is important that such lagging metrics include both serious incidents and near-misses. Differently, leading indicators can include safety audit results, safety climate measurements,

training rates, inspection reports, and deferred maintenance. Both leading and lagging indicators must be honest to ensure accuracy (Mannan et al. 2013).

Sheehan et al. (2016) agreed with Mannan et al. (2013) with respect to what constitutes leading and lagging indicators. In their multi-industry analysis of Australian workers, Sheehan et al. (2016) measured lagging and leading indicators of occupational health and safety. The lagging indicators in their study included reported incidents, unreported incidents, and near-misses. The leading indicators in their study were employee perceptions of safety audits, safety improvements, the priority of safety in the workplace, availability of safety information, involvement in safety decisions, power to make safety changes, positive safety recognition, and availability of resources for safety. The researchers found that lagging and leading indicators are associated with each other. This provided evidence that there should be a movement towards using leading indicators; leading indicators of occupational health and safety are preventative rather than reactive.

The literature emphasizes that, in order to promote reporting methods and development of metrics, there should be no disciplinary action for reporting, the system should be confidential, managers should not be the ones to analyze the data as they may be biased, and feedback should be provided regularly to the reporting community (Reason 1998). These behaviors can lead to psychological safety in individuals and teams. In their literature review, Newman et al. (2017) argued that psychological safety is needed for employees to report errors and to create safe workplaces. Psychological safety occurs when workers feel respected, are encouraged to provide constructive criticism, and feel like they will not be rejected for reporting. When an individual or team reports a mistake or error, psychologically safe work environments are free from negative consequences, such as repercussions to an employee's self-image, status, and career. Instead, the individual or team is praised for reporting. Researchers

have shown that high levels of psychological safety in the workplace can result in increased employee attitudes, organizational safety, innovation, performance, communication, learning, and high quality relationships with others.

As an application of the relationship between metrics and reporting, Williamsen (2013) argued that near-miss reporting is the missing link for developing an organizational safety culture and that several barriers must be overcome in order for reporting to be used. According to Williamsen, the barriers to a safety reporting system are status quo, the definition of a near-miss, reporting forms, fear of punishment or retaliation, the fault-finding mindset, lack of recognition and feedback, peer pressure, concern about record and reputation, desire to avoid red tape, and desire to avoid work interruptions. To overcome these barriers, Williamsen asserted that the accountability cycle can be used. The accountability cycle includes employee expectations, training, measurement, and employee recognition. For employee expectations, it is important that the reporting system's expectations are clearly defined and communicated to workers. These expectations can be communicated in training. For training, it is important that leadership is involved. This not only shows leaders' commitment to the reporting program, but shows employees how their leaders will react when employees complete a reporting form. Also, during training, it is important to educate employees on the barriers and solutions to safety reporting systems. For measurement, an organization should generate metrics on the information submitted to the reporting system. These metrics should be posted in the workplace for workers to see; this can foster a learning organization. For the continuance of a reporting program, it is important to recognize employees or groups of employees for their participation in the program. This can be as simple as recognizing the crew-of-the-month and/or the employee-of-the-month that contributed the most to the reporting system, or establishing awards such as leaving early, special parking, and

celebratory lunches.

Still, safety reporting systems may be underused or misused. Sanne became an ethnographic informant within Sweden railway maintenance to understand the barriers to traditional safety reporting systems (2008). After gaining trust from the railway employees, he conducted observational studies and focus groups to uncover the underlying reasons for underreporting. Through his studies, he discovered that storytelling, as opposed to traditional reporting systems, was much more used among employees in this industry. This may be because storytelling restores self-image among employees who experienced an incident, reaches the audience that most needs the information, and likely does not ensue blame to employees. By using methods to capture both storytelling and traditional safety reporting, perhaps more incidents can be captured to facilitate organizational learning. Such a new system must be founded on trust, employees taking ownership for the system, and leaders taking appropriate actions when an incident is reported, such as minimizing blame and embarrassment of employees. This can encourage employees to engage in such a system.

Organizational Learning

A significant component of organizational safety culture is to be able to learn from incidents, so that the organization and its workers can improve. This is accomplished through becoming a learning organization (Mannan et al. 2013). Learning organizations are more likely to be committed to safety through worker training. As safety changes, safety incidents, and near-misses occur, learning should be updated. Workers should also be mobilized to participate in conferences and external training (Mannan et

al. 2013; Park and Khai 2015). Zwetsloot et al. (2017) promoted trainings in the employees' own workspaces, which can result in active engagement. Additionally, there should be initial trainings as well as re-trainings to ensure workers are reminded of the importance of safety to their jobs (Mentzer et al. 2014). In this section on organizational learning, the following topics will be addressed:
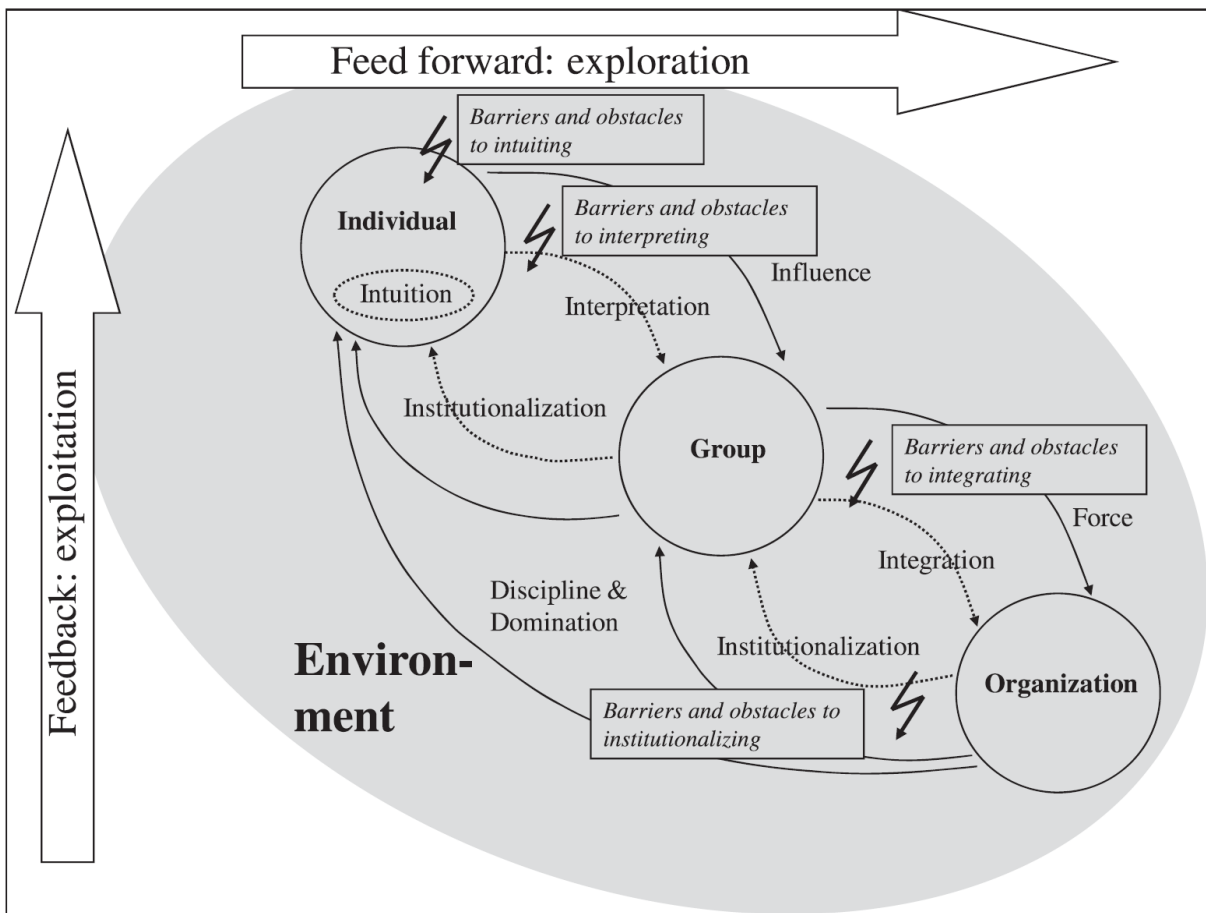* What are the barriers to organizational learning?
* What are the outcomes of organizational safety learning?

What are the barriers to organizational learning?

Schilling and Kluge (2009) broadly analyzed the barriers to organizational learning. As can be seen in Figure 9, the researchers asserted that there may be barriers to intuiting, interpreting, integrating, and institutionalizing organizational learning. There are many barriers to each of these processes. Barriers to intuiting organizational learning included lack of motivation, biases, fear of disadvantages, strict rules and regulations, and controlling management styles. Barriers to interpreting organizational learning included fear of loss of control with knowledge, high workload, hidden agendas in the group, and organizational silence. Barriers to integrating organizational learning included lack of top management support, inconsistency between employee and management visions, inadequate communication, ineffective resource allocation, and lack of the value of organizational learning. Barriers to institutionalizing organizational learning included perceived irrelevance of learning to the future, low levels of trust among teams and employees, lack of resources, national culture, and decentralization.

Figure 9. Barriers to organizational learning using the 4I Model.

According to Pidgeon and O'Leary (2000), it is important to enable organizational learning in order to promote safety in the workplace. In their research paper, the researchers took the perspective of man-made disasters theory to assert this point and to discuss barriers to organizational learning. Man-made disasters theory is, "despite the best intentions of all involved, the objective of safely operating technological systems could be subverted by some very familiar and 'normal' processes of organizational life." Organizational learning helps to overturn disasters before disasters occur. According to this theory, there are two main barriers to organizational learning: information difficulties; and blame, organizational politics, and cover-up. To counter information difficulties, the researchers proposed that members of an organization develop safety imaginations. A safety imagination is "based upon the principle that our understanding and analysis of events should not become overly fixed within prescribed patterns of thinking." To employ safety imagination and avert disasters, Thomas (1994) proposed that organizations should fear the worst, allow spread of varying viewpoints from meetings, play the what-if game, encourage discussion of worst-case scenarios, avoid assumptions about the past, approach safety issues with ambiguity, and imagine near-miss situations developing into accidents. Conversely, for averting organizational politics and blame, there appear to be no easy answers but to counteract blaming and politics (Pidgeon and O'Leary 2000). The aviation industry approached this issue by maintaining a

reporting culture founded on trust and making it clear that there is a boundary between acceptable and unacceptable mistakes.

What are outcomes of organizational safety learning?

Argote (2012) provided a broad literature review of organizational learning. The researcher asserted that organizational learning consists of creating, retaining, and transferring knowledge. Creating knowledge allows for opportunities in organizational learning. Retaining knowledge allows for the knowledge to persist and be applied to other situations. Transferring knowledge allows for knowledge to be useful to others throughout an organization. Transfer can occur through social networks, personnel movement, routines, and alliances. In organizations that are geographically distributed, it can be valuable for organizational members to communicate knowledge in order to be more productive. Overall, the outcomes of organizational learning can be increased communication, productivity, and readiness for the future.

In the context of occupational health and safety, Huang et al. (2012) asserted that, as well as management commitment to safety, organizational learning in the form of safety training is an important predictor for predicting employee safety commitment and future injury in restaurants. Through frontline workers perceptions, the researchers suggested a mechanism for management commitment to safety, safety training, employee commitment to safety, and employee injury. The rationale behind the mechanism is as follows. Employee commitment to safety is influenced through what employees perceive of their management's commitment to safety. Management commitment to safety is translated into how the employees perceive the value and effectiveness of their safety training. Finally, the value and effectiveness of the safety training influences future injury rates for restaurant employees. The researchers found that this mechanism was supported by the data they collected from the restaurants. Therefore, if organizational learning and management commitment to safety have a positive effect on employees, then lower injury rates may be an outcome.

Verification and Audit

Grote and Künzler (2000) studied the effectiveness of an auditing program conducted in UK and US petrochemical organizations. The auditing program was based on the sociotechnical model of safety culture, which was established by the researchers. The researchers, who served as third party auditors, conducted a total of seven audits via questionnaire with internal safety professionals. The questionnaire intended to measure operational safety, safety and design strategies, and personal job needs. From validity measures and communication with organizational members, the researchers accepted their auditing program as a valid measure for auditing safety culture. Overall, the audit results were communicated to the participating organizations in the form of a feedback meeting, which promoted further safety culture development. The researchers claimed that organizational members appreciated the auditing program because it provided the organization with a "informed outside view of their own situation which could serve as a basis for more constructive criticisms and suggestions for improvements." (Grote & Künzler, 2000, p.149)

Mannan et al. (2013) agree with Grote and Künzler (2000). Mannan et al. (2013) asserted that it is important to use third party auditors to evaluate organizational safety climate and/or culture, as this provides an additional assessment on the state of an organization's safety culture.

Other Considerations for Safety Culture and Climate
Change and Resistance
Many organizational researchers have proposed theories of how organizations change. In their paper on organizational safety culture, Kim et al. (2016) supported Lewin's theory of change. Lewin's theory of

change involved the following stages:
* *Unfreezing* involves disconfirmation, survival anxiety, and creation of psychological safety.
* *Change* involves people learning new ways of doing things. They learn new meanings and new standards. An obstacle at this stage may be resistance.
* *Refreezing* involves sustaining the change into the future

**Figure 10. Accident statistics and development of organizational safety.**
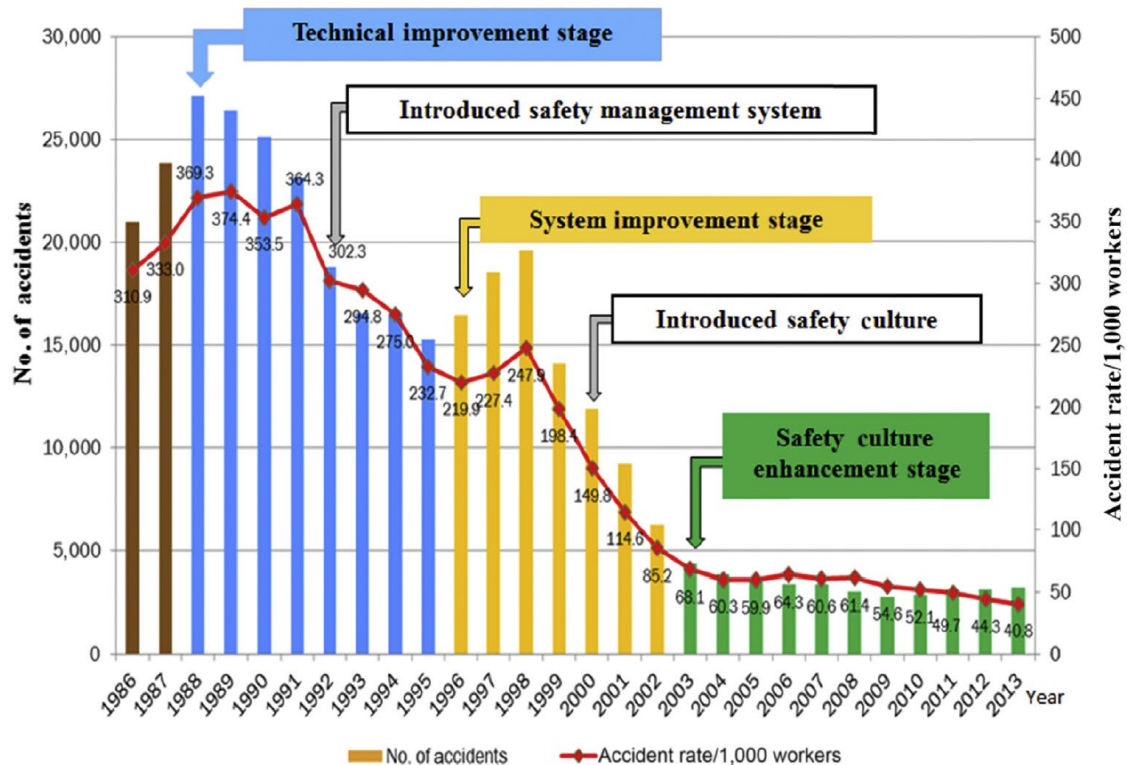
Note. From "Creating a culture of prevention in occupational safety and health practice." (p. 90) by Y. Kim, J. Park & M. Park, 2016, *Safety and Health at Work 7*:89–96, doi:10.1016/j.shaw.2016.02.002. Copyright 2016 Elsevier.

Kim et al. (2016) argued that, in terms of safety culture, a plateau in the amount of employee incidents is characteristic of the safety culture enhancement stage. This is in accordance with Reason (2000) and Parker et al. (2006) who argued that the plateau in injuries shows a great importance and need for the development of an organizational safety culture. As can be seen in Figure 10, safety culture development stage occurs after technological, SMS, & system improvement have been established. This may mean that it is important to consider proper timing and an organization's incident history before deploying a safety culture program.

Deploying such a program during the plateau of safety incidents may be more efficient, effective, and may be met with less employee resistance. In the case study explored by Kim et al. (2016) on an organization's hearing conservation program, it was found that management commitment to safety and action learning were most important for the organization to progress with their safety culture during the plateau stage. In the literature, there was an argument on whether organizational safety should focus on safety culture changes or behavior-based safety changes. Dejoy (2005) explained both the safety culture and behavioral change approaches. The behavior-based safety approach uses negative and positive

reinforcement to make workers behave safely; this approach is a bottom-up approach to safety. The safety culture change approach is founded on making management rethink safety and change organizational safety values. Therefore, the safety culture change approach is a top-down approach to safety. The nature and relationship between the behavior-based safety and safety culture change approaches can be seen in Figure 11. Because of the benefits and implications of both methods, the researcher proposed that the complementary methods should be integrated to create a holistic approach for achieving organizational safety. The researcher argued that an integrative approach would involve data-driven and participatory problem solving as well as a process for culture change. Such an approach may be met with less resistance and could lead workers to value safety.

Figure 11. Proposed relationship between behavioral-based safety and safety culture change.

Modes of Culture Change
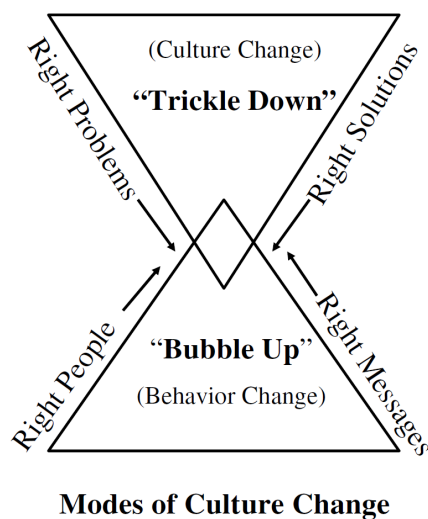
Note. From "Behavior change versus culture change: Divergent approaches to managing workplace safety" (p. 117) by D. Dejoy, 2005, *Safety Science 43*:105–129; doi:10.1016/j.ssci.2005.02.001. Copyright 2005 Elsevier.

Differing National Cultures

Yorio et al. (2019) asserted that a nation's culture reflects onto organizational cultures because socially accepted beliefs, assumptions, and values constrain individual behavior. The researchers proclaimed nine cultural dimensions that can influence organizational culture, as follows:

* *Uncertainty avoidance:* High uncertainty avoidance occurs when organizations rely heavily on established social norms, policies, and practices. Employees in high uncertainty avoidance cultures may see safety as something outside of what their organization and job entails.
* *Power distance:* High power distance occurs when power is concentrated within higher levels of the organization, therefore creating organizational boundaries and diminishing voice to lower levels. Studies have shown that organizations with high power distance create low job satisfaction in employees. Organizations with low power distance result in higher job satisfaction because low power distance promotes open communication and information sharing.
* *Institutional and in-group collectivism:* High institutional and in-group collectivism occur when resources and action are encouraged at the collective level, not on an individual basis. High institutional and in-group collectivism encourages teamwork and positive relationships with coworkers. In these cultures, it is important to place incentives on the group, not the individual.
* *Assertiveness:* High assertiveness occurs when people of a group are assertive, confrontational, and aggressive in social relationships. People with high assertiveness may be more competitive with coworkers and therefore may not be concerned with coworkers' safety and welfare.
* *Future orientation:* High future orientation involves planning, investing in the future, and delaying gratification. Organizations with high future orientation see the benefits of safety and want to attain full maturity of their organization's safety culture. Future-oriented organizations also are more likely to set goals and

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benchmark.
* *Performance orientation*: High performance orientation occurs when performance improvement and excellence are encouraged. In this culture, people are motivated to achieve goals and respond well to suggestions for improvement, such as performance appraisal and feedback.
* *Humane orientation:* High humane orientation occurs when organizational environments are fair, altruistic, friendly, generous, caring, and kind to others. This dimension encourages open communication among employees.
* *Gender egalitarianism:* Defined, this is "the extent to which gender role differences are minimized while gender equality is promoted." In high gender egalitarianism cultures, high rates of injury are prevalent in men.

The main takeaway from the researchers' article is that achieving the same behavioral outcome in all nations will likely depend on different means. Different means need to be considered through the nine dimensions to achieve organizational safety cultures. As an application of how national culture can influence safety performance, Mearns and Yule (2009) administered a survey to employees working for a multinational oil and gas organization. The study population included workers from the US, UK, Malaysia, the Philippines, and Australia. The survey measured the employee's cultural values, perceived safety climate, and risk-taking at work, where risk-taking at work was the outcome of interest. The researchers found that, when management was committed to safety, workers took less risks on the job. Also, workers who tended to value success, progress, and monetary gain took more risks. The researchers found that the worker's locally-held cultural values were not related to risk-taking behaviors. This suggested that globalization — as measured in this study through similar management commitments to safety across nations — was the most significant predictor for risk-taking behaviors, not locally-held cultural values. This may suggest that the same means for

developing a safety culture can be used in globalized nations.

Conclusions
The authors of this presentation have presented researchers' findings on safety culture and climate models, safety culture and climate measurement, the indicators of safety culture and climate, and other considerations for developing an organizational safety culture and climate, such as national culture, change, and resistance. These findings can be useful in developing strong, positive organizational safety climate and culture in industry.

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References
Ajslev J, Dastjerdi EL, Dyreborg J, Kines P, Jeschke KC, Sundstrup E, et al. (2017). Safety climate and accidents at work: Cross-sectional study among 15,000 workers of the general working population. *Safety Science 91*:320–325; doi:10.1016/j.ssci.2016.08.029.

Argote L. (2012). Organizational learning research: past, present and future. Development and Learning in Organizations: *An International Journal 26*; doi:10.1108/dlo.2012.08126baa.007.

Baer M, Frese M. (2002). Innovation is not enough: climates for initiative and psychological safety, process innovations, and firm performance. *Journal of Organizational Behavior 24*:45–68; doi:10.1002/job.179.

Bottani E, Monica L, Vignali G. (2009). Safety management systems: Performance differences between adopters and non-adopters. *Safety Science 47*:155–162; doi:10.1016/j.ssci.2008.05.001.

Chen C-F, Chen S-C. (2014). Measuring the effects of safety management system practices, morality leadership and self-efficacy on pilots' safety behaviors: Safety motivation as a mediator. *Safety Science 62*:376–385; doi:10.1016/j.ssci.2013.09.013.

Christian MS, Bradley JC, Wallace JC, Burke MJ. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology*

94:1103–1127; doi:10.1037/a0016172.

Colley SK, Lincolne J, Neal A. (2013). An examination of the relationship amongst profiles of perceived organizational values, safety climate and safety outcomes. *Safety Science 51*:69–76; doi:10.1016/j.ssci.2012.06.001.

Conchie SM, Taylor PJ, Charlton A. (2011). Trust and distrust in safety leadership: Mirror reflections? *Safety Science 49*:1208–1214; doi:10.1016/j.ssci.2011.04.002.

Cooper M, Collins M, Bernard R, Schwann S, Knox R. (2019). Criterion-related validity of the cultural web when assessing safety culture. *Safety Science 111:*49–66; doi:10.1016/j.ssci.2018.09.013.

Cooper M, Phillips R. (2004). Exploratory analysis of the safety climate and safety behavior relationship. *Journal of Safety Research 35*:497–512; doi:10.1016/j.jsr.2004.08.004.

Cooper MD. (2000). Towards a model of safety culture. *Safety Science 36*:111–136; doi:10.1016/s0925-7535(00)00035-7.

Cooper MD. (2016). *Navigating the safety culture construct: a review of the evidence.* Retrieved from http://bsms-inc.com/articles/safety_culture_review.pdf

Cox S, Flin R. (1998). Safety culture: philosophers stone or man of straw? *Work & Stress 12*:189–201; doi:10.1080/02678379808256861.

Dedobbeleer N, Béland F. (1991). A safety climate measure for construction sites. *Journal of Safety Research 22*:97–103; doi:10.1016/0022-4375(91)90017-p.

Dejoy DM. (2005). Behavior change versus culture change: Divergent approaches to managing workplace safety. *Safety Science 43*:105–129; doi:10.1016/j.ssci.2005.02.001.

Díaz-Cabrera D, Hernández-Fernaud E, Isla-Díaz R. (2007). An evaluation of a new instrument to measure organisational safety culture values and practices. *Accident Analysis & Prevention 39*:1202–1211; doi:10.1016/j.aap.2007.03.005.

Filho APG, Waterson P. (2018). *Maturity models and safety culture: A critical review. Safety Science 105*:192–211; doi:10.1016/j.ssci.2018.02.017.

Flin R, Mearns K, O'Connor P, Bryden R. (2000). Measuring safety climate: Identifying the common features. *Safety Science 34*:177–192; doi:10.1016/s0925-7535(00)00012-6.

Fogarty GJ, Shaw A. (2010). Safety climate and the theory of planned behavior: Towards the prediction of unsafe behavior. *Accident Analysis & Prevention 42*:1455–1459; doi:10.1016/j.aap.2009.08.008.

Fruhen L, Mearns K, Flin R, Kirwan B. (2013). From the surface to the underlying meaning-An analysis of senior managers' safety culture perceptions. *Safety Science 57*:326–334; doi:10.1016/j.ssci.2013.03.006.

Fruhen LS, Griffin MA, Andrei DM. 2019. What does safety commitment mean to leaders? A multi-method investigation. *Journal of Safety Research 70*:169–180; doi:10.1016/j.jsr.2018.12.009.

Fugas CS, Silva SA, Meliá JL. (2012). Another look at safety climate and safety behavior: Deepening the cognitive and social mediator mechanisms. *Accident Analysis & Prevention 45*:468–477; doi:10.1016/j.aap.2011.08.013.

Griffin MA, Hu X. (2013). How leaders differentially motivate safety compliance and safety participation: The role of monitoring, inspiring, and learning. *Safety Science 60*:196–202; doi:10.1016/j.ssci.2013.07.019.

Griffin MA, Neal A. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology 5:*347–358; doi:10.1037//1076-8998.5.3.347.

Grill M, Nielsen K. (2019). Promoting and impeding safety – A qualitative study into direct and indirect safety leadership practices of construction site managers. *Safety Science 114*:148–159; doi:10.1016/j.ssci.2019.01.008.

Grote G, Künzler C. (2000). Diagnosis of safety culture in safety management audits. *Safety Science 34:*131–150; doi:10.1016/s0925-7535(00)00010-2.

Guldenmund FW. (2000). The nature of safety culture: A review of theory and research. *Safety Science 34:*215–257; doi:10.1016/s0925-7535(00)00014-x.

Guo BH, Yiu TW, González VA. (2018). Does company size matter? Validation of an integrative model of safety behavior across small and large construction companies. *Journal of Safety Research 64*:73–81; doi:10.1016/j.jsr.2017.12.003.

He A, Xu S, Fu G. (2012). Study on the basic problems of safety culture. *Procedia Engineering 43:*245–249; doi:10.1016/j.proeng.2012.08.042.

Hedlund A, Åteg M, Andersson I-M, Rosén G. (2010). Assessing motivation for work environment improvements: Internal

consistency, reliability and factorial structure. Journal of *Safety Research 41*:145–151; doi:10.1016/j.jsr.2009.12.005.

Hedlund A, Gummesson K, Rydell A, Andersson I-M. (2016). Safety motivation at work: evaluation of changes from six interventions. *Safety Science 82:*155–163; doi:10.1016/j.ssci.2015.09.006.

Huang Y-H, Lee J, Mcfadden AC, Rineer J, Robertson MM. (2017). Individual employee's perceptions of "Group-level Safety Climate" (supervisor referenced) versus "Organization-level Safety Climate" (top management referenced): Associations with safety outcomes for lone workers. *Accident Analysis & Prevention 98*:37–45; doi:10.1016/j.aap.2016.09.016.

Huang Y-H, Verma SK, Chang W-R, Courtney TK, Lombardi DA, Brennan MJ, et al. (2012). Management commitment to safety vs. employee perceived safety training and association with future injury. *Accident Analysis & Prevention 47*:94–101; doi:10.1016/j.aap.2011.12.001.

Jiang L, Probst TM. (2016). Transformational and passive leadership as cross-level moderators of the relationships between safety knowledge, safety motivation, and safety participation. *Journal of Safety Research 57*:27–32; doi:10.1016/j.jsr.2016.03.002.

Kawakami T, Kogi K, Toyama N, Yoshikawa T. (2004). Participatory approaches to improving safety and health under trade union initiative-experiences of POSITIVE training program in Asia. *Industrial Health 42*:196–206; doi:10.2486/indhealth.42.196.

Kim Y, Park J, Park M. (2016). Creating a culture of prevention in occupational safety and health practice. *Safety and Health at Work 7*:89–96; doi:10.1016/j.shaw.2016.02.002.

Luria G, Rafaeli A. (2008). Testing safety commitment in organizations through interpretations of safety artifacts. *Journal of Safety Research 39:*519–528; doi:10.1016/j.jsr.2008.08.004.

Luria G. (2010). The social aspects of safety management: Trust and safety climate. *Accident Analysis & Prevention 42*:1288–1295; doi:10.1016/j.aap.2010.02.006.

Mannan MS, Mentzer RA, Zhang J. (2013). Framework for creating a best-in-class safety culture. *Journal of Loss Prevention in the Process Industries 26*:1423–1432; doi:10.1016/j.jlp.2013.09.007.

Mearns K, Yule S. (2009). The role of national culture in determining safety performance: Challenges for the global oil and gas industry. *Safety Science 47*:777–785; doi:10.1016/j.ssci.2008.01.009.

Mentzer RA, Zhang J, Xu W, Mannan MS. (2014). What does 'safe' look and feel like? *Journal of Loss Prevention in the Process Industries 32*:265–275; doi:10.1016/j.jlp.2014.09.013.

Michael JH, Evans DD, Jansen KJ, Haight JM. (2005). Management commitment to safety as organizational support: relationships with non-safety outcomes in wood manufacturing employees. *Journal of Safety Research 36*:171–179; doi:10.1016/j.jsr.2005.03.002.

Molenaar KR, Park J-I, Washington S. (2009). Framework for measuring corporate safety culture and its impact on construction safety performance. *Journal of Construction Engineering and Management 135*:488–496; doi:10.1061/(asce)0733-9364(2009)135:6(488).

Molnar MM, Schwarz UVT, Hellgren J, Hasson H, Tafvelin S. (2019). Leading for safety: A question of leadership focus. *Safety and Health at Work 10:*180–187; doi:10.1016/j.shaw.2018.12.001.

Neal A, Griffin MA, Hart PM. (2000). The impact of organizational climate on safety climate and Individual Behavior. *Safety Science 34*:99–109; doi:10.1016/s0925-7535(00)00008-4.

Neal A, Griffin MA. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology 91:*946–953; doi:10.1037/0021-9010.91.4.946.

Newman A, Donohue R, Eva N. (2017). Psychological safety: A systematic review of the literature. *Human Resource Management Review 27*:521–535; doi:10.1016/j.hrmr.2017.01.001.

Nunen KV, Li J, Reniers G, Ponnet K. (2018). Bibliometric analysis of safety culture research. *Safety Science 108*:248–258; doi:10.1016/j.ssci.2017.08.011.

Park J-K, Khai TT. (2015). Occupational safety and health activities conducted across countries in Asia. *Safety and Health at Work 6*:143–145; doi:10.1016/j.shaw.2015.03.001.

Parker D, Lawrie M, Hudson P. (2006). A framework for understanding the development of organisational safety culture. *Safety Science 44:*551–562;

doi:10.1016/j.ssci.2005.10.004.

Pidgeon N, O'Leary M. (2000). Man-made disasters: Why technology and organizations (sometimes) fail. *Safety Science 34*:15–30; doi:10.1016/s0925-7535(00)00004-7.

Pinion C, Brewer S, Douphrate D, Whitehead L, Dellifraine J, Taylor WC, et al. (2017). The impact of job control on employee perception of management commitment to safety. *Safety Science 93:*70–75; doi:10.1016/j.ssci.2016.11.015.

Reason J. (1998). Achieving a safe culture: theory and practice. *Work & Stress 12*:293–306; doi:10.1080/02678379808256868.

Reason J. (2000). Safety paradoxes and safety culture. *Injury Control and Safety Promotion 7*:3–14; doi:10.1076/1566-0974(200003)7:1;1-v;ft003.

Richter A, Koch C. (2004). Integration, differentiation and ambiguity in safety cultures. *Safety Science 42*:703–722; doi:10.1016/j.ssci.2003.12.003.

Rosso V, Simon J, Hickey M, Risatti C, Sfouggatakis C, Breckenridge L, et al. (2019). Engaging senior management to improve the safety culture of a chemical development organization thru the SPYDR (safety as part of your daily routine) lab visit program. *Journal of Chemical Health and Safety 26*:38–43; doi:10.1016/j.jchas.2019.03.005.

Sanne J. (2008). Incident reporting or storytelling? Competing schemes in a safety-critical and hazardous work setting. *Safety Science 46*:1205–1222; doi:10.1016/j.ssci.2007.06.024.

Schaufeli WB, Taris TW. (2014). A critical review of the job demands-resources model: Implications for improving work and health. *Bridging Occupational, Organizational and Public Health* 43–68; doi:10.1007/978-94-007-5640-3_4.

Schilling J, Kluge A. (2009). Barriers to organizational learning: An integration of theory and research. *International Journal of Management Reviews 11*:337–360; doi:10.1111/j.1468-2370.2008.00242.x.

Sheehan C, Donohue R, Shea T, Cooper B, Cieri HD. (2016). Leading and lagging indicators of occupational health and safety: The moderating role of safety leadership. *Accident Analysis & Prevention 92:*130–138; doi:10.1016/j.aap.2016.03.018.

Shi G, Shiichiro I. (2012). Study on the strategies for developing a safety culture in industrial organizations. *Procedia Engineering 43*:535–541; doi:10.1016/j.proeng.2012.08.093.

Sinclair RR, Martin JE, Sears LE. (2010). Labor unions and safety climate: Perceived union safety values and retail employee safety outcomes. *Accident Analysis & Prevention 42:*1477–1487; doi:10.1016/j.aap.2009.11.003.

Stiles S, Ryan B, Golightly D. (2018). Evaluating attitudes to safety leadership within rail construction projects. *Safety Science 110*:134–144; doi:10.1016/j.ssci.2017.12.030.

Thomas D. (1994). *Prescribed fire safety: Preventing accidents and disasters* part II. Unit 2-G in Course "Prescribed Fire Behavior Analyst". National Advanced Resource Technology Center.

Vierendeels G, Reniers G, Nunen KV, Ponnet K. (2018). An integrative conceptual framework for safety culture: The Egg Aggregated Model (TEAM) of safety culture. *Safety Science 103*:323–339; doi:10.1016/j.ssci.2017.12.021.

Vredenburgh AG. (2002). Organizational safety: Which management practices are most effective in reducing employee injury rates? *Journal of Safety Research 33*:259–276; doi:10.1016/s0022-4375(02)00016-6.

Wachter JK, Yorio PL. (2014). A system of safety management practices and worker engagement for reducing and preventing accidents: An empirical and theoretical investigation. *Accident Analysis & Prevention 68*:117–130; doi:10.1016/j.aap.2013.07.029.

Wang B, Wu C, Huang L. (2017). Emotional safety culture: A new and key element of safety culture. *Process Safety Progress 37:*134–139; doi:10.1002/prs.11953.

Warszawska K, Kraslawski A. (2016). Method for quantitative assessment of safety culture. *Journal of Loss Prevention in the Process Industries 42:*27–34; doi:10.1016/j.jlp.2015.09.005.

Williamson AM, Feyer A-M, Cairns D, Biancotti D. (1997). The development of a measure of safety climate: The role of safety perceptions and attitudes. *Safety Science 25*:15–27; doi:10.1016/s0925-7535(97)00020-9.

Williamson M. (2013). *Near-miss reporting: The missing link of safety culture.* https://aeasseincludes.assp.org/proceedings/2012/docs/541.pdf [accessed 24 August 2019].

Yanar B, Lay M, Smith P. (2019). The interplay

between supervisor safety support and occupational health and safety vulnerability on work injury. *Safety and Health at Work 10*:172–179; doi:10.1016/j.shaw.2018.11.001.

Yorio PL, Edwards J, Hoeneveld D. (2019). Safety culture across cultures. *Safety Science 120*:402–410; doi:10.1016/j.ssci.2019.07.021.

Zohar D, Luria G. (2005). A multilevel model of safety climate: Cross-level relationships between organization and group-level climates. *Journal of Applied Psychology 90:*616–628; doi:10.1037/0021-9010.90.4.616.

Zohar D. (1980). Safety climate in industrial organizations: theoretical and applied implications. *Journal of Applied Psychology 65:*96–102; doi:10.1037//0021-9010.65.1.96.

Zwetsloot GI, Kines P, Ruotsala R, Drupsteen L, Merivirta M-L, Bezemer RA, et al. (2017). The importance of commitment, communication, culture and learning for the implementation of the zero accident vision in 27 companies in Europe. *Safety Science 96*:22–32; doi:10.1016/j.ssci.2017.03.001.

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Critical Questions on COVID-19 and Management of Behavioural Safety Interventions

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Abstract

In 2020, with the COVID-19 pandemic it is important for everyone to redefine what is safe behaviour and spot-correct it for safety of self and others. This article addresses some behavioural safety aspects of COVID-19 in terms of why people take risks, what are the similarities and differences between COVID-19 infection control management and behavioral based safety (BBS) management as both interventions drive behavioural change. It includes how to implement BBS after lockdown in a plant, and behavioral challenges and solutions to contain COVID-19. This paper is based on qualitative data collection methods using interviews, group discussions and field surveys. The research objective was to review the current requirements for effective management of behavioural safety interventions.

Key words. COVID-19. Behavioural safety. Interventions. India.

Introduction

This article addresses three behavioural safety aspects of COVID-19 in terms of why do people take risks as they do? What are the similarities and differences between Covid19 and behavioral based safety (BBS) management as both interventions are driving behavioural change? How to implement BBS after lockdown in a workplace and the challenges? The research objective was to review the current requirements for effective management of behavioural safety interventions Qualitative data collection methods including personal interviews with 55 people, 14 group discussions and field surveys were used for the research data collection to provide answers to the three research questions.

This study is part of an ongoing interdisciplinary intervention of behavioural science, management and industrial safety disciplines, and part of a national longitudinal action survey in India. For this research a total of 500 people were approached and completed an action field survey with the researcher using remote data collection techniques. These research participants had already implemented behavioral safety at their work sites. The research participants included, the CEO, Directors, Managers, Heads of Departments, Safety Professionals belonging to the public and private industrial sectors, including chemicals, construction, gas, power and steel, across Indian locations. Their responses to COVID-19 related questions were collated and thematic data analysis was used to reflect on and analyse the findings. As part of this action survey, the participating organizations also started implementing COVID-19 infection control related new behaviors at their work sites.

Q1: Why do people take risks?

A: Risk-taking behaviors varies among people, cultures and countries. Risk perception of COVID-19 is based on risk consequences being felt as immediately visible, which it is not. Hence people keep taking risk. Risk perceptions depend upon the antecedents, the social realm and cultural backgrounds of people (Jens, 2019).

According to Susan Michie (2020), given differences in behaviours and their contexts, the factors maintaining them differ, as do the ways of changing them. As a citizen, when safety practices in general are not followed on a daily basis, risk perception remains low. Moreover, new safe behaviours (social distancing, wearing a facemask, hands hygiene, etc.) may not be followed as these actions are not part of the cultural

background. As soon as, lockdown enforcement is relaxed, people go back to their old behavioural patterns, possibilities of COVID-19 spread exist and risk-taking behaviors remain high. In order to prevent or circumvent this, people need to spread safety messages through multiple ways such as media, government, motivational speeches on a continuous basis.

Behavior based approaches are long-term interventions to contain HSE (health, safety environment) risks. The lockdown enforcement, political thought process, etc. are good enough, temporary and short-term responses to these pandemics. Hence management should prepare accordingly. There needs to be thought even beyond vaccine for COVID-19, as critical action is needed to contain the spread of the health risks through behavioural safety initiatives and interventions across all levels, areas and sectors in the country.

People in India are at a crossroad as today the issue is not only tackling the COVID-19 virus spread, but to address and reinforce the overall safety culture as a national agenda of the governments as planned interventions for saving human life before the incidents. There is a need to adopt the new set of these desired behaviors as safe operating procedures (SOP) and work-life styles to say goodbye to such risks.

Q2: What are the similarities and differences between COVID 19 and behavioral based safety (BBS) management, as both interventions are driving behavioural change?

A: People normally take at least 2-3 weeks to understand and adapt to the new behavioural changes expected in a new environment such as lockdown in the context of large public of a nation. Some deviations to these new behaviors may appear and reappear for few weeks till people adjust and self-control, irrespective of a place/country, and deal with the implications thereof, and keep developing new solutions. Similar deviations while implementing behaviour-based safety at industry sites are experienced.

Secondly, when could it be said that Zero-Corona-Virus Cases is achieved? What are its implications and solutions? The answer would depend, not only on lockdown enforcement, mass education and awareness, social distancing, motivational speeches, economic relief packages but also on continuous identification of cases through testing, monitoring, treatment, innovation etc. as a long term perspective. Any such country-wide or global multilevel socio-medico-economic-behavioral intervention requires rigorous follow ups for a year or so, failing which the chances of relapse/reoccurrence are equally high. People need to be ready for the long-time implications and solutions of any such pandemic social health issues. In brief, such interventions have to become a part of the existing safety health environment (SHE) management style in order to avoid relapse and achieve zero-corona-virus cases or zero at-risk behavior at sites.

The similarities and differences between Covid19 and BBS management are that both are driving behavioural change. Negligence of both can cause havoc. Both can be controlled through behaviour. To save humanity, we need to focus on our behaviour which may ensure our victory in this hour of peril. BBS management and COVID-19 management seem to be similar. For COVID-19 the following should be undertaken.
1. Make the person aware about COVID- 19;
    2. Educate the person on why precautions are necessary;
3. Tell the person what the risks are;
4. Ask the person what is missing in their behaviour in relation to infection control;
5. Take a promise that the person will follow the required infection control measures;
6. Thank the person when they use the required infection control measures.

Both COVID-19 and BBS can result in death if not corrected by taking adequate precautions in terms of behaviour (self as well as others). Everyone's safety is interdependent. Another similarity is that both are observable, measurable, implementable and curable.

If Governments want, they can implement a HSE systems. Behavioral changes may take place. In India there have been harsh punishment like police beating the violators but this was appreciated and supported by everybody including media. When a Safety Professional advices management to take action against violators, management find excuses to save them. Now the government is implementing all safety measures, not the safety professional. The National Safety Council (NSC) should clamp down like the World Health Organisation (WHO), but, on the contrary, as seen in past few decades, the safety enforcement in industry is poor by <30%. This is why, precisely, the behavioural implementation is recommended in all world safety standards (Kaila, 2019).

A similarity between COVID-19 and BBS is that people care for each other. Both leading to positive, sustainable, environment friendly behaviour among human, whereas BBS management nurtured through harmonious and cohesive way, COVID-19 pandemic is working through a fear-based approach which is the opposite to BBS. According to an executive director of India Glycols, an application of BBS is the need of the hour. Wearing PPEs and staying at home are very much the desired behavioural aspects. During COVID-19, the Police have become the observers and they also need BBS training. Of course, there are exceptions with some police people trying to counsel the public in a positive way. In many cases, they are not polite and many among the public also don't understand being polite, despite advices from leaders, celebrities and media. Patience and politeness are keys of any behavioral change intervention. Moreover, control by oneself (self-observation of social distancing, facemask etc.) in community sites is very crucial for one's own health and safety, when one is not certain about infection spread from another.

Level of Management of Safety Risks are:
1. Reactive safety,
2. Dependent safety,
3. Independent safety,

4. Interdependent safety.
In Covid19, most people are operating at level 1 & 2. They react to the situation proactively but are dependent on the governments' actions for citizen's safety. As an example; children are dependent on parents but keep committing mistakes. As soon as children grow up and become independent, their behavioural alertness is increased/ multiplied.

To go to level 3 and 4 there is a need to open/exit lockdowns with everyone supposed to manage the personal risk on his/her own. It should be understood that behavioural alertness is highest; when risk is known and well defined. For example, people are at high risk during daily morning/evening's city peak traffic time, and are highly alert at that time for road driving behaviors knowing the risks involved. Presently, in COVID-19, a situation has been achieved where everyone is aware of risks. People are aware, understand the need to be alert and alert others as well. An enforcement for wearing facemasks and physical distancing is not relaxed in levels 3 and 4. It is considered a violation if people do not wear PPE or maintain physical distancing in all places, etc.

Companies also thought of a new better safety idea during this Corona virus lockdown time that would be practiced in the times ahead at sites. The responses included:
1. Our management used the benefits of e-learning during this lockdown period. Audio conference were arranged for further action on safety implementation.
2. A comprehensive training program on BBS was commenced for the workers who were residing at the company premises. Two were trained through video conferencing and assigned to train all other workers. By doing this, all employees were engaged for 4 hrs. This is also helped to decrease employee anxiety. 100% physical distancing is maintained on a daily basis.
3. In preparation temperatures scanning was commenced on the 12th February 2020.
4. A device was used to proactively ensure de-energisation of electrical equipment in

addition to conventional LOTO (lockout tagout) to eliminate human intervention, using AI (artificial intelligence) to enhance safety.

Q3: How to implement BBS after Lock down in plant & related challenges?

A: A new behavioral category "Lockdown Behaviors" was added to the BBS observation checklist and communicated to all employees through different media for implementation at site. The manager of each work area was required to conduct daily small group TBT (toolbox talk) to convey the principles of lockdown (physical distancing, use of facemask, hand hygiene etc.) while observing and spot-correction of at-risk behaviors. Each area manager was required to display signboards at all respective areas/entry/exit etc. as below in English and Hindi
-Maintain Safe Distance
-Keep Wearing Face Mask
-Follow Queue at entry/exit
-Don't Touch Surfaces
-Request each other to do so if they don't
-Convey all the above on Public Address System (PAS)

The Occupational Health Centers (OHC) were required to conduct random medical/COVID19 specific tests for further actions. All Safety, Health and Environment (SHE) teams were required to coordinate actively for behavioural implementation of procedures and guidelines through departments.

There are similarities between BBS and lockdown implementation as both are people-based and behavior based. The COVID-19 pandemic is an opportunity to strengthen BBS further at worksites.

Conclusions

Organizations need to provide feedback to all employees every single day using multiple communication channels to keep people informed about the company's responses to the crisis (Dominic, 2020). According to a Director of DCM Shriram, these are the thoughts and actions in order to change the post-COVID-19 behaviours to prevent further spread and resuming operations safely. Above all, this is the right time for each citizen and each employee to play the role of safety catalyst in promoting interdependent safety culture everywhere. Governments alone cannot achieve zero corona virus cases. Sooner the better for society that the public and each person understands this significant role in critical times in favour of human race by using safe behaviours each day. Be an active observer.

References

Cooper, D. (2020). Faces of EHS: Talks Behavioral Safety and Managing COVID-19. https://ehsdailyadvisor.blr.com/2020/03/faces-of-ehs-dominic-cooper-talks-behavioral-psychology-and-managing-covid-19/

Kaila, H. (2019). Behaviour Based Safety for Corporates: A Shift toward an Interdependent Safety Culture https://worldsafety.org/wso-world-safety-journal/

Michie, S. (2020). Behavioural strategies for reducing covid-19 transmission in the general population. https://blogs.bmj.com/bmj/2020/03/03/behavioural-strategies-for-reducing-covid-19-transmission-in-the-general-population/

Zinn, J. (2019). The meaning of risk-taking – key concepts and dimensions. Journal of Risk Research, 22:1, 1-15, DOI: 10.1080/13669877.2017.1351465

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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 1985 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… Worldwide."

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X _____ ___
Applicant Signature ___ Date

FOR MID/HIGH SCHOOLERS ONY: WSO subscribes to the Family Educational Rights and Privacy Act (FERPA) philosophy in protecting student privacy and information. WSO may disclose "directory" information such as a student's name, WSO Student Chapter affiliation, name of school, grade in school, etc., along with group or individual photos in WSO NewsLetters, NewsFlashes, eNews, on WSO website, and on WSO's social media accounts.

❑ My student has permission to participate as outlined above.

❑ My student has permission to participate with exclusions:

_____

X _____ ___
Parent/Guardian Signature (Mid/High Student) ___ Date

X _____ ___
WSO Student Chapter Mentor Signature ___ Date
[IF APPLICABALE]

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World Safety Organization
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:

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

ళ•ఞ

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

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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 associate disciplines.

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

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Members must be responsible
for their complete sincerity in professional service to the
world.

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

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Members must be responsible
for their professional efforts to support the WSO motto:

"Making Safety a Way of Life…Worldwide."