

School of Mining and Metallurgical Engineering

**The Influence of Safety and Health Representatives in the Western
Australian Mining Industries**

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of

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DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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Date: 30th July 2018

ABSTRACT

The role of the Safety and Health Representative is an important one as it allows employees to represent their co-workers and have a voice in workplace safety and health in their place of employment. The aim of this research was to identify what influence and support Safety and Health Representatives had in the Western Australian mining industries to facilitate the achievement of a high standard of workplace safety.

This study explored the Western Australian mining industries Safety and Health Representatives experiences in their role using a hermeneutic phenomenological approach. A literature review was conducted: to identify the history of the role of Safety and Health Representatives; to determine the role of Safety and Health Representatives in Australia and other countries; to identify the factors that influence the role of Safety and Health Representatives and impact on their participation in workplace safety and health. Using the literature review findings a proposed model of factors that make the role of Safety and Health Representatives effective was developed to be tested in relation to the findings of this study.

Pilot study interview questions were developed based on the findings of the comprehensive literature review. The pilot study was conducted with 10 Safety and Health Representatives who worked in healthcare. The interview questions were then refined based on the results of the pilot study. All of the study's participants were Safety and Health Representatives who worked in the Western Australian mining industry. The participants were asked to describe their work experiences and to reflect on those factors that either assisted or hindered them in their work.

The interview results were analysed using NVivo 11 and identified that the most important factors that enable or hindered Safety and Health Representatives work effectiveness in the Western Australian mining industries was management support and communication.

Based on the research findings a revised model of factors that enable a Safety and Health Representative to work effectively was developed. Recommendations were made in relation to improving management support for the work of Safety and Health Representatives in their workplace. Recommendations were also made for mining industry workplace safety and health legislation to include providing Safety and Health Representatives with the power to include checking that workplace legal requirements were met in this legislation as there were managers that were not meeting legal requirements. Recommendations for further research to extend this study and to use and test the model developed are also made.

It is anticipated that implementation of the research findings, model and recommendations will enable legislation to be used more effectively to support the role of Safety and Health Representatives and to promote management support for them in the mining industry.

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THE INFLUENCE OF SAFETY AND HEALTH REPRESENTATIVES IN THE WESTERN AUSTRALIAN MINING INDUSTRIES

1. INTRODUCTION

1.1 Background

The role of the safety and health representative is important in the workplace as they act as a valuable link between employers and employees in facilitating safe work practices. Safety and health representatives can be key employees in promoting safe work practices in the workplace. There are many factors that can influence the effectiveness of safety and health representatives in performing their legally required tasks. For example, specialised knowledge about their actual role/position can make safety and health representatives more effective in the workplace (Brun & Loiselle, 2002; Hall et al., 2006; Wright & Spaven, 1999).

In many countries, workers' representation for workplace safety and health has been the subject of statutory arrangements and rights, which in turn can influence the effectiveness of safety and health representatives in performing their tasks. For example, in Great Britain, a safety and health representative performs their work under the Health and Safety at Work Act 1974.

Other factors that can influence the success of a person's work include: influential power; position power; information and expertise powers; coercive power; interpersonal power; and, personal power (Antonsen, 2009). Support from all levels of management, expert knowledge from professionals, support from co-workers, unions' support and their ability to influence the workplace safety committee have previously been identified as important for Safety and Health Representatives to work successfully (Menéndez et al., 2009; Milgate, Innes, & Loughlin 2002; Sobieralski, 2000; Wyatt & Sinclair, 1998; Biggins et al., 1998; Victorian Workcover Authority, 1997; Planek & Kolosh, 1994; Langford et al. 1993; Gaines & Biggins, 1992; Biggins & Philips, 1991; Biggins, Philips, & Sullivan, 1991). Unfortunately,

even with workplaces that have safety and health representatives accidents continue to occur.

In 1989/1990 the Western Australian mining industry had an unacceptable safety performance with 19 fatalities and a serious injury rate of 19 per 1,000 employees (Gilroy & Jansz, 2014). From 2000 to 2012 fifty people were killed in the Western Australian mining industries however, there were no fatalities during 2012-2013. In 2013-2014 there were no fatalities in Western Australian's oil and gas off shore mining industry but there were 5 fatalities in the mining industry (Department of Mines and Petroleum, 2015). In 2016-2017, in the Western Australian mining industry, there was one fatality; of the 106,590 workers, 313 suffered a serious injury (Department of Mines, Industry Regulation and Safety, 2018c). A serious injury is one that results in two or more weeks away from work. The lost time injury frequency rate (number of lost time injuries per million hours worked) was 2.3 (Department of Mines, Industry Regulation and Safety, 2018c).

An analysis of the Western Australian mining industry's fatalities identified that the main causes were unsafe acts or workplaces, hours of work, employee non-compliance with procedures, and other causes (Department of Mines and Petroleum, 2014b). A sample of 25 fatal accidents in the Western Australian mining industry that occurred between 2000 and 2012 that were analysed to identify the cause of the accident revealed that 4 were caused by the equipment used by the miner not being supported or isolated while being worked on, 4 were caused by a safety harness not being used by the miner, or being incorrectly used; 3 were caused by each of the following activities, live electricity, no safety precautions taken and human error (9 fatalities). The remaining fatalities were caused by having a vehicle not stopping (2), working without ground supports (2), excessive speed (1), unsecured fork lift attachment (1), modifications made to equipment (1) and supervisor interference (1 fatality) (Department of Mines and Petroleum, 2014b).

Recommendations made in this accident analysis report to improve safety and employee health in the Western Australian mining industry included the need to promote the involvement of more workers in hazard identification and risk assessment (one of the roles of safety and health representatives); promote more

employee involvement in the development of principal hazard management plans and safe work procedures; improved training processes for supervisors and workers related to compliance with workplace procedures and working safely; site familiarisation for all workers; and, adequate breaks during each work shift.

The fatality that occurred in 2016, as noted above, was due to the substantial corrosion of a gantry bridge, which fell killing the boilermaker who was working below (Department of Mines, Industry Regulation and Safety, 2018c). A careful inspection of the gantry bridge would have identified the corrosion. One of the roles of safety and health representatives is to inspect their workplace. Safety and health representatives are a valuable link between their employer and employees for hazard identification and workplace safety promotion and accordingly have their powers and functions documented in the Mines Safety Inspection Act 1994 of Western Australia.

This research was conducted on safety and health representatives in the Western Australian mining industries to identify their effectiveness in the workplace. In particular, to detect any barriers safety and health representatives might experience whilst performing their work and to ascertain those factors that enabled them to work effectively according to their legal duties and responsibilities. In Western Australia the current Mine Safety and Inspection Act 1994, Occupational Health and Safety Act 1984, Petroleum and Geothermal Energy Resources Act 1967, Petroleum and Geothermal Energy Safety Levies Act 2011, the Pipelines Act 1969 and the Petroleum (Submerged Lands) Act 1982 are being combined to form one single Work Health and Safety Act (Resources Safety Division, 2017). The Western Australian Government intends to use the information from this study to develop legislation to assist in making the roles of safety and health representatives more effective in representing their fellow workers and in assisting with maintaining and improving workplace safety and health.

1.2 Research Aim and Questions

The aim of this research was to identify what influence and support safety and health representatives had in the Western Australian mining industries to facilitate the achievement of a high standard of workplace safety.

To assist with achieving the research aim the following three questions were asked:

1. What support does workplace management provide to safety and health representatives in the Western Australian mining industries to enable them to work effectively in promoting occupational safety and health?
2. What power and methods do safety and health representatives in the Western Australian mining industries use to influence the achievement of a high standard of health and safety in their workplace?
3. Which strategies are used in the workplace by safety and health representatives to maintain the highest level of workplace safety and health according to leading and lag indicators?

1.3 What Was Known About This Topic

Prior to conducting this research the legal responsibilities of safety and health representatives in the Western Australian mining industry were known. However, there was very little published literature found on the influence of these safety and health representatives in this particular industry. What was known to enable safety and health representatives to influence workplace safety positively in other industries in Australia and internationally was legislative support (Walters & Frick, 2000; Lewchuk, Robb, & Walters, 1996; Glendon & Booth, 1982; Leopold & Beaumont, 1982), good communication with management (Tedestedt, 2014; Hovden et al., 2008; Walters et al., 2001; Biggins et al., 1998; Langford et al., 1993; Biggins et al., 1991), knowledge of the work processes and their co-workers experiences (Espluga et al. 2014), education on hazard identification, risk assessment and other factors related to the safety and health representatives role in meeting their legislative and workplace responsibilities (Brownlie, 2014, Knotes, 2010, Harris, 2010, Walters et al. 2005).

1.4 New Knowledge Generated

Based on the findings of this research study, the following has been added to the body of knowledge on factors that influence the effectiveness of safety and health representatives in the Western Australian mining industries:

New knowledge generated through this research stresses that the ability of safety and health representatives to perform their duties in the Western Australian mining industries is very much affected by the amount of support provided to them by all levels of management. This research identified that 75% of the barriers that prevent safety and health representatives from working effectively were due to management factors. These factors include: harassment; bullying; age and gender discrimination; not allowing work time for representative work; not providing sufficient resources; lack of trust; poor managers' safety culture; lack of communication, consultation and cooperation from management; not being allowed to conduct workplace inspections or be involved in incident and accident investigations in their work representation area; managers blocking change to improve workplace safety and managers perceiving that the work of safety and health representatives was a waste of production time. Rather than having union support for their work safety and health representatives reported harassment, sexual discrimination and bullying by certain members of their union.

This research identified that strong support by the Chief Executive Officer (CEO) provided a positive safety culture in which all levels of management supported the work of the safety and health representatives so that they were able to work effectively. The safety culture of the workplace affected the ability of safety and health representatives to do their representative work. However, without management support safety and health representatives were not able to affect their workplace safety culture positively. With management support the safety and health representatives improved workplace safety and health through conducting workplace inspections to identify hazards and risk assessments to implement risk control measures. They also improved workplace safety through attending and chairing workplace safety committee meetings.

It was found that when they were supported by management (some had very good management support) safety and health representatives were able to take a leading role in promoting workplace safety and health to their co-workers, particularly through the use of Tool Box Meetings. Safety and health representatives also performed other work outside of their legal representative duties that included: writing workplace safety related documents; writing safety reports; developing and

writing site safety procedures and safe operating procedures for equipment; writing policies related to safety; developing and writing site based training packages and safety management plans; writing meeting agendas and meeting minutes; writing monthly hazard reports and by conducting research to improve workplace safety. Most of the work of the Western Australian mining industries safety and health representatives was related to workplace safety with very little being reported on any occupational health work.

All of the information under ‘new knowledge generated’ is an original and significant contribution to understanding the factors that influence and support Western Australian mining industries safety and health representatives to facilitate the achievement of a high standard of workplace safety and the barriers that prevent them conducting their representative work.

1.5 Research Significance

In relation to the Western Australian mining industries there was no published literature found related to how management worked with the safety and health representatives and if their interaction was positive or negative. Although the role of safety and health representatives is defined in the legislation no published information was identified for the Western Australian mining industry about their actual power to influence safety and employee health in their workplace and what strategies used by these safety and health representatives were effective. The effects of the workplace safety culture in the Western Australian mining industries on the work of safety and health representatives has also not been published. This research has provided the information to fill these gaps in knowledge.

This research also identified that there is significant discrimination against some of the safety and health representatives based on age (discrimination against younger people) and gender (being female and working in the Western Australian mining industry). There is now an opportunity for management to implement policies that prevent this discrimination. Antidiscrimination policies were written, but not used in all mining industries workplaces.

The economic impact on the work of safety and health representatives was identified. Some of them reported that their workplace did not have sufficient money budgeted to be able to provide safe equipment and products; some feared losing their job if they were persistent in asking for risk control improvements. Budget cuts also prevented managers giving safety and health representatives work time to be able to do their duties. These managers did not see the greater cost of not having a safe workplace and processes. Time was provided for some safety and health representatives to perform safety observations on their co-workers. There were some employees who would not take on the role of a safety and health representative as they perceived it would impact negatively on their career prospects.

The lack of communication to safety and health representatives about leading and lag indicators statistics in their workplace and the outcome of the accident investigations in their area of representative work was significant. Although safety and health representatives have legislated rights to perform their representative duties it was found that these rights were not allowed by management in all workplaces. The research has made a recommendation for improved legislation to enable safety and health representatives to report to the Legislator when the Mine Safety and Inspection Act legal requirements are not being met in their workplace.

This research found that safety and health representatives received some work related safety education from their workplace safety and health professionals, from some managers and from Resources Safety Inspectors. However, they also indicated that they wanted more safety and health knowledge to be able to do their representative work and were using their own time and money to complete tertiary education courses to gain this knowledge. They reported being able to work more effectively as safety and health representatives with this additional knowledge. There is an opportunity with the changing Western Australian mining industries health and safety legislation to allow safety and health representatives to have more safety and health education for their professional development.

1.6 Research Limitations

1. This research only included the safety and health representatives from the Western Australian mining industries, which may limit the application of research outcomes for other industries.

2. Some of the participants did not know the answer to the last three questions in the questionnaire, as they were not provided with this information at their workplace.

The questions were:

- What is your company's Total Recordable Injury Frequency Rate?
- What is your company's Lost Time Injury Rate?
- What is your company's Medical Injury Frequency Rate?

Poor communication of leading and lag indicators to safety and health representatives made it difficult for the effectiveness of workplace safety and health management practices to be assessed for these research participants' workplaces.

1.7 Outline of the Research Report

Chapter 1

The chapter first describes the background factors that can influence the effectiveness of safety and health representatives' work. This is followed by the research aim, research questions, what was known about this topic, new knowledge generated through this study, research significance, and research limitations. Collectively they provide an outline of the research report.

Chapter 2

The introduction section of the literature review chapter includes a description of the literature review methodology. Section one explores the history, role and published factors that influence the effectiveness of safety and health representatives in Australia and internationally. Section two examines published literature related to factors that impact on the safety and health representatives work that include the effect of legal requirements, union involvement, and workplace management factors. Section 3 reviews published literature related to personal factors that affect the work and powers of safety and health representatives.

Chapter 3

This chapter provides information on the research methodology and includes a description of the study design, research setting, scope, target population, sampling techniques, study participants and ethical issues. It describes the research tools used, the method of data collection and data analysis.

Chapter 4

This chapter contains the results of the Pilot Study. It includes demographic information about the mining industry participants, participant's responses about their role as a safety and health representative and the management support they receive to do their work. The chapter provides the answer to the first research question.

Chapter 5

Chapter 5 presents the results related to the powers that safety and health representatives have to influence the achievement of a high standard of health and safety in their workplace. The chapter describes factors that can influence the effectiveness of representatives. It discusses the barriers that prevent representatives from performing their role effectively and how they overcome them. Following this, the chapter provides information on safety and health education that representatives complete and the effects of this on their skills as well as the factors that promote workplace safety and health. The chapter provides the answer to the second research question.

Chapter 6

Chapter 6 presents the results related to how often safety and health representatives conduct workplace inspections and their involvement in workplace incident investigations. The chapter reports on the safety and health representatives' knowledge of their workplace leading and lag indicators. The answer to the third research question is provided in this chapter.

Chapter 7

Chapter 7 describes the conclusions and recommendations arising from the research findings.

1.8 Introduction Summary

This research was the first study to look at the influence of occupational safety and health representatives in the Western Australian mining industries, and to evaluate the effectiveness of their work in promoting a high standard of workplace safety and work related ill-health prevention. The next chapter reviews published literature about the role of safety and health representatives and explores the factors that affect their work. Note that the terms safety and health representatives and representatives are used interchangeably throughout this and following chapters.

2 LITERATURE REVIEW

2.1 Introduction

The purpose of this literature review was to provide a theoretical foundation for the research by reviewing previously published literature about safety and health representatives. In particular, the review focuses on their role, powers, factors that influence their effectiveness in promoting a high standard of workplace safety and employee health, any barriers that they have to overcome to fulfil their representative work duties and how these barriers are overcome. The chapter begins with an introduction to the literature review methodology.

2.2 Literature Review Methodology

The literature review was conducted using an initial search of the databases Science Direct, PubMed, ProQuest, Emerald, EBSCO, SAGE, Wiley Online Library, and Web of Science. Other searches were conducted through Google Scholar, a Curtin University library catalogue search and through exploring the Resources Safety and Safe Work Australia websites. The literature search was limited to the English language and included published literature from 1974 up to and including 2018. A total of 1250 relevant references were identified using the relevant keywords. Relevant key words used in the literature search were “safety and health”, “safety culture”, “safety and health representatives”, “training for Safety and Health Representatives”, “safety and health legislation”, “safety and health management”, “communication and safety”, “safety and health professionals”, “role of Safety and Health Representatives”, “trade unions and safety”, “Mining history in Australia”, “Roben’s report”, and “role typology”. The method used for the literature search and screen process is summarised with the flow chart (figure 1) as follows:

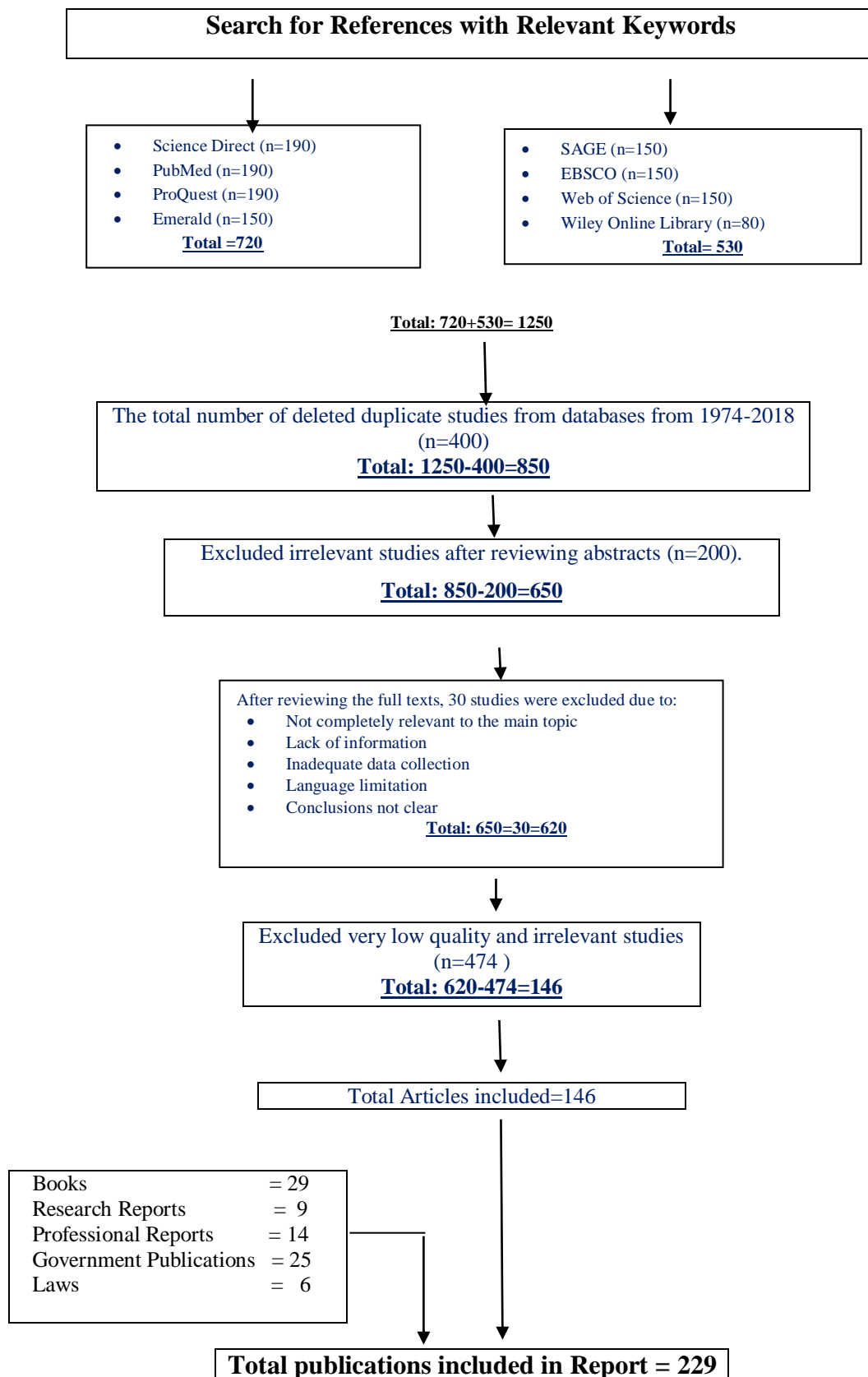


Figure 1: Method of Literature Review Process.

The first section of the literature review describes the history of safety and health representatives and their role in the mining industry.

SECTION ONE

The History and Role of Safety and Health Representatives

2.3 Introduction

Since the 1970s, many western countries have reformed their government policies, occupational safety and health (OSH) legislation and recognised the importance of workers' participation in their safety and health at their workplace (Bryce & Manga, 1985). In Australia and internationally, workers' representation has been a statutory arrangement for occupational safety and health legislation for many years. By the end of the 1980s these requirements had been established in most Australian jurisdictions, after the Australian government ratified the International Labour Organisation (ILO) Convention number 155. This Convention included having a general duty of care with set responsibilities for employers, employees and any other person/s connected to the work. It introduced the role of employees as being workplace safety and health representatives and having safety and health committees in which at least half the members were elected health and safety representatives and the remaining committee members were managers (employer representatives).

The statutory provisions of many countries in the world are widely based on a common model in which workers select representatives to represent the interest of employees' safety and health at the workplace. Statutory provisions, generally offer a number of minimum legal rights for worker representation at the workplace and one of the most important legal rights is the selection of safety and health representatives by the employees (Walters, Wadsworth, Johnstone, & Quinlan, 2014).

The role of a safety and health representative is important in the workplace, as they are a valuable link between the employer and employees in facilitating a safe work place and work practices. According to unitarists and pluralist ideologies, the purpose of the role of a safety and health representative is twofold as they should represent the interest of employees as well as assisting management to reach a higher standard of safety and health at the workplace (Harris, 2010). This literature review

considers the introduction of safety and health representatives in Britain and Australia.

2.4 Introduction of Safety and Health Representatives in Britain and Australia

With the introduction of the United Kingdom (UK) 1833 Factory Act, Inspectors were employed to enforce the requirements of this Act on both employers and employees. After the introduction of this Act the mining industry was recognised as a hazardous industry for which there were requirements for specific occupational safety and health legislation.

In the United Kingdom, the Coal Mine Regulation Act 1872 was legislated. In this Act there was a provision for mine workers to be involved in inspecting the mine in which they were working to ensure that it was safe. In 1911, the United Kingdom Coal Mines Act was updated to allow the workers' representatives (who had to be coal mine workers with 5 or more years mine working experience) to not only inspect the mine, but also to examine all safety statutory documentation and investigate the causes of any workplace accidents.

In Britain, on 29th of May 1970, a committee on safety and health at work was formed to review the British occupational safety and health legislation. The committee was chaired by Lord Robens, with a report of the review, titled the *Robens Report*, published in 1972. The Robens Report identified that everyone, including the employer, employees, manufacturers, installers of plant and suppliers of goods and services had a general duty of care; to ensure that the workplace, work processes and goods and services were safe and healthy for everyone who entered the workplace and/or who could be affected by the work, goods or services provided (Brooks, 1987; Ochsner & Greenberg, 1998; Adams et al., 1999; Milgate et al., 2002). The Robens Report documented that, "the primary responsibility for doing something about the present levels of occupational accidents and diseases lies with those who create the risks and those who work with them" (Creighton, 1983, p. 199).

The Robens Report proposed that, cooperation, consultation and participation between employees and employers on work related safety and health should be a

voluntary arrangement at the workplace. Robens called this *self-regulation*. Lord Robens recommended that occupational safety and health should be centralised in a united government regime and an inspectorate should act predominantly as advisors and provide assistance to employers (Bennett, 2015).

The committee's assessment of the current situation was extensive idleness and self-satisfaction on all sides (Bennett, 2015). Recommendations were made that the safety and health system should be based on a common and real interest of safety for all parties concerned and there should be no scope or room for collective bargaining on occupational safety and health (Bennett, 2015). A finding of the Robens Report was that the people doing the work in the industry had practical experience and should be included in decision making in their workplace management of occupational safety and health (Browne, 1973). The Robens Report recommended that employees should elect people in their area of work to represent them in discussions related to occupational safety and work health issues. These people were to be called safety and health representatives.

A further recommendation in the Robens Report was that, workplaces have a safety and health committee in which at least half the members were to be safety and health representatives and the remainder management representatives. The workplace safety and health committee was to include the employer or chief executive officer to enable effective occupational safety and health communication between the people doing the hands on work and the management, so that appropriate actions could be identified and taken for everyone to meet their general duty of care in providing a high standard of workplace safety and preventing work-related ill-health (Browne, 1973). On the 3rd of June 1981, the main recommendations of the Robens Report were included in the International Labour Organisation (ILO) Convention number 155. The recommendations in the Robens Report were endorsed in the United Kingdom Health and Safety at Work Act, 1974 to promote self-regulation, self-reliance and increased responsibility on the part of the worker and employer at the workplace (Harris, 2010).

The United Kingdom Coal Mine Regulation Act 1872 included a provision for mine workers to be involved in inspecting their mine. This idea was taken to Australia and

used in the first decades of the 20th century in New South Wales. Experienced miners were elected in a ballot by their fellow workers and appointed by their trade union as check inspectors (Walters, Wadsworth, Johnstone, & Quinlan, 2014).

Check inspectors conducted detailed inspections at their mines and participated in identifying serious hazards related to issues like ground conditions or ventilation and prepared reports on their inspection findings. According to Walters, Wadsworth, Johnstone and Quinlan (2014) check inspectors became valued members of the mining communities. They describe how the mining check inspectors and government mining industry inspectors usually conducted joint workplace inspections, investigations; together they decided on the safest rescue / recovery methods after a serious incident in the workplace, as the check inspectors knew the workplace, aspects of the work and the employees better than the government investigators. The authors highlight how following their success in New South Wales in facilitating mine safety and health, check inspectors were introduced into the Queensland mining legislation and industry in 1915 and had the same role as those in the New South Wales mining industry. These employees had union support for their work and some of the early check inspectors were also the union branch president (Walters, Wadsworth, Johnstone, & Quinlan, 2014).

When the Western Australian Mines Regulation Act 1895 was repealed and the Western Australian Mines Regulation Act 1906 was made law, there were three classes of mines inspectors who were (a) district inspectors (who had a similar role to today's mining inspectors); (b) special inspectors (who had advanced technical or educational knowledge in a particular area for a particular inquiry or investigation) and (c) workmen's inspectors. Section 7(c) of the 1906 Act stated that the workmen's inspectors were to be elected by the majority of the people with bona fide employment at the mine and who were born in Australia, or were British subjects. Other employees, who were not British or born in Australia, were not eligible to vote. To be elected as a workmen's inspector the employee had to have been previously employed for at least 5 years as an underground miner. Under section 55 of this Act it was against the law for females to work below ground at any mine in Western Australia. This meant that the inspector had to be male, which is why employee inspectors were called workmen inspectors.

Section 9 of the 1906 Act stated that the minister for mines allocated each of the workmen's inspectors the number of days they had to perform their duties. The number of days a week varied from mine to mine depending on what the minister allocated. Section 10 of the Act stated that the workmen's inspectors were to be elected for 2 years and that they were eligible for re-election, which is still current practice for safety and health representatives. The workmen's inspector could "be removed from his office by the Minister for any cause which the Minister may, in his discretion, deem sufficient" (s.10). In this legislation the minister for mines had great powers.

Under section 11 of the 1906 Act, the workmen's inspectors had a similar role, but with greater powers, to today's health and safety representatives in the Western Australian mining industries. Workmen's inspectors had the power to check that all of the requirements of the mining Act were complied with [s. 11(a)]. They had the power to, at any time of the day or night, enter, inspect and examine any mine with any assistance from any employee or official that they requested assistance from and to make sure that the workplace was safe for both people and animals [s. 11(b) (c)]. After every workplace inspection the results, and the part of the mine inspected, had to be recorded in the company mine record book [s. 16]. This record book was available for any mine employee, or other authorised person, to examine [s. 17]. Workmen's inspectors also had the power "to obtain written statements from witnesses, and to appear at inquiries held respecting mining accidents, and at inquests, and to call and examine witnesses, and to cross examine witnesses" [s. 11(e)]. If any person obstructed the workmen's inspector from doing his work, or did not provide the inspector with the necessary means to conduct an inspection, examination or inquiry related to workplace safety, or used insulting language to the inspector while he was doing his official work then there was a penalty (not exceeding 50 pounds) to the person who committed any of these offences against the workmen's inspector [s. 15 + 16].

Prior to the ratification of the ILO Convention, Australia had 132 pieces of occupational safety legislation and hundreds of specific regulations related to occupational safety, most of which were written to meet a specific need and then had

become outdated (Creighton, 1983). Employees had no powers to influence occupational safety or ill-health prevention in their workplace in those 132 pieces of occupational safety and health legislation.

In Western Australia, the requirements of the ILO Convention No. 155 were brought into law with the Occupational Health, Safety and Welfare Act 1984. This Act allowed the election of safety and health representatives in Western Australia for the first time. The Western Australian mining industries followed the Mines Regulation Act 1946, which did not come under the Occupational Health, Safety and Welfare Act 1984. The jurisdiction of general occupational safety and health was separate from the jurisdiction for safety and health in mines in Western Australia. The Occupational Safety and Health Act, 1984 was administered by the Department of Commerce, Western Australia. Ten years later the ILO Convention No. 155 requirements were included in the Western Australian mining legislation and the Mines Safety and Inspection Act 1994 was administered by the Department of Mines and Petroleum.

2.5 The Role of Safety and Health Representatives Internationally

2.5.1 Introduction

Ongoing employees' representation and participation is prevalent in occupational safety and health to establish a strong and an effective system in the workplace in many countries; the value of safety and health representatives and a successful safety and health program at the workplace are well recognised (Hovden, Lie, Karlsenc, & Alteren, 2008). In the following subsections information from various countries is provided about the roles of safety and health representatives and factors that can influence their work and resultant outcomes. Despite an extensive search (1,250 publications assessed) of peer reviewed published literature the only countries found that had published information about safety and health representatives were Australia, New Zealand, Canada, Norway, Sweden, Italy, Spain and Britain.

2.5.2 Britain

In Britain, the Health and Safety at Work Act 1974 defines the functions of safety and health representatives and provides legal support for them to perform these

functions (Dimond, 2002). According to the Act, safety and health representatives are not liable to be prosecuted if they fail to perform their functions, and are entitled to paid time off work to perform their duties effectively. As an example, under the Act a safety and health representative is to be provided with sufficient time to investigate workplace hazards and incidents, prepare agendas for occupational safety and health meetings at their workplace and to undergo occupational safety and health training. Safety and health representatives can make a request in writing to the employers to obtain information, which is related with any workplace accident they investigate or to their inspection of the workplace, as employers are obligated by the Act to do so. Exceptions to this requirement include any disclosure regarding national security, personal confidential information of employees, and information regarding legal proceedings (Dimond, 2002).

Research conducted by Reilly, Paci, and Holl (1995) showed a relationship between industrial injuries and worker representation in the British Manufacturing industry. The focus of this study was on the joint safety and health committee and union appointed safety and health representatives, and collected data from small manufacturing industries (fewer than 25 employees) in the United Kingdom. The study used quantitative data from the Workplace Industrial Relations Survey, which contained information about workplace injuries and provided a questionnaire for the managers at the workplace to answer. Research results identified that the joint consultative committees and union appointed safety and health representatives reduced more workplace injuries compared to those workplaces where management made decisions on all safety and health issues alone or without consultative arrangements.

Walters et al. (2001) examined the significance of trade union training and education for safety and health representatives within Britain (also called the United Kingdom). They identified that the majority of the representatives in the United Kingdom are appointed by trade unions and that they receive training from trade unions to support their role's activities in the workplace (Walters et al., 2001).

Walters et al. (2001) in their research focused on the significance of training provided by the trade union in the United Kingdom for safety and health

representatives to support their occupational safety and health activities at the workplace. They examined the link between the content, training provision, methodology and the perception of the representatives concerning the support they received from this training. The research identified barriers to training availability. Data was collected through the use of a questionnaire, interviews and group activities with safety and health representatives undertaking Trade Union Congress (TUC) Stage 2 training. There were 1533 participants in this study that included 1400 representatives who completed the research questionnaire. Of these participants 48 representatives who had all undertaken a stage 1 Health and Safety Course offered by the TUC Regional Education Programme were selected for a telephone interview. Group activities, face-to-face interviews and a questionnaire survey were completed by 85 representatives who had undertaken a Stage 2 Health and Safety Course offered by the TUC Regional Education Programme. All the answers on the completed questionnaires were coded and analysed with SPSS data analysis package.

The research findings of the study were that safety and health representatives reported that their responsibilities were: to attend safety meetings on a regular basis; conduct safety checks at the start of each shift; to investigate work related incidents and hazards in their workplace; being involved in conducting safety audits; raising safety issues with management; discussing safety issues with line management on a regular basis in relation to promoting occupational safety; manual handling issues at the workplace; making risk control recommendations for lighting and ventilation hazards if they occurred at their workplace and reporting dangerous machinery and chemicals and making general recommendations to ensure employee workplace safety. The study concluded that this form of training supports safety and health representatives in developing their skills to achieve positive occupational safety and health outcomes at their workplace. Furthermore, that the availability of this training needs to be taken into account by workplace managers in the future (Walters et al., 2001).

Research conducted by Wright and Spaven (1999) identified that the employment position of safety and health representatives within their organisation influenced their role as they had expert or specialised knowledge related to this area. Wright and Spaven (1999) analysed data from two earlier research projects, which were funded

by the Health and Safety Executive (HSE), which is the state health and safety regulatory body. The first research project was carried out between 1991 and 1992 and focused on the success of the safety and health representative in meeting official offshore goals (Spaven et al., 1993). A questionnaire survey was completed by 2,413 members of the oil and gas industry and analysed through a 52-point matrix. This survey was followed by semi structured interviews with 83 safety and health representatives.

During 1995 a second research project was carried out by Wright and Spaven (1999), using semi structured interviews and a questionnaire, with the participants being senior management working in the oil and gas industry either offshore or onshore. In addition this questionnaire survey was carried out with over 1,100 employees who worked offshore. This second study was focused on discovering how companies fulfilled the requirements of safety cases and a new safety management system. Wright and Spaven (1999) explained how the ‘managerialist interpretation’ influences the role of safety and health representatives in the off shore oil and gas industry in the United Kingdom. Representatives were assigned to conduct incident investigations when workplace accidents occurred. Their role was to encourage workers to follow the safety rules at their workplace. These two roles of the safety and health representatives were given by the management to enforce the use of safety policies at their workplace. Safety and health representatives were interviewed, and based on their roles and purpose they were categorised as “disillusioned”, “proactivists”, or “traditionalists”. The role of the representatives was influenced by the actual roles or work they undertook and jobs assigned to them by the management at the workplace.

Under the Safety Representatives and Safety Committees Regulations 1977 and the Health and Safety (Consultation with Employees) Regulations 1996 in the United Kingdom, employers have to perform their duty of care regarding consultation about safety and health with their employees at the workplace. These regulations were planned to allow employers and employees to co-operate efficiently in maintaining, promoting, and developing measures that safeguard safety and health at the workplace and to monitor the effectiveness of such measures. According to these regulations, employers may have to consult with employees at the workplace who are

members of recognised trade unions and those who are non-members. Under the Safety Representatives and Safety Committees Regulations 1977, the employer must set up a safety and health committee if two, or more than two, union safety and health representatives make an official request in writing for a safety and health committee at the workplace. The recommendation of the Health and Safety (Consultation with Employees) Regulations 1996 is to design a forum with a joint consultative committee, or safety and health committee at the workplace. (Health and Safety Executive, 2015).

Walters and Nichols (2006) examined the work practices of safety and health representatives in the United Kingdom and the factors that supported them in performing their role. This research identified that the key factors were communication and consultation between worker representatives and their electorates, external trade union support, effective worker's representation at the workplace, management commitment and participation in occupational safety and health, competent management to implement risk control measures at the workplace and a "strong legislative steer" (Walter et al., 2014, p. 17).

Walters and Nichols (2006) also assessed the effectiveness of consultation with worker representatives in the United Kingdom. The researchers selected 5 chemical industries to access documentary evidence and used a questionnaire based survey to collect data from supervisors, safety and health managers, safety and health advisors, manual and non-manual workers, senior managers, shop stewards and safety and health representatives. A total 349 employees were surveyed. The research results identified that although management stated that it was committed to having employee representation for workplace safety and health there was no provision for training for safety and health representatives, no representative receipt of information, no representative engagement in risk assessment or liaison with the inspectors and that they were rarely used in practice. Walters and Nichols (2006) recommended that in order to improve consultation and employees' representation towards safety and health at their workplace a strong legislative provision was required.

Walters and Frick (2000) stated that employees' participation is the foundation of systematic occupational safety and health management and is a legislative strategy used to improve safety and health at workplaces across the industrialised nations of the world. Workers' participation is seen as a fundamental aspect of the occupational safety and health system. This is because of workers' practical knowledge about production and how this may be used to identify hazards at their workplace and so contributes to effective risk control of hazards (Walters & Frick, 2000).

A program, involving workplace safety and health representatives was conducted in the United Kingdom at the Devonport Royal Dockyard to change the workplace safety culture through the involvement of their whole workforce (Health and Safety Executive, 2015). The program focused on managing safety and health issues that varied from radiation to working at heights at the workplace. Members of the trade unions looked at the root cause of accidents, conducted quality risk assessments, monitored the use of personal protective equipment at the workplace and visited other companies as well as working with representatives to improve communication (Health and Safety Executive, 2015). A case study of this program, documented by the Health and Safety Executive (2015), reported that employees attended safety sessions on a regular basis and were encouraged to bring any ideas to discuss safe working at their workplace. Representatives and middle managers from the Royal Dockyard's Accident Prevention Team met with the employees on a monthly basis to discuss and deal with any safety issues at the workplace. The benefits from these activities showed a 35% reduction in workplace accidents with absences from work related illnesses also reduced (Health and Safety Executive, 2015). This case study illustrates how the safety and health representatives in the United Kingdom work with unions, management and other employees to improve workplace safety and business profits.

Another case study reported by the Health and Safety Executive (2015) described how cooperation between safety and health representatives and management improved employee's mental health problems at a company namely the BT Group PLC. At this company employee stress was a growing issue that impacted on their performance and affected company production. The Communication Workers Union (CWU) and the BT Group PLC had an agreement in place, which involved the safety

and health representatives working with the managers to initiate a strategy to tackle this issue, to provide formal training for the employees, and to implement a cooperation strategy between the representatives and management at the workplace. The aim of this program was to involve employees in managing their health issues through joint problem solving. This program resulted in 51% of employees who made changes in their daily routine observing improvements in their mental health issues as well as their wellbeing in general. Of the employees 68% reported that they learnt new skills to tackle their mental health issues (Health and Safety Executive, 2015).

The Health and Safety Executive (2015) results in the above research identified that management working with safety and health representatives to implement this educational program resulted in a 30% decrease in the sickness absence rate related to workplace mental health problems. Of the employees who were sick and absent for more than six month due to mental health problem 80% were able to return to their own jobs compared with 20% nationally who returned to work after experiencing mental health issues related to their employment (Health and Safety Executive, 2015). This case study illustrates that having the involvement of safety and health representatives in workplace educational programs can result in improving employee mental health and can increase company profits through decreasing the employees need to take paid sick leave.

Another example of the role of safety and health representatives improving workplace safety in Britain was reported by the Health and Safety Executive (2015) in a case study of Springfield Fuels, a nuclear fuel fabrication facility in the United Kingdom, where a joint working group to monitor how new shift work impacted on employee's health and well-being in the workplace was formed. This group included the employees' non-union and the union safety and health representatives, people from human resources, management and occupational safety and health advisors. A questionnaire was sent to all shift workers by the joint working group. Employees, contractors and safety and health representatives were involved in regular "Safety in Partnership" meetings and encouraged to share examples of good safe practices at work. As part of this program the representatives were involved in incident investigations at the workplace, and employees learnt from them how to prevent

accidents using an “accident awareness form.” As a result, near miss reporting increased on site and loss time injuries decreased. Occupational safety and company profitability for this workplace improved through having employees working safely and risk control measures being implemented promptly for workplace hazards that were reported. Another country that has safety and health representatives is New Zealand.

2.5.3 New Zealand

In New Zealand, a cross sectional survey was conducted by Johnson and Hickey (2008) to assess training courses for safety and health representatives. Results identified that after attending the Safety and Health Representatives’ training course, the representatives encouraged employees to report work related discomfort and pain so that work could be rearrange to include risk control measures. It was also reported that representatives supported employees in their rehabilitation process, conducted occupational safety and health training, identified and reported hazards at the workplace, conducted incident investigations, helped to review occupational safety and health policies, informed employees about occupational safety and health policy changes at the workplace and participated in the recruitment process to recruit members of occupational safety and health committees. This resulted in improved workplace safety and employees’ health.

In New Zealand’s Health and Safety in Employment Act 1992, the roles and functions of elected safety and health representatives were stated as identifying hazards and working with management to improve workplace safety. Safety and health representatives could issue a hazard notice if their employer did not implement risk control measures when notified of a dangerous situation. In New Zealand the safety and health representatives role included fostering positive safety and health management at their workplace, engaging with the employer when related to workplace safety and health matters, consulting with inspectors on any safety and health issues at their workplace, carrying out any duties related to occupational safety and health which required an employee participation system, supporting employees in the rehabilitation process and their return to work program following a work related injury or ill health (Harris, 2010).

Harris (2010) conducted research in New Zealand in two metal industries. This study focused on how safety and health representatives participated in occupational safety and health within New Zealand workplaces in light of the Health and Safety in Employment Amendment Act 2002, which encouraged and promoted safety and health representatives' participation in occupational safety and health at the workplace as a primary formal mechanism. This study used a cross sectional approach within the case study method and employed a semi structured interview process with a total of 30 participants including managers, safety and health representatives, and other employees. The study concluded that representatives played a valuable role in the workplace and made positive contributions towards improving occupational safety and health.

As a continuation of the 2010 study a qualitative cross sectional study was conducted by Harris et al. (2012) at two metal manufacturing companies in New Zealand. The aim of the study was to identify how safety and health representatives improve safety and health at their workplace through their *role typology* under New Zealand law. Semi structured interviews were conducted to collect the data from occupational safety and health managers, workers, senior managers, union convenor, and safety and health representatives. In this research, a total of eight safety and health representatives were interviewed. Their employment positions were as an administrator, workshop inspector, and craft experts.

In this study, Harris et al. (2012) identified that workshop inspectors were mainly recruited to run the workshop but as safety and health representatives. The workshop inspectors were very much focused on improving overall workers' attitudes towards safety and health and with compliance to occupational safety and health regulations. Harris et al. (2012) concluded that the two safety and health representatives hired to deliver secretarial support to the managers had their roles classified as administrators because their jobs were focused on the implementation and operation of the occupational safety and health management system. Administrators as well as safety and health representatives identified hazards, investigated incidents, wrote accident reports and provided support through administrative work for hazard risk control at their workplace. Administrative risk control measures were implemented through

sourced information on occupational safety and health codes of practice and the Health and Safety in Employment (HSE) Amendment Act 2002.

In 2015 New Zealand adopted the Australian Harmonised Health and Safety Act as the country workplace safety and health legislation. In the Health and Safety at Work Act 2015 New Zealand's health and safety representatives now have the same protection, duties and powers, as their counterparts in Australia.

2.5.4 Norway

Hovden et al. (2008) conducted research to examine the role of safety and health representatives in the Norwegian offshore oil and gas sector. This study was based on a one day workshop. Data was collected through the use of a questionnaire, plenary discussion, and focus group discussion. Twenty-five participants were involved consisting of thirteen safety and health representatives, six general managers, three safety managers, one petroleum safety authority person and two people from a trade union. The main objective of this study was to investigate the influence of employees on safety and health matters and to assess the opinion of the safety and health representatives and their managers on the safety and health at their workplace. This study concluded that safety and health representatives had minimum participation in planning and that they perceived themselves as having low social status at their workplace.

The Norwegian Working Environment Act places emphasise on cooperation and consultation between employers and employees on occupational safety and health issues at the workplace. Employee's participation through safety and health representatives with the support of the trade union was an elementary condition for safety and health practices in Norwegian workplaces. The position of safety and health representatives was a vital part of Norwegian health, environment and safety management. Hovden et al. (2008) documented that all companies with five or more employees were required to establish a safety committee and to elect safety and health representatives at their workplace so that, the employer (through workplace managers) and employees were equally represented.

The Norwegian Working Environment Act, 2005 (subsequently amended in 2012) allocated two main functions to safety and health representatives which were, (1) being a spokespersons and ombudsmen and (2) carrying out workplace inspections. Representatives who were helping their company to fulfil their external and internal requirements related to occupational safety and health were called ombudsman. These representatives played the role of spokesperson when they appeared as interpreters of the regulation on behalf of employees and protected the special interests of the employees. Both the spokespersons and ombudsmen functions of the representatives were included in the safety and health regulations of Norway (Walter & Frick, 2000). Other functions of the representatives were to carry out workplace inspections, investigate hazards and incidents, inspect relevant documents related to workplace safety and employee's health, undertake safety training, attend safety committee meetings, and to participate in discussions with the employer about safety, health and welfare on behalf of employees (Hovden et al., 2008).

2.5.5. Sweden

In 1889, the first law in Sweden that was introduced concerned employees' health and life at their workplace. The Work Environment Act subsequently introduced in 1949 stated that every workplace with more than five employees was to have one safety and health representative who also had to be a member of a trade union (Tragardh, 2008). In the 1950's and 1960's there was a series of reform health and safety laws introduced that provided stronger workers' workplace safety rights. In 2001, the Swedish Work Environment Authority required Swedish employers to have safety and environmental management systems at their workplace, which was called "systematic work environment management" (SWEM) in the Work Environment Act, 2001 (Tragardh, 2008). Representatives had the right to demand that their employers act according to the SWEM and to stop work if they found something dangerous at their workplace. The Act gave this power to the safety and health representatives along with their normal safety and health duties such as risk assessment. Representatives were given the legal right to appeal to the Swedish Work Environment Authority if they considered that the measures taken by their employer were inadequate, to reduce the risk of workplace hazards causing harm to employees (Tragardh, 2008).

2.5.6 Italy

According to Dazzi (2008, p. 1), in “Italy the Workers Representative for Health and Safety was introduced by Legislative Decree No 626/1994 on Health and safety, which implemented eight EC Directives on such matters (Directives 89/391, 89/654, 89/655, 89/656, 90/269, 90/270, 90/394 and 90/679)”. According to the Decree n.81/08 these representatives are elected according to the legislation requirements. Representatives may be elected by coworkers or appointed by management. They may be elected to represent a production group of employees or a regional group of employees (International Labour Organisation, 2015). In Italy, the representatives have access to the workplace that they represent but do not have a general right to inspect this workplace. They do, however, have a right to be informed about security measures at their work place, “receive OSH information and workplace records relating to the risks assessment and prevention measures, as well as those relating to the hazardous substances, preparations and machines” (International Labour Organisation, 2015, p.17).

2.5.7 Spain

A study carried out in Barcelona (Spain) by Espluga et al. (2014) examined how effective the interaction between safety and health representatives and workers was. Using a qualitative, exploratory, descriptive interpretative study data was gathered through a semi structured interview with ten safety and health representatives (data saturation was achieved at this number), with three or more years’ experience who belonged to the trade union confederation. Interviews were transcribed, textual data was categorised and coded and a manual thematic analysis was conducted on the data collected.

In this study, all of the safety and health representatives stated that their main tasks were to identify workplace hazards and to report these workplace hazards to the management as well as to notify the workers. Safety and health representatives considered themselves as a defender of safety on behalf of workers to protect workers’ interests. Espluga et al. (2014) noted that decision making was another important role of safety and health representatives. Representatives considered

workers' safety and health demands, prioritised their demands, and raised workplace safety and health related concerns to management on behalf of the workers. The ability of the representative's decision making skills depended on their knowledge and skills in relation to occupational safety and health at their workplace. This study concluded that multiple factors have an influenced on the interactions between representatives and workers. One of the main factors was the technical, legal views that the representatives' role was restricted to workers' participation and this reduced their effectiveness at the workplace.

Espluga et.al. (2015) conducted further research to explore the awareness of workers on the preventive action outcomes related to their safety and health when they have safety and health representatives at their workplace. This study was conducted as a survey through multi stage, stratified sampling combined with quota criteria. There were 5562 participants who were salaried employees aged between 16-65 years and who were working on farms with 6 workers or more. The findings of this research concluded that it was beneficial to have a representative at the workplace to identify work related safety hazards. It was also identified that workers who were not aware that they had representatives at their workplace were less protected by risk control measures for work related hazards. This study established that representatives should communicate with all workers at their workplace. It was envisioned that this would enable workers to raise any workplace safety and health issues directly to the representatives for action to improve workplace safety and to prevent employee work related ill health issues.

2.5.8 *Canada*

Research conducted in Canada (Newfoundland and Labrador) by Hart (2006) examined the existing framework of the right of workers to participate in workplace safety and health decisions. In the Labrador Occupational Health and Safety Act, 1990, the main roles of the safety and health representatives were to receive occupational safety and health complaints from the employees; maintain a record of complaints; promote safety and health educational programs for employees; identify any hazards or unsafe features at their workplace; make recommendations to their employer for safety management practices at their workplace and to contribute to establishing standards to protect safety and health for employees at their workplace

(Hart, 2006). This study conducted a regulatory review through qualitative online documentary analysis of the present and proposed/upcoming legislation, which covered participation of workers in Labrador and Newfoundland offshore oil and gas industries. This study concluded that the current legislative framework appears to be similar to the proposed legislative changes but the representatives' participation in workplace health and safety decisions under the proposed legislation was less due to the reduced role of the safety and health committees, reduced training standards and reduced committee members' workplace safety training.

A study was conducted by Hall et al. (2006) in Canada to examine the concept of knowledge activism as an approach to accepting safety and health representation within the Ontario legal regime. The study population included 27 small to medium size auto parts plants in Ontario (who each had 50 to 500 employees), Data was collected from the unionised worker safety and health representatives. A total of 42 representatives participated. The study used both qualitative and quantitative data collection methods. Qualitative data was collected through semi structured open ended interview questions that were answered by the representatives. The quantitative data was collected through self-reported monthly injury data, survey data and assessment data regarding the impact of the workplace safety and health committee. Representatives were characterised as *knowledge activists* (11), *technical legal* (10), and *political activists* (21) in establishing safety and health systems in their workplace.

This study identified that although the three different methods (technical legal representation, politically active representation, and knowledge active representation) influenced the degree of effectiveness of the representatives the concept of *knowledge active* representation was the most effective way. This is a form of political activism in that the representatives were active in gaining additional safety and health knowledge through self-education; in collecting workplace safety information; focusing on underlying causes of occupational accidents in their workplace; teaching co-workers about workplace risk management if co-workers did not have a good knowledge; recommending risk control measures and safer ways to do work for workplace managers if this was required; encouraging their co-workers

to support them in making their workplace and work processes safe and working successfully in gaining safety improvements within the workplace politics.

Hall et al. (2006) reported that the *political activist* representatives believed that identifying and reporting hazards in the workplace was not their only role and challenged management with making claims or through their actions. These particular representatives were ready to organise employees to create pressure on management when the risk of workplace hazards causing harm was not controlled by management and were prepared to file a complaint with the Ministry of Labour.

Hall et al. (2006) stated that the third group of safety and health representatives who were characterised as *technical legal* were not different by their effort or training from other employees or representatives. They were experienced and hardworking representatives who reported hazards which they identified at their workplace and saw themselves as an *inspector*. They tended to report or communicate hazards at their workplace to management for correction and occasionally assisted with implementing risk control measures for minor hazards (such as broken machinery or minor leaks). These representatives hardly ever challenged management. This research identified that the concept of knowledge active representation was the most effective way for representatives to convince management to improve safety and health conditions at the workplace within the existing Ontario legislative regime.

All of these studies conducted in a variety of countries have clearly demonstrated that safety and health representatives can make an important contribution to improve the overall safety and health performance for employees at the workplace.

2.6 The Role of Occupational Safety and Health Representatives in the Australian Mining Industries.

2.6.1 Introduction

The importance and role of safety and health representatives is generally well understood in the safety world. Representatives are employees who generally represent their fellow colleagues in their workplace in relation to occupational safety and health. They are a valuable link between employers and employees in facilitating

a safe workplace, safe work practices and in preventing employee work related ill health (Safe Work Australia, 2016).

In Australia, all territory and state health and safety legislation promotes workers' participation and consultation in the workplace with work related safety and health issues. The general role of safety and health representatives in Australia's states and territories are common to all and include being allowed to conduct workplace inspections; accompanying the inspector at their workplace; being involved with workplace incident investigations and hazard and risk assessments; undertaking safety and health training and attending safety meetings (Safe Work Australia, 2016). There are three states in Australia that have mining safety and health legislation. These states are Western Australia, Queensland and New South Wales.

2.6.2 New South Wales

The functions of safety and health representatives in the New South Wales mining industry are included in the Work Health and Safety (Mines) Act 2013, New South Wales (sections 29, 30 and 31). The representatives' position in the New South Wales mining industry is an elected one. According to the s29 of this Act, representatives can review the content and implement the safety management system in respect of the mine that they are employed to work at. They can participate in incident investigations, workplace inspections, and accompany a government official when carrying out an inspection at their mine. Representatives are allowed to give suspension notice to the mining operator if they think that there is a failure to comply with the work health and safety laws that can harm the mine workers (s30). Trained safety and health representatives can also issue a Provisional Improvement Notice (s31).

2.6.3 Queensland

Walters et al. (2014) examined the legislative support for safety and health representatives to perform their roles effectively under the Queensland Coal mining Safety and Health Act, 1999. Walters et al. (2014) stated that according to this Act safety and health representatives are "to participate in investigations into serious accidents and high potential incidents" (p.60). This Act gives powers to

representatives to inspect and examine specific documents, which are related to particular safety and health issues at the workplace.

In Queensland, the functions of the safety and health representatives are described under section 99, 100, and 101 of the Act. The representative is an elected position. According to s99 of the Act the main functions of the mining industries representatives are to inspect their mine, review the procedures, to investigate complaints from workers, to detect unsafe practices and conditions at their mine and to take actions if required for workplace safety or employee health. The Act documents that senior management and supervisors will provide reasonable help to the representatives to perform their duties. As an example, the site senior executive may accompany the representative during an inspection. If the representative believes that the safety and health system is not adequate in their mine they can inform their senior site executive. Representatives may stop work at their mine if they believe that there is an immediate danger (s101). They can report to the supervisor in charge of the operation of the coal mine regarding this issue. An inspector may investigate the matter if the representative is not satisfied with the decision made by the senior site executive.

2.6.4 Western Australia

In 1995 the Western Australian Mine Safety and Inspection Act 1994 (MSIA) replaced the previous Mines Regulations and Acts and introduced safety and health representatives into the Western Australian mining industry (Gilroy & Jansz, 2014). The reason for recruitment of the safety and health representatives under the new Act was to assist with keeping the mine safe as well as the mine workers. In the Western Australia mining industry, representatives are elected positions under section 56 of the Act. Generally they are elected for a two year period (s57). A qualified safety and health representative refers to a representative who has finished a course of training prescribed for the purposes of this definition [s 60 (7a)].

The Act Section (s) 53 defines the functions of the safety and health representatives and provides legal support for them to perform these functions. The roles of representatives are to inspect the workplace, identify hazards and report to their

employer the risk of hazards causing harm, participate in carrying out an investigation in their workplace if there is a work related incident or accident and to keep up to date with safety and health information.

These representatives also have the responsibility to liaise with the employees that they represent and their employer regarding safety and health issues in the workplace that are relevant to their area of work; consult and cooperate with their employer regarding any safety and health issues in the workplace and to refer to the workplace safety and health committee any relevant matters [s53 (1)]. Representatives can request the employer to establish a health and safety committee for the mine site [s53 (2)] so that they can refer to it any relevant matters.

Under section 53, a safety and health representative is protected from civil liability, “they cannot be sued for damages for anything arising from their having performed, or failed to perform, any function related to their position as a Safety and Health Representative” [s 53 (3)]. This protection applies to both employees and contractors who are elected to representatives. Section 69 provides protection for representatives in the performance of their legislated duties from negative discrimination by their employer or trade union.

Section 60 (5) (a) provides the legal authority for the representative to have adequate and paid work time to perform their duties. Representatives have the power to notify Resources Safety (the legislative organisation) if an employer does not agree to remedy a workplace hazard that is likely to cause serious injury or death. These representatives also provide support to the Resources Safety inspectors, as they are able to accompany them when a workplace accident is investigated or an inspection is carried out by the inspector and can assist by providing work related information. Trained qualified safety and health representatives have the power to issue a Provisional Improvement Notice (PIN) about a safety and health issue at the workplace to the manager but according to section 31BG, 4(a), “if the manager of the mine is not the person to whom the notice is issued, the qualified representative who issues the notice must, as soon as is practicable, give a copy of the notice to the manager.”

Once safety and health representatives are elected the person conducting the election is required to notify the state mining engineer within 7 days of their election (MSIA 1994). Using the contact details provided Resources Safety assists representatives to keep up to date with the latest work related safety and health information by regularly emailing the information, having 'Road Shows' at which safety and health information is provided, sending a quarterly magazine titled 'Mining Safety Matters' and by having occupational safety and health information available through the Resources Safety home page on the internet. Section 66 of the MSI Act requires representatives to be part of the workplace safety and health committee. This allows them to communicate and make work related safety and health decisions with their managers who must also include the person who has the authority to implement the recommendations of the said committee.

Safety and health representatives play an important role under the MSI Act. The objectives of the Act are to promote and improve occupational safety and health standards for employees who work within the mining industries in Western Australia. This Act helps to maintain a safe and healthy workplace for employees and to protect employees at work from incidents and hazards.

The Occupational Safety and Health Act 1984 (the OSH Act), and the MSI Act focus on consultation between employer and safety and health representatives for safety and health issues at the workplace. There are some formal processes set out for consultation in both Acts, which are:

- Safety and health representatives are elected by and represent their co-workers in relation to their safety and health issues at the workplace through consultation with the employers (OSH Act, 1984 of WA, s33; MSI Act, 1994 of WA, s53);
- Safety and health committee members participate in discussion forums to discuss the safety and health issues of employees and make recommendations on safety and health issues at the workplace with employers (OSH Act, 1984 of WA, s40; MSI Act, 1994 of WA, s62);
- The Occupational Safety and Health Act 1984 and Mines Safety and Inspection Act 1994 set out a process to deal with resolution procedures through a consultation process (OSH Act, 1984 of WA, s33; MSI Act, 1994 of WA, s70).

Consultation and cooperation between employees and employers are an important way to protect employee's safety and health at the workplace. The MSI Act fosters cooperation and consultation between employees and employers so that they can work together to identify hazards and to implement risk management processes for employees to maintain overall safety and health at the workplace [s53, s1(f), s1(g)].

According to the MSI Act, the mine manager must ensure and provide a suitable experienced person to work with the safety and health representative whenever the latter is carrying out a workplace inspection at the mine [s58(1)]. The mine manager and employer should inform the safety and health representative about any changes at the mine pertaining to plant and substances, and report any incidents that occur at the mine for the area and to the employees that they represent [s60 (2b), s60 (6)]. Safety and health representatives are entitled to paid leave to attend a course for safety and health [s60 (7a)].

2.7 Mining in Western Australia

The first miners in Western Australia were the Aboriginal people (Australian Mining History, 2012; Department of Mines and Petroleum, 2012, Mineral Resources, 2007). In 1898, the first commercial mining began in Western Australia with coal mining at Collie. This was followed by gold mining in the Murchison district in 1891, Coolgardie in 1892 and Kalgoorlie in 1893. In 1943 asbestos mining began at the Wittenoom Gorge. Large scale iron ore mining commenced in the north of Western Australia in 1943 and oil and gas mining commenced in 1953 (Australian Bureau of Statistics, 2006).

The second major resources boom in Western Australia began in the 1960s when the Commonwealth Government rescinded the iron ore export restriction that had been in place since 1938. In the 1960s and 1970s, major discoveries of petroleum, alumina, nickel and bauxite helped to develop significant mining industries in Australia (Australian Bureau of Statistics, 2006). Bauxite mining commenced in 1963 in the Darling Ranges, and nickel mining began in 1969 at Mount Windarra (Australian Mining History, 2012; Department of Mines and Petroleum, 2012).

The word *Aborigines* comes from the Latin words *ab origine*, which means *from the beginning*. The first European settlers thought the indigenous people they met in Australia had been there since the beginning of time. Research by Tindale and George (1973) identified that the first wave of Aboriginal people to migrate to Australia were a Negrito race, which travelled through the north of Australia to Tasmania. The Negrito people came from India, Burma, Thailand, Cambodia, and Vietnam. These Negrito people were curly haired, dark skinned, small of stature (about 1.5 metres), and are called the Barrinean people. The second group of people to arrive had straight hair and were of medium build. They also came from Asia to Australia and were called the Murrayian group. It is believed the Murrayian people are related to the Ainu Aborigines of Japan. Apart from in the Queensland rain forest and Tasmania the Murrayian people killed, or integrated with the Negrito inhabitants of Australia. The final group of Aboriginal people who came to Australia are close relatives of the Veddas people of Sri Lanka. They were dark brown skinned, tall, had curly hair and settled in the northern parts of Australia and are called Carpentarians. These three races of people, Barrinean, Murrayian, and Carpentarians are collectively called Aborigines in Australia (Jansz & Gilbert, 2017).

The first professional miners in Australia were the Aboriginal people. Ownership of a mine was with the Aboriginal family on whose land the mine was located. Permission from the land owner was required to access the mine. Rocks and ochre were the main items mined. Rocks mined included, “amphibolite, andesite, basalt, blue metal, chalcedony, chert, diabase, granite, green stone, greywacke, ironstone, limestone, mudstone, obsidian, porphyry, quartz, quartzite, sandstone, silcrete, silicified stone, siltstone and trachyte” (Mineral Resources, 2007, p. 3). Relevant members of each family were provided with training and education on how to safely remove the minerals from the mine. Safety and health of the workers was the responsibility of the family as well as the worker’s responsibility. (Jansz & Gilbert, 2017). In 2014, 5.8% of the Western Australian mining workforce were Aboriginal people (Chamber of Minerals and Energy of Western Australia, 2014).

The Western Australian School of Mines (WASM) was founded in 1920, in Kalgoorlie to provide mining education in the state. This mining educational facility

was maintained by the Australian Department of Mines until 1969. In 1969 the management of this School was transferred to the Western Australian Institute of Technology, which changed its name to Curtin University in 1987 (Jansz & Gilbert, 2017).

In 2015-2016 when this research was being conducted, the value of iron ore sales was \$48.3 billion, a decrease of 11%. At the same time the value of Western Australian gold production had risen by \$10 billion, an increase of 10% (Department of Mines and Petroleum, 2016b). The Western Australian mining industries in 2015-2016 directly employed an average of 102,258 people and included employees in mineral processing, transport, catering, mining exploration, mine site infrastructure and construction (Department of Mines and Petroleum, 2016a). Figure 2 shows the Western Australian mining employees' numbers from 2006-2007 to 2016-2017 and Figure 3 illustrates the direct employment by mineral commodity in 2016-2017.

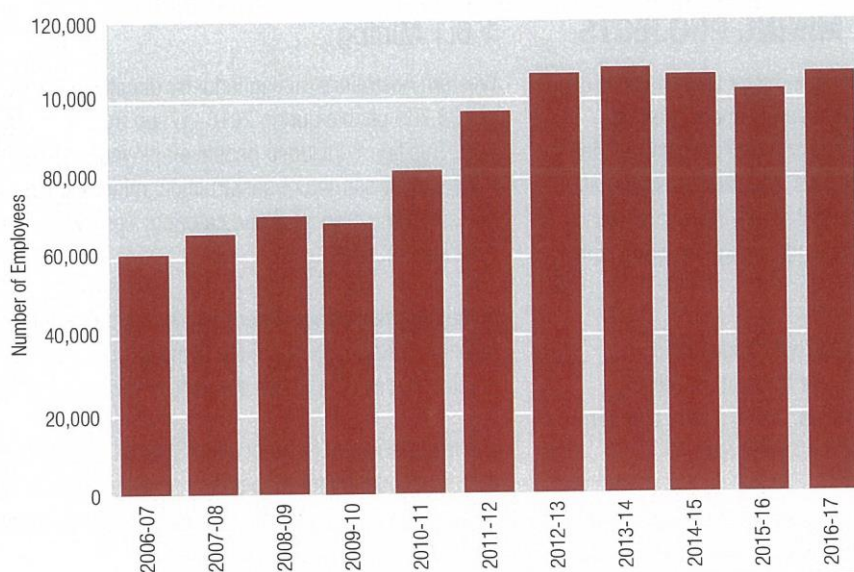


Figure: 2 WA Mining Employment 2006-2007 to 2016-2017 (Department of Mines, Industry Regulation and Safety, 2018a, p. 15)

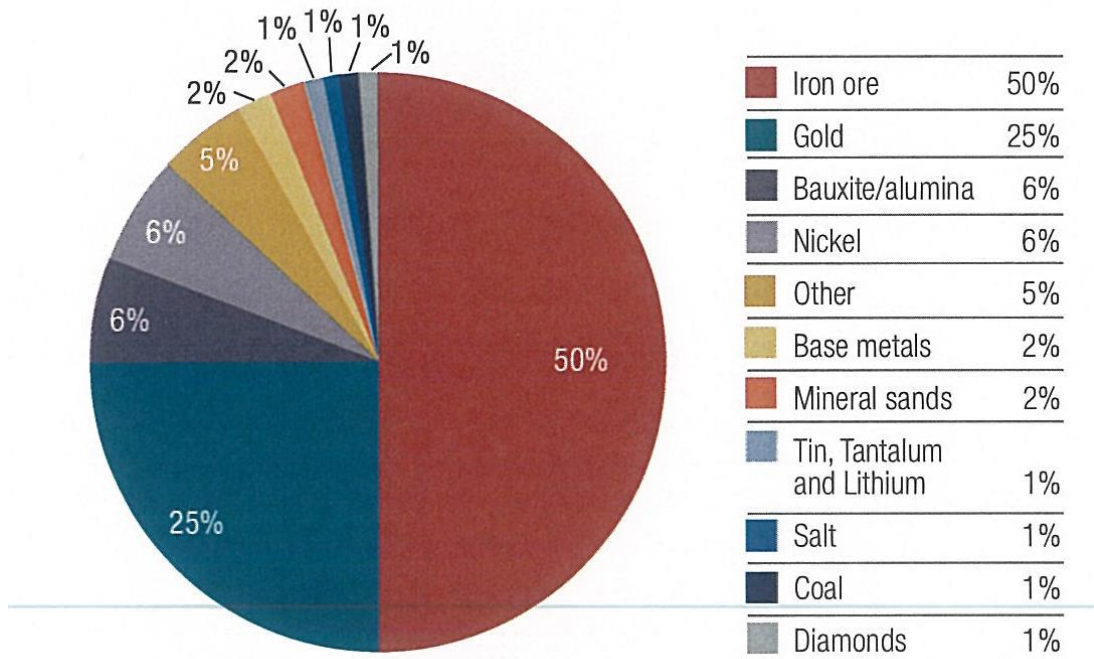


Figure: 3 Employment by Mineral Commodity 2016-17 (Department of Mines, Industry Regulation and Safety, 2018a, p. 14)

2.8 Mining Workplace Safety and Health

Mining is a highly hazardous industry throughout the world. The Australian mining industry is no exception to this as miners work with a range of workplace hazards that can cause not only injuries and ill health, but also death (Walters et al., 2014). Some of the major mining disasters that have happened in Australia include those at Mount Kembla in 1902, Mount Lyell in 1912, Bellbird colliery in 1923, Kianga in 1975, Appin colliery in 1979, Moura No.4 in 1986, Bulli colliery in 1987, and Moura No.2 in 1994 (Walters et al., 2014).

Common mining hazards include falls from height, fire, gas, explosion, rock falls, chemicals, dangerous machines, and electrocution and mining employees develop serious health problem such as lung diseases (Walters et al., 2014). In Australia, thousands of coal mining workers died from pneumoconiosis in the late 19th and 20th century (Walters et al., 2014).

During the 1800s and 1900s, most miners in Western Australia were individual prospectors and were responsible for their own safety and health at workplace. Gradually, individual mining was replaced by company mining as a more specialized and profitable way of mining (Jansz & Gilbert, 2017). Table 1 shows the fatality numbers for the Western Australian Mining industry during the early 1990s.

**Table: 1. Western Australian Mining Industry Fatalities 1901-1918
(Jansz & Gilbert, 2017, p. 5)**

Year	Fatalities	Workforce	Incident rate per 1,000 workers
1901	45	16, 755	2.68
1902	39	17, 525	2.22
1903	42	17, 329	2.42
1918	23	17, 790	1.29

The introduction of workmen inspectors (whose functions were similar to today's safety and health representatives) in 1906 decreased the number of work related fatalities and the injury incident rate per thousand employees working in the Western Australian mining industry. However in 1989/1990 the Western Australian government decided that the Western Australian mining industry had an unacceptable safety performance with 19 fatalities and a serious injury rate of 19 per 1,000 employees but it took until the 7th of November in 1994 before the Mine Safety and Inspection Act of Western Australia received Royal Assent (Gilroy & Jansz, 2014). This legislation introduced safety and health representatives into the Western Australian mining industries.

During 2011, the Department of Investigation Services Branch was created with specialist investigators to investigate reported mining industry safety incidents in Western Australia. Between 2011 and 2012, only 5 out of 22 (23%) investigations were completed compared to 66 out of 67 (98%) between 2013 and 2015 demonstrating that this Special Branch had more human resources to be able to complete the required work (Department of Mineral and Petroleum, 2016b). There were no employees' deaths in Western Australian mining industries in 2012.

In 2016-2017, there were no exploration fatalities in the Western Australian mining industries but unfortunately there was a fatality in a gold processing plant (Department of Mines, Industry Regulation and Safety, 2018b). This fatality occurred when a boilermaker was working inside a tank during plant shutdown. The gantry bridge above this tank was corroded and collapsed on the boilermaker when he was removing the thickener rake shaft (Department of Mines, Industry Regulation and Safety, 2018b). Over the last 10 years in the Western Australian mining industries there has been a fatality rate of between 0 and 0.1 per thousand employees. Lost Time Injuries (LTI) in 2016-17 resulted in 8,038 employee days off work and 11,263 days with employees having Restricted Work Injuries (RWI) (Department of Mines, Industry Regulation and Safety, 2018b). The Lost Time Injury Frequency Rate (LTIFR) was 2.3 with 47 hours lost per million hours of work time in 2016-17 (Department of Mines, Industry Regulation and Safety, 2018b).

In the 1990s, significant improvements occurred in Australia through internal and external regulations to manage safety and health at the workplace in the coal mining industries, especially in Queensland (Walters et al., 2014). These improvements were incorporated in to the policy and mission statements of the companies as *zero harm* objectives and established a greater accountability for safety and health performance for all levels of mine management. Workplace safety and health practices focused on promoting positive safety attitudes and behaviour of the employees at the workplace, emphasised safe work practices and improvements in safety outcomes. These approaches included monitoring, evaluation and continuous improvement of safety and health at the workplace (Walters et al., 2014).

Similarly in the Western Australian mining industry, to maintain safety, compliance and more transparent services with the stakeholders the Department of Mines and Petroleum promoted the use of a risk based approach to workplace safety and health, and reinforced compliance with people in the workplace following the implementation of safety regulation and standards (Department of Mines and Petroleum, 2016b).

A Model Work Health and Safety Act was developed by Safe Work Australia in 2011 for implementation in all Australian States, Territories and in New Zealand (Cliff, 2012). With the election of the Labour government in Western Australia in 2017 there are government plans to introduce a version of the Model Work Health and Safety Act into Western Australia. Now that WorkSafe Western Australia and Resources Safety have been combined under the Department of Mines, Industry Regulation and Safety, there are plans to have one Act for occupational safety and health that will cover all industries in Western Australia, including the mining industry (Department of Mines, Industry Regulation and Safety, 2017).

2.9 Section Summary

This section of the literature review has summarised information related to the history of the implementation of safety and health representatives into safety and health legislation internationally, nationally and in the Western Australian mining industries. It also reported on the published roles of safety and health representatives under legislation. The history of the development of the mining industries in Western Australia was also presented. The next section of this review of published literature analyses the factors that impact on the work of safety and health representatives in their workplaces.

SECTION TWO

Factors that Impact on Safety and Health Representatives Participation in Workplace Safety and Health

2.10 Introduction to Factors that Impact on Safety and Health Representatives' Work.

The first section of the literature review examined the history and role of safety and health representatives from the time of the United Kingdom's coal mining industry worker representatives to their current role in the Western Australian mining industries. With the change of government and the revision of the Western Australian safety and health legislation for all industries, including the mining industry, it is very important to identify the factors that impact on safety and health representatives' participation in workplace safety and health.

Section two of the literature review analyses published information on factors that influence the effectiveness of safety and health representatives in promoting a high standard of workplace safety and preventing employee ill health due to work related causes. It explores the impact of society expectations, social policies, the labour market, economic considerations, legislation, unions, company shareholders, management, co-workers, safety professionals, workplace safety and the health committee and other factors and people who may affect the work performed by safety and health representatives.

Through a comprehensive literature review that assessed over 200 publications related to the research key words a total of 15 research based studies on the role of safety and health representatives were identified, with only one student research report in 2014 providing information about the role in the Western Australian mining industry. The lack of recent published information about factors that affect this role in the Western Australian mining industry highlighted the need for this research to be conducted.

Employees' participation in decision making in a workplace can be grouped as formal and informal in occupational safety and health and does not always happen through representative channels. Informal employees' participation occurs in situations where an employee does not have obvious mechanisms to participate in occupational safety and health and therefore uses ad hoc channels to influence management decisions. Formal employees' participation can be direct and most often an employee's involvement will be direct interaction with the management in the decision making process (Harris, 2010). Menendez et al. (2009) stated that multiple factors can impact on representative worker participation in occupational safety and health, which includes social policies, laws, regulations, the labour market and the power of trade unions. Factors that support the safety and health representative to be effective in their role can include legislative support such as their statutory rights at the workplace, communication with and support from all levels of management, support from safety and health professionals, co-worker's support and support from trade unions (Sedano et al., 2014; Menendez et al., 2009). Other factors that have been reported in the published literature to influence the effectiveness of the work of safety and health representatives are society expectations, social policies, economic climate and the labour market (Walter & Frick, 2000; Ruhm, 2000; Hopkins, 2000).

Table 2 includes an analysis of research studies related to the factors discussed in this section of the literature review, which may affect the work of safety and health representatives.

Table: 2. Factors that impact on Safety and Health Representatives

Author(s) Publication year. Data collection country.	Research Aim	Participant Recruitment	Study population.	Research Methodology and data analysis	Research Limitations/ Strengths	Key findings
Harris, A. (2010). New Zealand.	To determine how safety and health representatives (SHRs) participated in occupational safety and health in New Zealand workplaces following the implementation of the Health and Safety in Employment Amendment Act 2002 and identify their contribution to workplace safety and health.	Recruitment was through the use of emails, which invited selected people to participate in the study. Participants were recruited on the basis of their interaction with the SHRs and included their managers, co-workers, health & safety managers, senior managers and union representatives.	Total 31 participants including SHRs (8), and other workplace employees (23). Conducted in two metal manufacturing industries.	Qualitative research. Used a cross perceptual approach with 2 case studies. Semi structured interviews were conducted with 8 SHRs and 23 other people in the workplace by one interviewer. Analysed company documents related to employee OSH work. Interview and document data was thematically analysed.	<p><u>Limitations</u> The role was new and representatives had different interpretation of their purpose.</p> <p><u>Strengths</u> Vast and rich data collected from semi-structured interviews and document analysis.</p>	<p><u>Legislation support</u> Concluded that legislation enabled SHRs to play a valuable role in the workplace safety and make a positive contributions.</p>

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Walters, D., Nichols, T. (2006). United Kingdom	To examine the effectiveness of workers representation and consultation on occupational safety and health following the implementation of the Safety Committee and Safety Reps. Regulations, 1977.	5 chemical manufacturing companies with union membership were chosen.	Total number of participants was 341 (of 1477 employees. 23% response rate to questionnaire) and included senior managers, health and safety managers and advisers, supervisors, SHRs, shop stewards, manual and non-manual workers.	4 case studies with questionnaire based survey, interviews and examination of documentation use for data collection. Pattern matching was used to analyse qualitative data. Descriptive statistics were used for quantitative data analysis.	<u>Limitations</u> Questionnaire response rate of 23% indicates that the opinions of 77% of employees are not included. <u>Strengths</u> Both qualitative and quantitative data collected and analysed.	<u>Legislation support</u> Legal requirements were not met in companies 1+2 for SHRs. Management support was provided for SHRs in company 3 and partly in companies 4+5. Companies 1+4 had more employee injuries than the average for the industry. Companies 2+3+5 had less injuries. Company 3 was rated by SHRs as most effective and companies 1+4 as least effective in working with SHRs.
Brownlie, T. (2014) Western Australia.	To improve SHR written procedures and practices to meet the requirements of the Mines Safety and Inspection Act 1994 WA.	Participant recruitment was via email, phone and site visits. Completion of the questionnaire by SHRs was voluntary.	34 SHR participants who worked at 3 mines in northern Western Australia.	Mixed method approach. Both quantitative and qualitative data was collected. 5 SHRs completed the pilot study questionnaire followed by 21 questionnaires completed by other SHRs at 3 mine sites. 12 months incident reports (2,144 incidents) were analysed. Excel was used for data analysis.	<u>Strengths</u> Research findings and recommendations were used to improve the effectiveness of the work of SHRs at 3 mine sites in Western Australia. <u>Limitations</u> Sample size was small and the research results may only apply to the company that owned the 3 mine sites.	<u>WA Mining industry</u> SHRs reported insufficient work time provided for their duties, no training framework or standardised documentation for their role. There was minimal SHR involvement in incident investigations and hazard identification. Only one Provisional Improvement Notice had been issued by a SHR. 19 of the SHRs had accompanied a Resources Safety inspector at their work site. SHRs saw their function as to consult & cooperate with their employer & co-workers on SH matters.

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology Data analysis	Research Limitations/ Strengths	Key findings
Walters, D., Wadsworth, E., Johnstone, R. & Quinlan, M. (2014) Queensland, Australia.	To review the role and activities of the SHRs in the Queensland coal mining industry.	In June and August 2013 participants who were attending and annual training course provided by the CFME Union were recruited to be interviewed. Interviews were conducted between training sessions.	24 participants, 18 of whom were site safety health representatives (SSHRs), 4 of whom were industry safety & health representatives (ISHR), 1 union district president, 1 union district secretary and 1 senior mines inspector. The ISHRs are full time union employed safety inspectors.	Mixed method approach. Qualitative research with data collected through semi structured interviews. Documentary evidence of SHRs work during the last 15 years was analysed.	<u>Strengths</u> This exploratory study added to the body of knowledge about the role of SHRs in the Queensland coal mining industry. <u>Limitations</u> Results may not be as applicable to SHRs who do not have strong union support by ISHRs for their industry.	<u>Coal Mining</u> SSHR were supported in their work by experienced ISHRs who provided them with education & personal support. SSHRs worked within legal requirements for their own protection so that their employer would not discipline or dismiss them for their SSHR work. SSHRs also worked closely with Mining Inspectors. SSHRs were involved in workplace inspections, hazard identification & safety management. SHRs reported having supportive co-workers was helpful. Both SSHRs & ISHRs investigated and acted on mine workers OSH issues. When necessary for safety reasons a SSHR could issue a suspension notice to stop work. Management were not always supportive, particularly in allowing work time or facilities for SSHR work and allowing them to be involved in incident investigation. Reported too much management reliance on documentation.
Walters, D., Quinlan, M., Johnstone, R. & Wadsworth, E. (2016a). Queensland, Australia.	To identify how SSHRs work with employers and the effectiveness of the strategies they use.	Convenience sample of union members from 2 construction, forestry, mining and energy union (CMFEU) offices.	18 SSHRs. 5 ISHRs. 1 senior mines inspector. 2 senior CFME union officials.	Mixed method approach. Interviews were conducted with research participants in 2 union offices. OSH documents from 1998 to 2013 at 19 coal mines were analysed.	<u>Strengths</u> Identified strategies SHRs used to maintain workplace safety when management were hostile. <u>Limitations</u> No managers agreed to participate.	<u>Coal Mining</u> SSHRs were focused on preventing reoccurrence of site accidents. ISHRs were more concerned with the implications of safety incidents & took more of a monitoring role. In a hostile management environment SSHRs met legal requirements and used the protection of legislation to be able to do their SSHR work to avoid workplace fatalities. Support of co-workers, other SSHRs and ISHRs was also used. To protect workers' safety the SSHRs used organised resistance rather than trust and cooperation with management.

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Walters, D., Quinlan, M., Johnstone, R. & Wadsworth, E. (2016b). Queensland, Australia.	To explore the regulatory provisions for OSH representatives' inspection work in the Queensland coal mining industry.	Convenience sample obtained from a site visit and attendance at 2 CFMEU organised training sessions held for SSHRs in June 2013.	14 SSHRs at 1 mine+ 4 from other mines. 3 ISHRs + 2 former ISHRs. 1 senior mines inspector.	Mixed methods. Interviewed participants. Examined OSH records at 1 workplace. Attended 2 five day annual training courses for SSHRs. Data analysed using binary logistic regression.	<u>Strengths</u> Added to the body of knowledge about the inspection work conducted by SHRs. <u>Limitations</u> Did not report on the effectiveness of the outcomes of the inspections.	<u>Coal Mining industry</u> ISHRs and mines inspectors focused most on examining OSH management documentation while SSHRs inspections focused more on workplace high risk hazard identification and risk control measures.
Walters, D., Kirby, P., & Daly, F. (2001). United Kingdom.	To determine the impact of trade union health and safety education and training on the Health and Safety Representatives workplace activities.	Postal questionnaire sent to 5,800 trade union SHRs. Telephone interview requested from stage 1 Union Health and Safety course participants. Union stage 2 course participants requested to complete a survey, interview and group activities.	24% response rate to postal questionnaire (1,400 respondents) 48 telephone interviews with stage 1 course participants. 85 stage 2 course participants.	A mixed method research approach was used with both qualitative and quantitative data collected. Methods used to collect data were postal questionnaire, telephone interviews, face to face interviews and group activities.	<u>Strengths</u> Including both quantitative and qualitative information enabled training provided to be comprehensively analysed. <u>Limitations</u> Only assessed the effectiveness of trade union representative's education, and not the training provided to non-union SHRs.	<u>Union support</u> Research findings were that union provided education enabled SHRs to have the knowledge to work in their role effectively.

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Hovden, J., Lie, T., Karlsen, J., & Alteren, B. (2008). Norway.	To identify the dilemmas and challenges that influence safety representatives (SRs) in the off- shore Petroleum industry.	All invited people who attended a one day workshop held in 2004 for Norwegian offshore oil and gas personnel from 2 installations, 1 Norwegian, the other foreign owned.	25 participants. 13 SRs, 6 general managers, 3 safety managers, 1 petroleum safety authority representative, and 2 trade union officials.	Data was collected through questionnaire, plenary discussion, and from focus group discussions. Data analysed using reliability analysis of indexes. Mean score. Cronbach's Alfa. Pattern matching for qualitative data.	<u>Limitations</u> The small sample made statistical significance difficult to obtain. <u>Strength-</u> Qualitative study that generated rich data.	<u>Management support</u> SRs reported they did not have the time, competency training or resources to be able to do their representative work, lacked management support when issues were raised, management were unwilling to listen to SRs and this resulted in poor motivation to improve workplace safety. SRs perceived they had minimal influence on long term planning, workplace changes that influenced safety and on workplace safety generally. Mangers saw themselves as supportive of SRs and valuing their work.

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Olle-Espluga, M., Menendez-Fuster, M., Muntaner, C., Benach, J., Vergara-Duarte, M., & Vázquez, L. (2014). Barcelona (Spain).	To identify how SRs perceive and establish their interactions with workers and influencing factors.	Selected from 4 trade union provided lists according to gender, industry type and size, sector (public or private sector worker) who had 2 or more years' experience as a SR.	Participants were SRs from Barcelona in Spain. Data saturation was determined with 10 participants.	Qualitative, exploratory, descriptive interpretative study using a semi structured interview. Analysed data using manual thematic analysis and descriptive statistics.	<p><u>Limitations</u> Only covered workplaces with union SRs who were employed in Catalan workplaces. Industrial relations within companies was not explored and this would have affected the work of the SRs.</p> <p><u>Strengths</u> Identified areas for future studies as this was an exploratory study.</p>	<p>Co-worker support 90% of SRs considered that their functions were hindered by management. There was gender discriminate against female SRs. Interacting with co-workers enabled SRs to identify any work related health or safety problems. SRs reported close working relationships with, and trust by co-workers. Most interaction was at information provision and consultation level. In firms with 50 or more workers SRs had less co-worker support, particularly when there was a threat of management retaliation. Unionised workers were more likely to perceive that they were subject to management reprisals if they spoke about work related safety. SRs who covered multiple work sites had a non-existent relationship with co-workers who were not at their work site. SRs work was least likely to be supported by co-workers who had a temporary contract, were self-employed, had frequent work site rotations, had outsourced work, who had management roles and by workers whose job security was threatened. In the public sector only SRs had paid work time to interact with co-workers.</p>

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Olle-Espluga, L., Vergara-Duarte, M., Belvis, F., Menendez-Fuster, M., Jodar, P. & Benach, J. (2015). Spain.	Aim was to explore preventive action outcomes related to SRs work when employees have a known SR compared to when there was no known SR.	Used previously collected data from the Spanish Working Conditions Survey.	5450 participants who were salaried employees age between 16-65 who were working at a farm with 6 workers or more.	Cross sectional survey through multi stage, stratified sampling combined with quota criteria. Data was analysed using bivariate analysis, multivariate multinomial logistic regression and Odds Ratio. Analysis was performed using PASW v.19 & STATA v.11.1.	<u>Limitations-</u> The survey of workers did not include information about management involvement, SRs training or SRs duties that were not prevention. <u>Strength</u> Adds to the body of knowledge about SRs.	<u>Co-worker support</u> Men had higher workplace preventative action than women ($p<0.001$). If the SR was known to the worker there was a higher level of preventative action at both intermediate (aOR=2.87 (95% CI 2.39-3.44) and high level (aOR=10.26, 95% CI 7.27-14.50). There was no statistically significant difference in preventative actions taken at workplaces where workers reporting having no SR and those who did not know who their SR was.
Reilly, B., Paci, P., & Holl, P. (1995). United Kingdom.	To analyse the relationship between workplace injuries, unions and safety committees.	Used already collected data from the 1990 Workplace Industrial Relations Survey (WIRS3), questionnaire for Managers.	Results for 432 establishments were available for analysis.	8 binary variables were analysed using Wald statistics, the sample mean and logit coefficients estimates for injury rates. Coefficients for the variables used provided the estimated effects on the log odds of an injury occurring.	<u>Limitations</u> Small companies with less 25 employees were excluded. Larger companies were over sampled. Managers were asked to record the number of injuries that had occurred in the last 12 months so recall bias could have occurred.	<u>Safety & Health Committees</u> Companies that had a consultative committee with all union appointed SRs had 5.7 fewer injuries per 1,000 employees than companies with no safety & health committee. Companies with consultative committees with non-union SRs had 4.9 fewer injuries per 1,000 employees, making them just slightly less effective.

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Kim, W. & Cho, H. (2016). Korea.	To estimate the effects of unions and health and safety committees on preventing workplace accidents at manufacturing firms in Korea.	Used already collected 2012 Occupational Safety and Health Trend Survey data from the Korean Safety and Health Research Institute.	A sample of 3,000 manufacturing (with 5 or more workers) industries were randomly selected to represent the Korean manufacturing industries.	Survey data was analysed using mean, standard deviation of variables, two-way ANOVA, F statistic and negative binomial regression using STATA v.13.	<p><u>Limitations-</u> Only considered manufacturing industries. Results may be different in other industries.</p> <p><u>Strengths-</u> Large sample size enable conclusions to be made on the effectiveness of workplace health & safety committees on reducing the incidents of accidents.</p>	<p><u>Health & Safety Committees</u> Having unions at a workplace increased the incident of accidents, because accidents were more likely to be reported according to the researchers. Accident rates in companies without a joint health & safety committee were significantly higher ($F_{2,2997} = 6.7$, $p=0.001$). The accident rate was lowest when there was a union and joint health & safety committee dealing with safety and health issues (F statistic 11.18, $p=0.000$). In non-union workplaces health & safety committees were effective in reducing accidents (F statistic 31.40, $p=0.000$). Accident rates for companies having any type of safety committee was 0.86 times the accident rate of companies without a health & safety committee. Authors concluded that joint health & safety committees, not unions, were most effective at reducing workplace accidents.</p>

2.11 Society Expectations, Social Policies, Economic Climate and the Labour Market

In Sweden, from 1945 to 1990, it was evident that labour had the economic power to force management to enter into joint arrangements due to labour shortage (Walter & Frick, 2000). This resulted in employees' being allowed to have a stronger voice in making decisions related to their safety and health at work. For safety and health representatives this increased the effectiveness of their role. The social policies of countries were identified by Menendez et al. (2009), as a factor that facilitated worker engagement in workplace safety and health decisions. Good government social policies allowed workers to raise their voice and to make decisions in regards to minimum employment conditions in their workplace (Menendez et al, 2009).

Sedano et al. (2014) analysed how the economic climate affected the number of employee work related injuries occurring in Spain. The data was obtained from the Ministry of Work and Immigration. During the years 2000 to 2009, the number of injuries amounted to 8,713,981. The study design was based on the major injury index (number of major injuries per 100,000 workers) and the seriousness index. Another index was calculated as days off work due to occupational injuries per 1,000 hours worked. Sedano et al. (2014) analysed employees' length of service, age, gender, size of the firm, and employment stability during the year 2005 to 2009. A Chi squared statistic was used through SPSS V18 statistical software analysis package to analyse the data.

Their research findings were that in times of economic expansion, there were more new and inexperienced people employed in industry and the number of minor, serious and fatal injuries increased per 100,000 workers. Conversely in times of economic down turn there was a natural selection with mainly the more qualified and experienced workers being retained and a significant drop in minor, serious and fatal injuries occurring. With the economic down turn fatality rates decreased from 9.2 to 4.2; serious injury rate decreased from 94.3 to 34.6 and minor injury rate decreased from 7,558.4 to 4,091.8 per 100,000 workers (Sedano et al, 2014).

Sedano et al. (2014, p. 77) identified in their study that, periods of economic slow-downs could result in a reduction in the number of injuries. Ruhm (2000) argues that economic crisis can affect people's health, quality of life, can lead to the loss of employment, and affect

the rate of occupational injuries occurring at workplaces. Therefore, it would be logical to suppose that during an economic crisis, with a rise in unemployment and a subsequent fall in the number of employed workers, the number of injuries would also fall. Ruhm (2000) also found that, there was a solid relationship between employee health and microeconomic conditions.

Societal expectations influence occupational safety and health in Australia. This was clearly indicated by Hopkins (2000) during investigations of the Longford gas plant explosion and the Glenbrook train crash (Hopkins, 2005). In the case of Glenbrook, society expected the trains to run on time and the rail industry had a culture of running to schedule rather than maintaining safety (Hopkins, 2005). In the case of Longford, society expected gas at the cheapest price practical and this was provided by private enterprise that concentrated on production over safety (Hopkins, 2000).

In Western Australia there was a mining boom from 2003 to 2013 in which the price paid for iron ore by China and other Asian countries increased from \$20 to \$170 a ton (Stanley, 2017). In 2013 the price paid by other countries for Australian minerals decreased and there was a down turn in mining industry profits (Stanley, 2017). In 2016 mining industry production in Western Australia was worth \$94.8 billion, which was an increase of 4 per cent to the previous year (Department of Mines and Petroleum, 2016) indicating that the mining industry had increased profitability in 2016. For the mining downturn years between 2013 and 2016 there was not a marked decrease in mining industry employment (Department of Mines, Industry Regulation & Safety, 2018a). In fact employment numbers in the mining industry increased in 2012-13 and 2013-14. There was a slight decrease in industry employment numbers during the following two years (Department of Mines, Industry Regulation & Safety, 2018a). In the down turn years however, many mining companies had less money to spend on improving workplace safety and health (Garntry, 2016).

2.12 Impact of Legislation

Occupational safety and health legislation promotes and facilitates the right of safety and health representatives to participate in occupational safety and health decision making when meeting the International Labour Organisation (ILO) Convention number 155. Workplace safety and health representatives have been included in the occupational safety and health

legislation in the countries in which the head of the country has ratified the International Labour Organisation (ILO) Convention 155 (Walters et al., 2014).

The specific rights workers have to participate in occupational safety and health can differ according to their country's legislation but common and minimum rights are the same (Walters & Frick, 2000). These include the right to elect safety and health representatives by the workers, paid work time to meet the legal requirements of the role of the representative at their workplace and protection from discrimination, etc. (Walters & Frick, 2000). All of these rights help to facilitate the role of the safety and health representatives to be involved in assisting the company to maintain a high standard of occupational safety and health at their workplace.

The British Health and Safety Commission has overall responsibility for safety and health policies at the national level and supports the employees' having consultation for safety and health. Representatives from all the unions in the industry support the National Joint Safety Committee in Britain. Leopold and Beaumont (1982) surveyed 970 businesses and found that 82% of them had a health and safety committee 44% of which were in existence prior to the introduction of the Health and Safety Act in 1974.

Similar to safety and health professionals, inspectors under the Mine Safety and Inspection Act 1994 (s21) provide guidance to the employer on risk control for workplace hazards and incidents. Inspectors are able to inspect and examine any plants, chemicals and other substances at the workplace and provide relevant information to any person to facilitate compliance with this Act.

There were no publications found that described how legislation affected the work of the safety and health representatives in the Western Australian mining industries. However, in the Queensland coal mining industry the site safety and health representatives worked within legal requirements and used legislation to protect themselves from hostile management actions (Walters, Wadsworth, Johnstone, & Quinlan, 2014).

2.13 Type of Industry Worked in

International studies identify that in occupational safety and health, employee participation is most predominant within manufacturing, production and public sectors because the rates of

work related injuries are high in these sectors. As an example, the highest percentage of occupational safety and health representatives in Britain are found in the energy and water, metal, chemical manufacturing, and transport industries (Walter & Gourlay, 1990). Safety and health representatives are also prevalent in the chemical, metal and public sectors in Italy (Istituto Per Il Lavoro, 2006). Safety and health representatives were also found to be in high numbers in the health care, education and the public sector industries in Australia, particularly where trade union membership was high (Vanderkruk, 2003). Participation of representatives was found to be more predominant in larger than smaller business, according to evidence from studies across multiple countries including Britain (Hillage, Kersley, Bates, & Rick, 2000), Australia (Vanderkruk, 2003), Spain (Garcia et al, 2007), Italy (Istituto Per Il Lavoro, 2006), Sweden (Tragardh, 2008), and New Zealand (Harris, 2010). In larger businesses safety and health representatives often had more adherence to legal rights and were more likely to participate in workplace safety and health decisions compared to smaller business (Walters, 1987; Walters, 1996).

Walters (1987, 1996), Robinson and Smallman (2006) identified that formal employee participation in occupational safety and health is greater in larger than in smaller organisations because they have more resources, a more formal structure and procedures, higher union membership, provide more training opportunities and a larger amount of information is made available for safety and health representatives. In small organisations (less than 10 employees), employees tend to have more interaction and communication with their employer than in large organisations (Walters, 1987, 1996; Robinson & Smallman, 2006). Hence, in larger organisations, it may be more important for employees to have safety and health representatives at the workplace in order to have a formal method of communication about workplace safety and health issues with their employer.

2.14 Trade Unions

Countries that allow trade union participation through industrial relations legislation traditionally have more collective bargaining power for the trade union to compel management to improve employment conditions, including occupational safety and health in the workplace. Trade unions provide support to the employees to participate in collective bargaining internally within the workplace and externally at national, regional and sectoral levels (Walter & Frick, 2000). Trade unions also provide indirect support to employees for workplace safety and health, for improvement of social policy, labour regulations and

regulatory maintenance through political lobbying (Johansson & Partanen, 2002). Commonly trade union representatives in Britain participate in decision making processes related to occupational safety and health legislation at a national level (Ochsner & Greenberg, 1998). In New Zealand, the New Zealand Council of Trade Unions advocated for the introduction of the Health and Safety in Employment Act including the rights of health and safety representatives (Walters, 2005).

Union and employee participation tends to be high and interrelated in high risk environments and larger businesses, because employees are more motivated to join a union and to participate through collective bargaining with the management to protect their interests (Beaumont, Coyte, & Leopold, 1981). A number of studies found that employees' union membership was common in metal manufacturing industries, which are high risk environments and have a greater tendency to implement voluntarily formal occupational safety and health participation (Eaton & Nocerino, 2000; Leopold & Beaumont, 1982).

Trade unions provide a 5 day introductory safety and health training course to the safety and health representatives to enable them to understand how to perform their role. Information is provided on risk management, which may enhance safety and health representatives' knowledge of how to minimise the occurrence of hazards at their workplace and to prevent future adverse incidents (Walters et al., 2001)002E For the Western Australian mining industry safety and health representatives are legally required to attend a 5 day Introductory Health and Safety Representatives course [Mine Safety & Inspection Act 1994 of WA (s60 (7a); (s62 (1) (b))], which is provided by registered training organisations that are certified by the government to provide this training (Aveling, 2014).

One Australian wide union is the Construction, Forestry, Mining and Energy Union (CFMEU). The section of this union, which is relevant to the Western Australian mining industry, is the Western Australian Branch of the Mining and Energy Division. In all capital cities in Australia, CFMEU has offices with the national office located in Melbourne. As of July 2016 the CFMEU had approximately 120,000 members and 400 full time staff and officials (Construction, Forestry, Mining and Energy Union, 2016). In Western Australia, about 98.5% of mining workers do not belong to a union, with the majority of the union members working in the coal mining industry in the south west of the state (CFMEU, 2013).

Research conducted by Walters et al. (2005) in the chemical and construction industries in Britain identified that where most of the employees were union members at the workplace, safety and health representatives had strong union support, which included specific educational programs and information provision to increase their occupational safety and health knowledge and skills. Walters et al. (2005) also reported that the union supported safety and health representatives had more influence over managements' decisions in relation to improving workplace safety than non-union supported representatives. Creighton (1983), Glennon (1987), Biggins and Farr (1988), Rabson (1990), Harris and Beaumont (1993), and Reilly et al. (1995) had similar research findings.

Planek and Kolosh (1994) stated that a unionised safety and health committee in the United States of America includes management and employee representation. In Sweden regional safety representatives had the power to appoint the trade union and act on behalf of small workplaces as long as that workplace had at least one employee who was a member of the trade union (Tragardh, 2008). The use of trade unions was seen to improve workplace hazard risk control particularly in small organisations (Tragardh, 2008).

Walters et al. (2001) research results in the United Kingdom identified that the majority of safety and health representatives receive education for their roles and training from their trade unions. With support from their managers, who allowed paid work time, the representatives, were able to participate in trade union provided training to enhance their effectiveness in performing their roles.

A previous study by Walters (1997) highlighted the importance of the trade union as a training provider for safety and health representatives' education in the United Kingdom. This study examined a whole training programme including documentary materials, which were offered by the trade union in eight countries (Belgium, France, Spain, Norway, Germany, United Kingdom, Sweden, and Italy). The training materials covered the process of risk assessment, hazard identification, workplace safety and health inspections, the roles of safety and health representatives, incident and hazard reporting and so forth, which can increase the knowledge of safety and health of representatives and can impact on their effectiveness at the workplace.

Walters et al. (2001) conducted follow on research in the United Kingdom to examine the significance of the trade union training and education provided for safety and health representatives. They reported that although the majority of the safety and health representatives appointed by trade unions received training from the union there were barriers to access. This was due to policy changes and approaches to worker participation in safety and health in the United Kingdom, as other organisations were now also providing safety and health representative training. Walters et al. recommended that future training standards needed to be improved to develop the safety and health competencies of these representatives, so that they are effective in their workplace safety and health improvement participation. Walters et al. (2001) found that information and training provided by trade unions and support from trade unions from outside of the workplace was very important; in order for safety and health representatives to have the skills to identify hazard and to make risk control recommendations in their workplace. Previous surveys conducted in Australia indicated that safety and health representatives use their union to obtain most of their information about workplace safety and health (Biggins & Philips, 1991; Biggins, Philips, & Sullivan, 1991; Gaines & Biggins, 1992).

A study by Garcia, Jacob, Dudzinski, Gadea, and Rodrigo. (2007) was conducted in Spain. This study recognised the significance of training provided by the trade union to safety and health representatives. Research findings were that representatives receive more benefits from training provided by the union. These authors reported that, “trade union training is more effective than training from other sources” (Garcia, Jacob, Dudzinski, Gadea, & Rodrigo, 2007, p.789) because they teach the representatives how to negotiate, how to put pressure on management for hazard risk control measures to be implemented, where to find additional information about workplace safety and health and that trade union staff continued to act in an advisory capacity.

Sinclair, Martin, and Sears, (2010) stated that trade unions are important workplace stakeholders as they can influence safety policies and procedures through safety and health representatives’ work. Donado (2014) conducted research that identified that non-unionised workers have more fatal injuries than unionised workers at their workplaces. This study used data from the National Longitudinal Survey of Youth, 1979, which contained the interview results of 12,686 American young women and men aged between 14 and 22 years.

Oliver (2014) conducted research that identified that union membership in Western Australia had decreased between 2005 and 2008, and that membership of trade unions had fell from 22.4% to 18.9% per cent of the workforce. Oliver (2014, p. 3) stated that, “statistics have consistently shown that union membership and density is lowest in Western Australia and this is a continuing trend, despite reversals elsewhere”. Oliver (2014) identified in his study that the reasons for the decrease in union membership included demographic changes in the work force. He argued that young people entering the work force experience better workplace conditions than did workers in the years in which the trade unions were formed. Changes in the nature of work with an increase in part time and casual work and shift work were contributory factors as well as the privatisation of industries, staff shifting from public industries to private industries and so on (Oliver, 2014).

As well as workplace safety and health being influenced by safety and health representatives having union membership can be influenced by mining company shareholders expectations that their investment in the mining company will be profitable.

2.15 Shareholder and Expectations

Shareholders buy company shares to make a financial profit and expect a good return on their investment (Kontes, 2010). As such they expect the principal employer and registered mine manager not to make a loss due to a major work related catastrophe. Therefore indirectly shareholder expectations influence the support that the employer provides to safety and health representatives (Kontes, 2010). No published literature was identified related to how shareholders’ expectations influence the role of safety and health representatives in the Western Australian mining industries.

2.16 Management Support

2.16.1 Introduction

Research conducted in Australia by Biggins et al. (1991), Langford et al. (1993), Biggins et al. (1998); by Walters et al. (2001) in the United Kingdom; by Tedestedt (2014) in Sweden and in Norway research conducted by Hovden et al. (2008), identified that cooperation from management can impact positively on the effectiveness of the roles of safety and health representatives in the workplace. According to Hovden et al. (2008) consultation, co-operation and employee representation is a vital part of effective workplace safety and health

in Norway and in other countries in the world. The concepts of employee participation and consultation have been incorporated in the safety and health policy at the workplace of many European countries including the Nordic countries (Hovden et al., 2008).

Managers who actively participated in occupational safety and health generally focused on their legal obligation for workplace safety and valued having a safe workplace, safe work procedures and worker's safety and health (Leopold & Beaumont, 1982; Beaumont, Coyte, & Leopold, 1981; Walters and Nichols, 2006). Studies by Zohar (1980) and Mearns et al. (2001) found that the nature of safety culture is an indicator of management's commitment to safety and safety culture, which can impact on the participation and effectiveness of the roles of safety and health representatives at the workplace. Good communication and safety specific trust, which is one of the corner stones of safety culture, can enhance positive safety outcomes and open communication at the workplace (Mearns et al., 2001).

Walters and Nichols (2006) provided five case studies in the United Kingdom, which showed how management's commitment impacted positively to provide the facilities for occupational safety and health representatives to work effectively in the chemical industries. All of these studies concluded that occupational safety and health representatives were most supported with resources and occupational safety and health training when management was supportive and cooperative. Walters and Nichols (2006) conducted research that focused on examining the effectiveness of workers representation and consultation on occupational safety and health in the context of the United Kingdom's Safety Committee and Safety Representatives Regulations, 1977. This research, conducted in the chemical industries, used a questionnaire based survey, interview and examination of documentation. Senior managers, health and safety managers and advisers, supervisors, safety and health representatives, shop stewards, and manual and non-manual workers participated in this study, with the total number of participants being 349. The age of participants were between 16 years and 65 and above years. Research participants' years of service varied from 2 years to more than 10 years. The research findings suggested that joint arrangements between management and employees through consultation and representation make better outcomes for good safety and health in the workplace.

Watson et al. (2005) research results identified that employees' trust in their supervisors and managers can enhance overall safety at the workplace. This is because honest communication about reporting incidents and hazards in an organisation can impact on the effectiveness of safety and health representatives. As an example, statutory rights are very important for managers and safety and health representatives to maintain a high standard of safety in the workplace and to allow representative participation in workplace safety and health matters. Joint consultation between management and representatives enables managers to understand workers concerns and assists with employees' commitment to a positive safety culture (Nichols et al., 2007; Nichols & Walters, 2009; Walters & Nichols, 2006).

Case study research conducted by Nielsen (2014) examined whether improved safety related interactions between management, safety and health representatives and other workers improved a company's safety culture. This research took place in Denmark in an industrial plant with 229 workers and collected both quantitative and qualitative data. In this company the health and safety committee at each workplace consisted of the company building inspector, production manager, safety manager and two safety and health representatives. The company had five safety groups that each included elected safety and health representatives, supervisors, the safety manager and the production manager. The research results identified that interaction between the safety and health representatives, health and safety committee, and the five safety groups improved the company's safety culture. The company experienced a decrease in the rate of work related injuries and an improved health and safety performance.

Zohar (1980) recognised the importance of communication at workplaces including incident and hazard reporting. Zohar stated that open communication between managers and employees was associated with good safety performance and documented safety specific trust, which is one of the corner stones of safety culture that can enhance positive safety outcomes and open communication at the workplace. Similarly the research results of Cho and Park (2011), found that employees' trust in their supervisors and managers enhanced the overall safety at their workplace, because honest communication about reporting incidents and hazards by safety and health representatives was more likely to occur.

Communication and consultation between workers and employees make a significant contribution to the effectiveness of safety and health representatives in being able to improve workplace safety (Walters & Nichols, 2006; Nichols et al., 2007; Nichols & Walters, 2009; Walter et al., 2014). These authors also reported that statutory rights are very important for managers and safety and health representatives to be able to make safety related decisions through joint consultation and to ensure that the latter were supported in their role (Walters & Nichols, 2006; Nichols et al., 2007; Nichols & Walters, 2009; Walter et al., 2014).

According to Work Health Department of Industries and Business (2000) management is able to utilise the ideas, solution and expertise of all staff at their workplace if management actively promote and encourage two way communication between management and safety and health representatives. Effective communication is part of information sharing, negotiating, training, and listening for overall safety and health management for everyone at the workplace (Work Health Department of Industries and Business, 2000).

Tedestedt (2014) stated that the rights of safety and health representatives are included in legislation and that one of the most important rights is to have cooperation from employers under the Work Environment Act of Sweden. In Sweden, safety and health representatives are entitled to have training in occupational safety and health, which is supported by the management to enhance their effectiveness. Tedestedt (2014, p.43) wrote:

The Work Environment Act states that the employer and employees shall co-operate in the issues regarding occupational health and safety, even if the employer has the ultimate responsibility for occupational health and safety, it is an explicit requirement that the organised work with occupational health and safety is to be conducted together with the employees and their representatives.

Shannon et al. (1997) identified that, according to the beliefs of safety and health representatives, cooperation and safety empowerment from management enhanced their capability to participate in the decision making process about safety at their workplace. Safety empowerment is another dimension that enhances the effectiveness of the role of safety and health representatives at the workplace.

Research by Beaumont, Coyle and Leopold (1982), Beaumont and Leopold (1982), and Jenson, (1997) identified that managers who had occupational safety and health training were more aware of occupational safety and health issues and therefore better understood their responsibility towards safety and health at the workplace as well as to the workers. These managers also valued the participation of safety and health representatives as front line workers who were able to report hazards in their workplace when they occurred; thus allowing the managers to implement risk control measures (Jenson, 1997). For some organisations, researchers Beaumont, Coyle, and Leopold (1982), Beaumont and Leopold (1982) and Jenson (1997) noted that safety and health representatives had higher levels of occupational safety and health training than their managers.

Research by Hillage et al. (2000) and Walters, Kirby and Daly (2001) found that workplace managers were focused on increasing production and failed to implement requests from safety and health representatives for workplace safety related changes. Brun and Loisel (2002) found in their study that the main goals of the occupational and safety practitioners and safety and health representatives were to achieve the central business goal without compromising safety and health at their workplace. Walters (2005) wrote that the ability of the safety and health representatives to influence the strategies and policies of the central management in relation to safety and health at the organisation was weak.

Sinclair, Martin, and Sears (2010), in the Midwestern United States, conducted research with unionised retail workers to address a knowledge gap on whether employee's perception about safety was considered at their workplace. A survey was distributed to union members working in 25 retail chains with the total number of participants being 535. This research identified that the central stakeholders for workplace safety are top management, the immediate supervisors, the workers and their labour union; however, the most important are top management and the workers' immediate supervisors as their actions and activities set the priorities regarding safety and health at the workplace. Sinclair, Martin, and Sears (2010) stated that top management has a major financial interest in safety when safety and health issues signify a huge productivity and financial cost at the workplace. Supervisors may worry about safety at their workplace because safety related issues can slow production and increase costs, particularly if work related fatalities occur (Sinclair, Martin, and Sears, 2010). The next section examines how the actions of top management affect the work of safety and health representatives.

2.16.2 Top management

In Western Australia the top management for each mine is the registered mine manager as this person is in charge of all activities at the mine (MSIA 1994). The mine manager is appointed by the principal employer this may be one person or a group of shareholders. Both the principal employer and the mine manager have the employer responsibilities documented in the MSIA 1994. Among their responsibilities they are to consult and co-operate with the safety and health representatives, who in turn must consult and co-operate with them in relation to workplace and employees' safety and health issues.

A research study on the role of workers' representatives by Walters et al. (2014) identified that some safety and health representatives in the Queensland mining industry had support from their top management to perform their duties, while others experienced conflict with their mine manager when performing their legal duties. Milgate, Innes, and Loughlin (2002) stated that some workplaces adopt safety and health practices to comply with the law in name only, when it is evident that there are often less or even no resources to maintain safety and health. They reported that some organisations include safety and health agendas for every day's management, which demonstrates support and commitment from top management for safety and health at the workplace. This is because top management influences the culture and practices in their organisation and the support that is provided to the safety and health representatives enables them to be more proactive about safety and health issues at their workplace (Milgate, Innes, & Loughlin, 2002).

Beaumont et al. (1981) reported that it was senior management's responsibility to write and approve workplace safety and health policies and procedures as well allocating the resources for occupational safety and health. The senior managers in the Beaumont et al. (1981) research study had determined that occupational safety and health training was not necessary for all managers. This was because, the workplace had designated occupational safety and health advisors who were responsible for providing advice about work related health and safety issues at their workplace.

2.16.3 Middle management

Comcare (2014) documents that the role of middle management in relation to workplace health and safety are to guide, support, and lead employees to know and follow the workplace

safety and health policies and procedures. Middle management have the responsibility to encourage employees to identify workplace hazards, promote and foster consultation and communication with employees through workplace safety and health representatives, and to get feedback from employees. Middle management are to take ownership of health and safety and work with other leaders and colleagues to promote safety and health at the workplace, so that it is part of day-to-day business. Middle management are to be responsible for providing support, equipment, and resources or facilities to the workplace safety and health representatives (Comcare, 2014).

Under the Mine Safety and Inspection Act 1994 of WA (s62) the manager is the person who permits the safety and health representatives to take time away from their normal work commitments (with full pay) to be able to perform their representative duties and necessary education required under s60 (7a). The manager provides the representatives with the information, facilities and assistance to perform their duties and consults with them in relation to any changes to the mine, equipment or products to be used that may affect employee safety or health (s60).

Sheehan et al. (2016) conducted a study on the influence of safety leadership on lead and lag indicators across six different Australian industries including mining. The study used a questionnaire, which was completed by 3,578 employees. The authors identified that safety leadership carried out by middle managers had the most effect on workplace safety practices and having a workplace culture that supported work in relation to occupational safety and health. Sheehan et al. theorised that this was because middle managers had a closer social proximity to the employees they were responsible for and thus were more able to strongly influence employees' behaviour. Therefore, middle managers' attitude and actions in relation to workplace safety, they contended, was the strongest predictor of the organisation's safety climate. These authors found that although top management developed and approved occupational safety and health policies it was middle management that implemented these policies in their workplace. Employees saw middle management as having more authority than their supervisors. Sheehan et al. (2016, p.132) wrote:

The middle management group has a primary responsibility for safety interaction or directions, guidance and advice; safety informing or the reinforcement and communication of the organisation's safety policy; and safety decision-making or the

implementation of safety strategies through planning, resource allocation, and safety improvement.

2.16.4 Supervisor

Supervisors control the day-to-day work in an area (Victorian WorkCover Authority, 2014). They normally allocate work tasks to be performed, ensure employee competency in performing work, provide information, instruction and training in performing the work safely and supervise the performance of the work (Victorian WorkCover Authority, 2014). Safety and health representatives should report the results of their workplace inspections, hazards identified and employee safety and work related health concerns to their supervisor for appropriate action. There is a responsibility for good two-way communication and consultation between the supervisor and the safety and health representative to enable both to perform their work effectively (Victorian WorkCover Authority, 2014).

In Western Australian mining, supervisors normally allocate resources through access to the internet and email, print facilities, allow time for workplace inspections, organise safety meetings, organise over all training for safety and health representatives, monitor incident and hazard investigations and encourage safety and health representatives to communicate effectively regarding the findings of incidents and hazards at the workplace. Supervisors notify safety and health representatives about the inspector's visit and provide opportunities and time to accompany the inspector to conduct an audit at the workplace. They also consult with the safety and health representatives regarding incidents and hazards with proposed controls and so forth (Department of Mines and Petroleum, 2013).

2.17 Safety and Health Professionals

Safety and health professionals include safety and health advisors, ergonomists, occupational hygienists and so on. Safety and health representatives can bring their findings and the concerns of the employees they represent to safety and health professionals for advice and action. They can also assist the safety and health professionals when investigating an accident that has occurred in their workplace (Nilsson & Vänje, 2018). When safety and health professionals provide information and education to safety and health representatives and share a strong two-way communicative relationship both are more effective in their work duties (Biggins & Philips, 1991). Safety and health representatives know the specific hazards and risks in their workplace, but are not responsible for having expert knowledge, solving

problems or implementing risk control measures (Nilsson & Vänje, 2018). Booth, Hale and Dawson (1991), when conducting research on the role of safety practitioners identified that safety practitioners may be of assistance to safety and health representatives when conducting hazard identification as well as helping with other safety and health issues at the workplace.

Safety and health professionals are valuable contributors to the decision making process for the workplace safety committee (Sobieralski, 2000; Wyatt & Sinclair, 1998). There are two types of safety professionals. Employers may recruit safety and health professionals directly or use consultants who give their expert opinion from outside the company (Wyatt & Sinclair, 1998). In Victoria, a safety and health professional can on behalf of the employer's representative be recruited and participate in the safety and health committee to enhance its effectiveness (Victorian Work Cover Authority, 1997).

Titterton, (2018) reported that one of the roles of a safety professional is to engage the safety and health representatives in assisting with developing safe systems of work and to mentor them. Similarly (Nilsson, & Vänje, 2018) saw the role of an occupational safety and health professional as being an educator and knowledge provider to safety and health representatives. Haslam et al. (2016) conducted a mixed methods cross sectional design study with 78 employees completing a semi structured interview and 2,067 employees from 31 organisations completing a questionnaire to assess their motivation, work commitment, health and organisational safety climate. The results of this study identified that one of the functions of the health and safety personnel when developing a positive workplace safety climate was to provide a supportive environment for safety and health representatives.

The work of safety and health representatives is also influenced by their relationship with their co-workers.

2.18 Co-workers

Safety and health representatives are elected by their co-workers under section 56 of the Mine Safety Inspection Act, 1994, of Western Australia; to represent and support the employees in their work area on safety and work related health matters required under section 53 (1). As they are elected by their co-workers safety and health representatives usually feel comfortable talking to their co-workers and have their support in implementing safety and work related health improvements (Walters et al., 2014). This co-worker support may be one of the factors

that contribute to the effectiveness of safety and health representatives with making the workplace and work processes safe (Walters et al., 2014).

Walters and Haines (1988) stated that sometimes safety and health representatives had difficulty in resolving occupational safety and health issues at their workplace because they were unable to influence management. They found that it was easier to gain management co-operation towards resolving workplace safety and health issues if the issues were brought to management's attention with collective co-workers support. Safety and health representatives also receive support from co-workers to identify workplace hazards and suggestions for hazard risk control measures (Beaumont, 1981).

Research by Espluga et al. (2014) identified that the effectiveness of safety and health representatives depends on the interaction between themselves and their co-workers at the workplace. The co-worker's judgements about how capable and proactive the representative is when resolving worker's demands and on how effectively the representative communicates with their co-workers about their activities are also important factors (Espluga et al. 2014).

Menéndez et al. (2009) and Espluga et al. (2014) indicated that a regular and a high level of connection with the co-workers in terms of communication at the workplace and the performance of the safety and health representatives was important. As an example, when safety and health representatives improved their level of occupational safety and health knowledge through training they were able to provide the latest work related health and safety information to co-workers and across the organisation. They were also able to improve their ability in resolving safety and health issues at the workplace, and had better negotiation skills to bargain for improved safety and health conditions for their co-workers (Espluga et al., 2014). This research also identified that co-workers helped to facilitate safety and health representative's roles at their workplace by providing support for the representatives' actions (Menéndez et al., 2009; Espluga et al., 2014).

Sometimes safety and health representatives are appointed by management rather than being elected by their co-workers (Hillage et al., 2000; Hovden et al., 2008; Tragardh, 2008). In this situation the safety and health representatives may, or may not, receive support from their co-workers. If multiple candidates contest for the position of safety and health representatives

at the workplace an election is necessary; however, this is not very common as it can lead to co-workers not being interested in occupational safety and health or in the work of the representatives (Hillage et al., 2000; Hovden et al., 2008; Tragardh, 2008). Johnson and Hickey (2008) reported that sometimes representatives felt frustration when their co-workers were not interested in their own safety and health at work and failed to follow correctly workplace safety and health policies.

The next section reports on how safety and health committees influence the participation in workplace safety and health of the safety and health representatives.

2.19 Safety and Health Committee

Under section 66 in the Mines Safety and Inspection Act 1994 of Western Australia an employee may request the establishment of a workplace safety and health committee for the mine. Then the employer, under section 65, has to form a workplace safety and health committee. Trade unions are not involved with mine safety and health committees in Western Australia.

The safety and health committee: provides an opportunity for the employer and employees to initiate, design, develop and implement a plan for safety and health at their workplace; recommend and inform the employer, mine manager and other employees about the standards, rules and procedures that needs to be followed for safety and health at their workplace; make readily available the necessary safety and health related information; deal effectively with matters referred by safety and health representatives to the safety committee and to perform other functions, with their consent, as prescribed in the regulation or referred to by the mine manager, employees or the employer (s. 63 in Mines Safety and Inspection Act 1994, of Western Australia).

Being part of a workplace safety and health committee is a source of power for the safety and health representative as the members of this committee initiate, develop and implement strategies to ensure the safety and health of all employees at the workplace (Walters et al., 2014). This committee reviews workplace safety performance and sets future directions for improving work safety and preventing employee ill health (Walters et al., 2014). As part of this committee, safety and health representatives interact with workplace managers who have

the authority to finance required resources, control employee rewards, make workplace and work process changes to improve occupational safety (Walters et al., 2014).

Safety and health representatives are able to table items to include on the committee agenda to be discussed (Aickin et al., 2012). Safety and health representatives have the ability to highlight health and safety concerns for their area of work, risk control solutions and to share best practice ideas through the safety and health committee meetings. Safety and health committee meetings allow the members to develop trust in each other, consult, cooperate, work together to enable positive change management strategies to be implemented and to develop networks that cover the organisation so that appropriate ideas can be discussed and implemented organisation wide (Wyatt, 1987; Work Health Department of Industries & Business, 2000; Aickin et al., 2012).

A safety and health professional can be recruited and participate in the safety committee as an employer's representative to enhance the effectiveness of the safety and health committee in Victoria, Australia (Victorian Workcover Authority, 1997).

A study conducted in the manufacturing industries in the United Kingdom by Reilly and Holl (1995) focused on the role played by joint safety and health committees and union appointed safety and health representatives to reduce or minimise the frequency of accidents at the workplace. Data was collected, over the previous 12 month period in 432 small establishments with less than 25 employees, using the 1990 version of the Workplace Industrial Relations Survey (WIRS3). Study results identified that union appointed safety and health representatives and the workplace safety committee jointly were able to reduce the rate of frequency of the workplace injuries more than in companies in which only managers dealt with workplace safety.

Planek and Kolosh (1994) documented that a unionised safety and health committee is recognised as providing guidelines for safety and health at the workplace. Unionised safety and health committees in the United States of America include management and employee representation. Planek and Kolosh (1994) reported that union appointed safety and health representatives and the safety committee working together reduced the frequency of workplace injuries.

Kim and Cho (2016) conducted research to determine the effect of the safety and health committee and union involvement on the number of accidents occurring in manufacturing workplaces in Korea. This study used occupational safety and health survey data from the 2012 Korean Safety and Health Research Institute and analysed a sample of 3000 manufacturing industries. These researchers concluded that the effects of the workplace safety committee and of the union on accidents and reported incidents depended on their interaction with management and other workers regarding workplace safety and health issues. It identified that workplace safety and health committees are an effective mechanism to use to decrease accidents and adverse incidents in an organisation where a union does not exist to protect the workers (Kim and Cho, 2016).

2.20 Workplace Safety Culture

Workplace safety cultures can be both positive and negative and can either facilitate improving workplace safety practices [positive safety culture] or produce barriers to having safety as an organisational value [negative safety culture] (Chiri & Jansz, 2016). No publications were found that explored if having a positive workplace safety culture facilitated the work of safety and health representatives and if having a negative workplace safety culture was a barrier to their effectiveness.

2.21 Section Summary

Section 2 has examined the factors that were reported in the published literature that impact on the participation of safety and health representatives in workplace safety and health. Factors identified included having legislative support, the type of mining industry worked in, union support, management support, co-worker support, society expectations, social policies, economic climate, the labour market, size of the company worked for and safety and health professionals' support. There was no published literature that identified shareholders and stakeholders expectations or on safety culture and how these impacted on the participation of safety and health representatives in the Western Australian mining industry.

The last section of the literature review considers the impact of personal factors on the effectiveness of the work of safety and health representatives.

SECTION THREE

Impact of Personal Factors on the Effectiveness of Safety and Health Representatives

2.22 Introduction to Personal Factors

The second section of the literature review considered information that had been published related to factors that impacted on safety and health representatives' participation in workplace safety and health. This final section of the literature review explores the influence of personal factors on the effectiveness of safety and health representatives' work. More specifically, the manner in which safety and health representatives are affected by their own skills, abilities and perceptions as well as all of the outside factors that can influence their work. Personal factors that impact on the effectiveness of the work of safety and health representative may include, the knowledge of hazard identification and the risk management processes, ability to represent employees on safety and health issues, communication abilities and their interpersonal skills (Brownlie, 2014).

In 2008 research was conducted in Western Australia by Jansz with 60 safety and health representatives, some of who worked in the mining industry. Also included in the study were 9 management staff and 78 safety and health professionals, a total of 147 research participants. This research was conducted through the use of a questionnaire to identify the skills and education required for effective workplace safety and health practices. One of the questions asked was to 'list the skills that you think are required to work as an effective safety professional'. Fifteen responses were related to personal factors. These were being "confident (2), assertive, resilience, pragmatic, approachable, open minded, patience coupled with perseverance, very patient sometimes, diligence, flexible, reliable, easy going personality, sense of humour, having an inquisitive and creative mind" (Jansz, 2008, p.29). The results of this research indicated that personal factors are thought of as a skill that is required for safety and health work, but there were a variety of perceptions as to what those personal traits might be (Jansz, 2008). This indicates that in different workplaces, in different situations, different personal traits may be required for effective work by safety and health representatives. Table 3 includes an analysis of research studies related to personal factors that may affect the work of safety and health representatives. There were very few research informed papers found on this topic.

Table: 3. Personal Factors that Impact on Safety and Health Representatives Work.

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Harris, A., Osen, B., & Walker, J. (2012). New Zealand.	Study purpose was to focus how Safety and Health Representatives (SHRs) enact their role and improve safety and health at workplace under New Zealand law.	Participants were recruited from two metal industries.	SHRs (8), safety and health managers (2), co- workers, line managers, union convenors and other people at the workplace known to influence the work of SHRs (23)	Qualitative, cross- perceptual case study with data collected through semi structured interviews. Interview transcripts were thematically analysed using the Danish National Working Environment Authority's (2002) Impact Ladder.	<u>Limitations</u> Only in Safety & Health roles in metal industries were evaluated. <u>Strength-</u> Comprehensive qualitative data collected added to the body of knowledge about the role of SHRs in New Zealand.	<u>Expertise & Employment Position</u> Identified that the role of the SHRs varied according to their expertise and employment position. In company one Administration SHRs identified hazards by examining accident reports and statistics. They facilitated the accreditation, implementation and operation of their company's OSH management system. Labourer and fitter-welder SHRs identified hazards by observation, worker consultation, activities monitoring and communicated safety information to co- workers. They increased co-worker safety awareness and safety compliance to meet management expectations, even when this was detrimental to employees' health (wearing protective overalls that caused heat stress). Company 2 had SHRs who were problem solver SHRs that worked with co-workers and management to make work processes and the workplace safer. Other company 2 SHRs had expert work process knowledge and provided safety and health guidance in their workplace. It was found that all SHRs in both companies contributed to the improvement of OSH in their workplace, but this may be in different ways, which were influenced by the SHRs expertise and employment position.

Author(s) Publication year. Country	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Jansz, J. (2008). Western Australia.	To identify factors that motivate SHRs and professionals to learn about occupational safety and health and skills required to maintain a high standard of workplace safety and employee health.	Survey was provided to participants who attended the Industrial Foundation for Accident Prevention SHR 5 day introductory course. An email was sent to Members of the Safety Institute of Australia and World Safety Organisation inviting them to participate in completing the survey.	60 SHRs. 9 managers. 78 safety professionals. Total of 147 participants.	Mixed method research with both quantitative and qualitative data collected via a survey. Data was analysed using descriptive statistics (quantitative data) and pattern matching (qualitative data).	<u>Limitation.</u> Convenience sample. <u>Strength</u> Added to the body of knowledge about what motivates Safety & Health Representatives to gain the knowledge to perform their representative duties.	<u>Motivation & Personality</u> The factor that motivated SHRs most was to improve workplace safety and health. Other factors that motivated SHRs was the need for knowledge to be able to do their work, to further their career, because of personal experiences with work related accidents or ill health, to improve business profitability and for personal satisfaction. This research identified that there were a variety (14) of personality types that were considered important to have to improve workplace safety and health.

Author(s) Publication year. Country.	Research Aim	Participant recruitment	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Hall, A., Oudyk, J., King, A., Naqui, S., & Lewchuk, W. (2016). Ontario, Canada.	To identify the methods that Occupational Health & Safety Representatives (OHSRs) used to address safety & health issues in their workplace.	OHSRs in Ontario were invited through multiple media channels; through hard copy invitation cards; through electronic invitations and through OSH Certification and other training sessions offered through the Ontario Workers' Health & Safety Centre.	888 Ontario OHSRs, who worked in a wide variety of industries, completed the survey	Data was collected through a survey. An SPSS 2 step cluster analysis v.11.5.0 was performed for activity questions. Statistics used to analyse survey results were Multivariate regression; Log- likelihood, Schwartz's Bayesian Information Criteria; Multi-level linear regression; Intra-class correlation coefficient.	<u>Limitations</u> Sampling procedure was not random and relied on self-reporting of work impact. <u>Strengths</u> Contained a large number of OHSRs and adds to the body of knowledge about the activities performed by OHSRs.	<u>Differences in performing OHSR role.</u> Survey answers analysis determined that there were 3 distinct clusters of OHSR types. Cluster 1 were called 'Knowledge activist'. These OHSRs were likely to spend more than 20 hours a week (including unpaid hours) in improving workplace safety and attempted the most changes and innovations. They built relationships with managers, supervisors and co-workers to be able to achieve change. Through committee meetings, inspections and writing reports they used their knowledge to gain allies, challenge unsafe working conditions, and make positive OHS changes, even for high cost and complex issues. Cluster 2 OHSRs were newer representatives who spent very little paid and unpaid time on their representative work. Their main activities were self-education, conducting research, attending meetings, organising and interacting with workers. They rarely interacted with managers. Cluster 3 representatives, who were called 'Technical legal activist' spent the most time delivering HS education to co-workers & organising worker support for OHS matters. Strongest predictors for success in performing effective OHSR work were individual commitment, positive perceptions of management support and having paid time for representative work.

2.23 Specialised Role

Brun and Loisel (2002) identified in their study that a, “specialised role” provides specialised knowledge to the people in that role to enhance their abilities to perform similar work. Employees who have worked for many years in mining with the same co-workers and for the same company have information and expertise power through their understanding of the work processes and the people that they work with (Lundgren & McMakin, 2013). Research conducted in New Zealand by Harris (2010) discovered that

one of the key sources of power and influence for the HS representative is their expert knowledge. HS representative are likely to derive their expert base from a combination of sources including their formal skills and qualifications, recognised job competencies, workplace experience and OSH knowledge. (p. 37)

2.24 Education in Workplace Inspection, Risk Assessment, Risk Management Processes and Accident Cause Analysis.

Elected safety and health representatives working in the Western Australian mining industry under the MSIA 1994 s62 are entitled to attend a 5 day Occupational Safety and Health Representatives course that is accredited under section 14(1) (h) of the Western Australia Occupational Safety and Health Act 1984, to learn about how to perform the functions of their role. In this accredited course the representatives are provided with information about how to

apply knowledge of legislation in the role of a Safety and Health Representative, conduct workplace inspections and investigations, communicate information on safety and health matters, effectively represent employees on safety and health issues, resolve conflict and issue Provisional Improvement Notices (PINs), identify hazards and apply risk management processes. (Aveling, 2014, p. 31)

Being educated on risk assessment and the other factors noted above should enable safety and health representatives to work more effectively with their mine managers and to promote a safe and healthy workplace and work processes. Mine managers must notify the safety and health representative about any hazards that do arise, or

may arise, at the mine related to employee safety and health, systems of work, equipment and products used and the workplace and work processes. They must also report any changes proposed to be made to the mine that may affect the health or safety of employees in the area that they represent and any accidents that do occur in the representative's place of work in the area that they represent (Mines Safety and Inspection Act 1994, s 60).

Safety and health representatives may continue to gain more occupational safety and health knowledge after completing the 5 day introductory course to increase their expertise (Bahn & Barratt-Pugh, 2012). They may attend additional educational opportunities to keep up to date with the latest information and to gain additional safety and health knowledge, or be mentored by a safety and health professional to gain additional knowledge in order to be more effective in improving workplace safety and health (Langford et al., 1993). Safety and health representatives' effectiveness at their workplace is enhanced when management provide them with sufficient time and financial support to gain basic and additional occupational safety and health knowledge (Milgate, Innes, & Loughlin, 2002).

Safety and health representatives can obtain expert power from a combination of sources that include formal qualifications and skills, work competencies, workplace knowledge and work experience (French & Raven, 2001; Hall et al., 2006; Walters & Frick, 2000). Leopold & Beaumont (1982) wrote that management are often keen to share decision making power if they notice their employees have good knowledge and skills in workplace safety and health through the completion of educational courses and qualifications.

Brownlie (2014) recognised that knowledge of hazard identification, risk management processes, ability to represent employees on safety and health issues, communication abilities and interpersonal skills was an expertise power. Western Australia mining safety and health representatives have power through their personal knowledge and experiences of hazards in their area of work and expertise in work processes. These personal skills of safety and health representatives can be updated by training and can impact positively on their effectiveness at the workplace (Brownlie, 2014).

2.25 Knowledge of the Workplace, Work Processes and People

To be a safety and health representative for an underground mining area, an employee must have worked as an underground miner for at least 12 months before being eligible for election (MSIA 1994, s56). For other areas, the employee just needs to be employed to work in the area that they represent.

Factors that may influence the effectiveness of a representative may be the length of time they have worked in their area (Jian & Jansz, 2010). Longer serving employees may have a more comprehensive knowledge of the workplace, work processes and people, which may enable them to be better at identifying hazards and have more influence over the people that they work with in relation to safety and health practices (Jian & Jansz, 2010).

2.26 Interpersonal Power, Consultation and Communication

Interpersonal power comes from a person's "ability to read and understand people and situations at work and to translate that knowledge into goal-directed influence over others" (Treadway et al., 2013, p. 1531). According to Antonsen (2009) interpersonal power also comes from a person's ability to form friendships, build strong coalitions with co-workers, managers and other relevant people in the workplace for mutual beneficial outcomes and to be perceived as being competent in their work. The author writes that safety and health representatives with strong interpersonal power are more likely to be able to positively influence workplace safety. Antonsen (2009, p.185) also wrote "charisma, energy, political skills and verbal facility are among the individual characteristics that constitute a source of power".

A person's individual reputation, goodwill and smartness are powerful factors that influence people (Pfeffer, 1992). Interpersonal power is related to skills in consultation and communication, the ability to use language, interact with others, develop alliances and networking (Robbins, 2017). Safety and health representatives with strong interpersonal power are more likely to influence workplace safety in a positive way (Comcare, 2014).

Safety and health representatives with good interpersonal skills may be more effective in consulting and communicating with employees and managers in their workplace (Treadway et al., 2013). Consultation between managers, workers, safety and health representatives, other stakeholders (internal and external) and occupational safety and health advisors can resolve health and safety issues which in turn promotes healthier and safer workplaces (Comcare, 2014).

Espluga et al. (2014) stated that co-workers' support for safety and health representatives depends on their judgements as to how capable and proactive the representative is in resolving workers' demands and in communicating with their co-workers about workplace safety and health.

2.27 Influential Powers

Dahl (1957) [cited in Antonsen, 2009, p. 185] defined power as the "individual's ability to carry out their will in a given situation." Lukes (2005) [cited in Antonsen, 2009, p. 186] defined power as promoting people "to have the desires that you want them to have." Power is the ability to influence people in the workplace and it comes from eight major sources which are 'position power', 'information and expertise', 'control of rewards and resources', 'coercive power', 'alliances and networks', 'personal power', 'access to and control of agendas' and being part of a dominant group (Antonsen, 2009).

Harris (2010) reported that sometimes different interest groups attempt to promote their agendas through political processes, which could influence decision making in an organisation. Dawson et.al. (1984) stated that a person can establish a personal relationship with the management through his or her personality, which is an advantage and strength that can be used to enhance her or his workplace safety agenda. This could be form a coalition with individual managers to get support for the safety and health representatives to improve safety and health at their workplace. The charm and approachability of representatives may encourage other employees to support their role or activities in maintaining safety and health at the workplace (Harris, 2010.)

A cross sectional study using a questionnaire was conducted by Wohrle et al. (2015) to investigate if trust existed between the majority of employees or only between a minority of employees at a workplace and examined if this was affected by different personality traits. Participants were 439 people who worked in the Netherlands in a wide variety of industries and employment positions. A 5-point Likert scale was used to measure each person's behaviour and a multi group latent mean analysis (LMA) in AMOS was undertaken to analysis the data. The results identified that having different cultures and backgrounds of staff at workplaces resulted in more trust in the organisation, supervisors and colleagues. Wohrle et al. (2015) found that people with social initiative, flexibility, open-mindedness and cultural empathy can build a trusting relationship between the group and other people at their workplace. This study concluded that trust is multidimensional in terms of people's cultural background and individual differences.

Anderson et al. (2012) conducted research with 1,141 participants to understand what personal power was. There were 5 sub studies that together comprised the main study. Research data was collected through a questionnaire and the answers analysed for each sub study. All sub studies involved either undergraduate or post graduate students. This research concluded that power was the "ability to control joint decisions" (Anderson et al., 2012, p. 316), "influence others' behaviour" (p. 317), "shape others' internal states" (p. 217) and to "satisfy one's own desires" (p. 317). As safety and health representatives are representing their co-workers on workplace safety and health matters they would need these skills.

Other findings of Anderson et al. (2012) were that power is a social relationship that can be influenced by a person's personality and how close, accepted and connected they are to other people in their workplace. The research identified that "the personal sense of power was related to generosity in one's relationships, care of the under privileged" (p. 336), that "prosocial people often attain higher power in groups" (p. 336) and that a personal sense of power correlated positively with being an extrovert, being conscientious, open and having high self-esteem. The results showed that people who believed that they had power behaved in more effective ways that increased their power. As well as being influenced by personality Anderson et al. (2012) research results showed that power was influenced by social structure.

Safety and health representatives have powers through legislation to be able to do their work. Anderson et al. (2012) research results identified that people with power had higher self-esteem, were more assertive, had more positive and less negative experiences and had better physical health. People who lacked confidence had less power (Anderson et al., 2012). This research found that the higher the status of the person, the more likely people were to be influenced by the person and to listen to what they had to say (Anderson et al., 2012).

2.28 Position Power

The position power of safety and health representatives comes from sections 53, 31, 58, 60, 62 and section 70 of the MSIA 1994. Representatives may also have position power from their employment position role (Watterson et al., 2014). The source of legitimate position power of an employee could be their election to a position or an individual appointment through a specified formal process (French & Raven, 2001). When an employee becomes a safety and health representative for a workplace through a specified formal process or election, their legislative rights allow them to access the resources and information about occupational safety and health at the workplace as well as to participate in occupational safety and health activities (Menendez, 2009).

Dawson et al (1984) stated that safety and health representatives can use their position power in two ways. One, as an employee, they have the right to a safe workplace and work processes, and (2) they can perform their role as a safety and health representative and use this position's power in relation to workplace safety and health matters that include workplace inspections to identify work related hazards and being part of an accident investigation team.

2.29 Motivation and Expertise

Sixty Western Australian safety and health representatives who were completing a five day legally required introductory safety and health representatives' course at the Industrial Foundation for Accident Prevention were asked in a questionnaire what motivated them to want to be a representative and learn about improving workplace safety and health (Jansz, 2008). Some representatives provided more than one

answer. The most common answer (48 responses [80%]) was that they wanted to improve occupational safety and health for themselves and for their co-workers, be able to stand up for their work mates and to encourage people to look after each-others well-being (Jansz, 2008).

The second most common response was that the representatives wanted the knowledge to be able to do their work effectively (22 responses, [37%]). Sub themes were that representatives felt that they needed to know the legal responsibilities for themselves, other employees and their employer. They wanted to have the knowledge to back up what they said when conducting their representative work in the workplace and in committee meetings so that they could contribute to making their workplace and work colleagues as safe as possible. They also wanted to improve their communication, problem solving and negotiating skills to enable them to work more effectively, to be a discipline leader and be able to convince everyone in the workplace that safety is an important organisational value (Jansz, 2008).

For other safety and health representatives the main motivation for learning about workplace safety and health was to further their career and make their employer want to retain them (11 responses [18%]). Four representatives were motivated due to having experienced, or witnessed, work related injuries or ill health. Another four representatives were motivated to learn about occupational safety and health to improve business profitability by saving the time and costs involved when occupational injuries or illnesses occurred and decreasing the number of workers' compensation claims. Two representatives were motivated to learn to achieve personal satisfaction, as having a positive safety culture was a company value (Jansz, 2008).

Of the safety and health representatives 4 (7%) were not motivated to learn about working more effectively. They were representatives because no one else in the workplace wanted the position (2), to keep busy (1) and to be able to eat cream biscuits (1). It was identified by Jansz, (2008) that there were many personal factors that influenced representatives to want to have information and expertise power, and that not all of them were motivated to obtain this.

Antonsen (2009, p. 185) wrote “to control knowledge or information that is crucial to the organisation is an important source of power”. Employees who have worked for many years in mining with the same co-workers and for the same company have information and expertise power through their understanding of the work processes and the people that they work with (Lundgren & McMakin, 2013).

One of the reasons that employee inspectors are no longer part of the Western Australian mining industry workforce is that they were not provided with occupational safety and health training while safety and health representatives were. The 5 day training course for their roles as representatives provided these employees with more information about, and expertise in, hazard identification, risk assessment, accident investigation, workplace inspections and an industry specific knowledge of the health and safety functions that they are legally allowed to perform than the check inspectors had (Gilroy & Jansz, 2014). This was because the check inspectors were not legally required to attend any workplace safety and health educational course (Gilroy & Jansz, 2014).

2.30 Coercive Power

Antonsen, (2009, p. 185) wrote “coercive power is closely connected to control over sanctions as it rests on the ability to constrain, block, interfere or punish.” As a final action, when there is a dangerous situation in a workplace that the employer (often through a workplace manager) refuses to make reasonably safe trained safety and health representatives in the Western Australian mining industries can issue a Provisional Improvement Notice (PIN) to their employer.

Safety and health representatives who have completed the training required in the MSIA 1994, can issue a Provisional Improvement Notice (PIN) that requires a breach of the MSIA 1994 or a breach of the Mine Safety and Inspection Regulations 1996 to be corrected (s 31) by the date set by the representative. Before using the coercive power of issuing a PIN the representative is legally required to consult with the person that they intend to issue the PIN to and with another safety and health representative in the workplace, if this is practical. The representative must also provide a copy of the PIN to the mine manager who must display the PIN in the relevant workplace and include a copy of the PIN in the record book for the mine

2.32 Leading and Lag Indicators.

Leading and Lagging indicators are used to measure a company's safety and health performance (Nicholas, 2010). Leading indicators focus on the proactive approach to occupational safety and health at the workplace by management and are an indicator, or a predictor, of root causes of incidents as well as the occupational safety and health performance (Sinelnikov, Inouye, & Kerper, 2015). Leading indicators, also called positive performance indicators, can be defined as, "measures of the positive steps that organisations and individuals take that may prevent an OHS incident from occurring" (Cieri et al., 2015, p. 16). Some examples of lead indicators include: education (such as the number of managers who have completed safety leadership training, ICAM incident investigation training, first aid competence and the number of employees who have scaling competencies, light vehicle safety driving competencies, working safely at height competencies); number of risk assessments conducted per month; number of safety task observations completed; employees compliance rate to pre-shift drug and alcohol blood level testing; number of pre-start inspections conducted; number of personal CONTAM monitoring activities conducted; number of safety and health audits conducted per site per year; comprehensive; ness of incident investigation activities; number of underground emergency drills conducted and the number of corrective actions taken when opportunities to improve workplace safety has been identified (Barminco, 2018; Lunsford & Young, 2017).

The Chamber of Minerals and Energy Western Australia (2004) has divided leading indicators into three main types. The first is the measurement of *Input Activity Measures* with examples of this type of positive performance indicator in the Western Australian mining industry being the number of Job Safety Analysis conducted and recorded, the number of employees who have attended emergency management training and the number of safety inspections completed. The second type of leading indicators are *Process Focused Measures* with an example being monitoring manual handling tasks performed by employees to ensure that risk control measures recommended to be used in the workplace are effective. The third type of leading indicators positive performance measures (PPM) are *Output Action*

Plan Measures. The following is an example of output action plan leading indicator measures from The Chamber of Minerals and Energy Western Australia (2004, p. 5):

If an occupational health and safety management plan (OHSMP) objective is set as “all supervisors are required to attend OHS training”, then the performance indicator is *actual* attendances recorded, measured, and reported as a percentage.

Lagging indicators, also called trailing indicators, measures failures that have occurred in workplace safety or employee health management (Nicholas, 2010). Cieri et al. (2015, p. 18) said, “lagging indicators are outputs and provide a measure of past performance.” Examples are the number of employee work related illnesses and accidents, workers’ compensation costs, number of non-conformances with legal requirements and incident frequency rates (Pawlowska, 2015).

The following Table 4 provides information on publications that describe research results related to the use of lead and lag indicators to measure workplace safety and health practices effectiveness.

Table: 4. Lead and Lag Indicators

Author(s) Publication year. Country	Research Aim	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Sinelnikov, S., Inouye, J., & Kerper, S. (2015). United States.	Aim was to advance knowledge on the use of leading indicators to measure organisational occupational safety and health.	2 OSH practitioners from the public sector, 13 from private industry, 2 researchers, 18 OSH managers.	A semi structure questionnaire was used for a 3 hour focus group discussion on the research topic by 15 OSH practitioners and 2 researchers. Qualitative data was analysed using pattern matching and used to develop a questionnaire. A questionnaire was sent to company OSH managers who were asked to complete an online survey through Survey Monkey within a 2 week period. 18 surveys were completed. Questionnaire results were analysed using bivariate correlation analysis using Spearman's rho coefficient for nonparametric data.	<u>Limitation-</u> The convenience survey sample was small and included mostly representatives from large companies. <u>Strength-</u> The topic was explored with safety professionals from a wide variety of industries.	OSH leading indicators were used to predict & prevent adverse outcomes, to develop a proactive OSH culture that was solution driven, to make decisions on OSH matters & to improve company OSH performance. To include leading indicators in the company OSH management system required leadership commitment, engagement, understanding and support as well as company-wide communication of leading indicator results and provision of performance incentives. Data analysis identified that both leading and lag indicators were required to measure organisational OSH performance and that leading indicators must have a clear focus to be used effectively. OSH lag indicators are still the most used indicator by companies.

Author(s) Publication year. Country	Research Aim	Study population.	Research methodology and data analysis	Research Limitations/ Strengths	Key findings
Pawłowska Z. (2015). Poland.	To determine what types of indicators were used for OSH measurement by companies with various levels of OSH performance.	60 companies, 50% of which employed more than 250 workers.	Questionnaire in the use of OSH performance indicators was completed by a company representative. Company self- assessment was confirmed by OSH management system consultants. Data was analysed using descriptive statistics, Kendall's rank correlation coefficient, chi- square, Goodman & Kruskal's tau, Pearson's correlation coefficient and the Mann- Whitney U test.	<u>Strengths</u> People from many different industries participated in this research providing a broad application for the findings. <u>Limitation-</u> Only examined companies in Poland.	Lag indicators are required by law to be reported to the Regulator and are also required to be reported to the company insurer. Higher OSH performing companies, and above 50% of low performing companies, used more than 4 types of lag indicators to measure their OSH performance. Leading indicator monitoring was conducted by 46% of high performing companies and 5% of low performing companies. Companies that used more indicators for monitoring OSH had a higher level of workplace safety.
Payne, C., Bergman, E., Beus, M., Rodríguez, M. & Henning, B. (2010). USA.	To identify if safety climate is a lead or a lag indicator.	Review of published literature only.	Literature review that analysed 56 research based publications using pattern matching.	<u>Strengths-</u> Reviewed a large number of publications on the topic. <u>Limitation-</u> Only examined one factor as a lead or lag indicator.	Determined that safety climate has been used as both a lead and a lag indicator of workplace accidents and injuries, but there was more evidence in published literature that safety climate was a lead indicator.

Author(s) Year. Country	Research Aim	Study population.	Methodology & data analysis	Research Limitations/ Strengths	Key findings
Nicholas, D. (2010) Australia and Off- shore.	To determine an indicator to use to measure OSH performance with a focus on preventing, or at least identifying adequacy of controls, for major accident events.	8 Safety Professionals with over 25 years of offshore experience working in mobile offshore drilling from a variety of locations around the world provided case studies of their experiences in the use of leading and lag indicators and accident analysis.	Systematic review of published literature on the topic was conducted. 58 publications and 8 case studies were analysed to determine effectiveness of the use of leading and lag indicators.	<u>Strengths</u> Use of case studies provided from a variety of locations in the world, as well as a comprehensive analysis of peer reviewed published literature on leading and lag indicators. <u>Limitations</u> Only examined the use of lead and lag indicators in the offshore drilling industry.	Lag indicators are a reactive measurement of the failure of accident prevention strategies & mainly reflect personal injuries, but not process safety failures, which can cause major accident events. There is often under reporting of lag indicators. Reported lag indicators show trends, effectiveness of current risk control measures & identify opportunities for improvements when accident analysis is conducted. Leading indicators show safety management strategies used proactively to prevent work related accidents and employee ill-health. Need to use both indicators as the lag indicators show what has happened in the past and leading indicators show current safety and health management strategies used.
Sheehan C., Donohue R., Shea T., Cooper, B. & De Cieri H. (2016). Australia.	To identify if there is an association between lead & lag indicators & if safety leadership affects these indicators.	3,578 employees from 66 workplaces. Mining. Arts & Recreation. Gas, Electricity, Water & Waste Services. Construction. Transport, Postal & Warehousing. Health & Community Services employees.	Quantitative research. Participants answered survey questions. Data analysed using multilevel modelling & regression analysis.	<u>Strengths</u> Identifies the importance of middle management in workplace safety and the association between lead & lag indicators & safety leadership. <u>Limitations</u> Only looked at medium & large organisations. Small (> 100 employees) not included.	Higher level of workplace leading indicators resulted in fewer unreported lag indicator incidents. This was influenced positively by safety leadership from middle management. Researchers concluded that managers who prioritise safety create a culture where the use of leading indicators reduce lag indicators and encourage a safety related reporting culture.

2.33 Summary of Published Literature on Safety and Health Representatives.

This literature review has identified that the history of the role of the development of legislation related to safety and health representatives is well documented (Brooks, 1987; Ochsner & Greenberg, 1998; Adams et al., 1999; Milgate et al., 2002; Walters, et al., 2014; Bennett, 2015). The duties that the Safety and health representatives are required to perform are included in legislation, for example, in the Western Australian Mine Safety and Inspection Act 1994. Published literature (Johnson & Hickey, 2008; Hoven et al., 2008; Harris, 2012; Espluga et al., 2014) has been identified that describes the benefits of the work performed by workplace safety and health representatives.

Factors that impact on the role of safety and health representatives were identified as: legislation support (Menendez, 2009; Harris, 2010; Walters & Nichols, 2006; Tedestedt, 2014); union support (Walters, Kirby & Daly, 2001; Johansson & Partanen, 2002; Walters, 2005; Garcia, Jacob, Dudzinski, Gadea, & Rodrigo, 2007; Donado, 2014); management support (Walters and Nichols, 2006; Hovden, Lie, Erik Karlsen & Alteren, 2008; Cho and Park, 2011; Tedestedt, 2014); co-worker support (Johnson & Hickey, 2008; Menéndez et al., 2009; Walters et al., 2014; Espluga et al., 2015); being a member of the workplace safety and health committee (Aickin et al., 2012; Reilly, et al., 1995; Kim & Cho, 2016); the economic climate (Sedano et al., 2014) and society expectations (Hopkins, 2000). The type of industry worked in (Walter & Gourlay, 1990; Hillage, Kersley, Bates, & Rick, 2000; Vanderkruk, 2003; Garcia et al, 2007; Tragardh, 2008) and the support of safety and health professionals (Biggins & Philips, 1991; Booth, Hale and Dawson, 1991; Sobieralski, 2000) also influenced the work of safety and health representatives.

Personal factors that influences the effectiveness of safety and health representatives reported in the published literature were found to be: the person's motivation and personality (Jansz, 2008; Anderson et al., 2012); workplace knowledge (Harris, Osen, Walker, 2012; Lundgren & McMakin, 2013); employment position (Antonsen, 2009; Harris, Osen, Walker, 2012; Anderson et al., 2012; Watterson et al., 2014); the level of occupational safety and health education (Milgate, Innes, & Loughlin, 2002; Bahn & Barratt-Pugh, 2012); interpersonal skills and ability to represent their co-

workers for workplace safety and health issues (Treadway et al., 2013; Brownlie, 2014) and their influential powers (Dawson et.al., 1984; Antonsen, 2009; Anderson et al., 2012).

While there is information published about safety and health representatives there are gaps in the published literature on information about their work in the Western Australian mining industry.

2.34 Gaps in Knowledge Identified

For safety and health representatives who worked in the Western Australian mining industry there was no published literature found related to how management worked with the representatives and if their interaction was positive or negative. Although the role of safety and health representatives is defined in legislation, no published information was identified for the Western Australian mining industry about their actual power to influence safety and employee health in their workplace and what strategies used by these representatives were effective.

This research was required to provide information to fill these gaps in knowledge as in Western Australia there was a change in government in 2017, which in 2018 called for a review of the existing workplace safety and health legislation. New occupational health and safety legislation is expected to be implemented for the Western Australian mining industry in 2019. Findings of this research will be provided to the government to use to ensure that the role of the safety and health representatives in the Western Australian mining industry is as effective as possible. The next section of this report describes the methods used to conduct research to provide information related to these knowledge gaps in the published information.

3. RESEARCH METHODOLOGY

3.1 Introduction

The scope of this research was to look into the influence of occupational safety and health representatives in the Western Australian mining industries and to evaluate the effectiveness of their inclusion in promoting a high standard of workplace safety and health. The aim of this research was to identify what influence and support safety and health representatives have in the Western Australian mining industries to facilitate the achievement of a high standard of workplace safety.

This chapter provides a description of the research methodology and includes the research setting, subjects, method of data collection, analysis of data and the ethical considerations that have guided this research. A phenomenological method approach was chosen for this research, as it was the most relevant design to meet the research aim and answer the research questions. Phenomenology research is a qualitative research method.

3.2 Qualitative Research

“Qualitative research is an approach to scientific inquiry that allows researchers to explore human experiences in personal and social contexts, and gain greater understanding of the factors influencing these experiences” (Gelling, 2015, p. 43). There are five types of qualitative research, which are:

- Phenomenology - It describes the people’s lived experience and the meaning of that experience (Yin, 2016).
- Grounded theory - In this theory, “concepts and theory emerge through a process of constantly comparing the data, generating questions to explain behaviour and testing these with further data collection” (Harris, 2015, p.33).
- Ethnography - It focuses on sociocultural phenomena to explore the cultural groups and culture in a specific community (Gelling, 2015).
- Case study - The case study approach is mainly useful to study a particular issue, event, or phenomenon of interest in a real life context (Kurdve et al., 2015).

- Historical - “The collection and evaluation of data related to past occurrences in order to test hypotheses concerning causes, effects, or trends of these events that may have an effect on current and future events” (Bakker, 2012, p. 74).

The main features of the qualitative research described by Yin (2016) are:

- Qualitative research represents the views and perception of the participants.
- Focuses on people’s life within a context, which is social, institutional or environmental.
- A characteristic of qualitative research is studying the meaning of an individual’s or a people’s life under real world conditions.
- Is determined by a desire to explain events through existing or evolving concepts.

In this research, open ended questions were created and provided to the participants (safety and health representatives) to collect data about their own experiences in the workplace. This research was designed to answer the following three questions:

- What support does workplace management provide to safety and health representatives in the Western Australian mining industries to enable them to work effectively in promoting occupational safety and health?
- What power and methods do safety and health representatives in the Western Australian mining industries use to influence the achievement of a high standard of health and safety in their workplace?
- Which strategies are used in the workplace by safety and health representatives to maintain the highest level of workplace safety and health according to leading and lag indicators?

3.3 Phenomenological Theory---A Methodological Approach.

The Phenomenological research method was used to gain an understanding of the experiences of safety and health representatives in their role and the outcomes of using their influence and powers in relation to workplace safety and employee health.

The Phenomenological research method was formulated in Germany in the late 1880s and it explores the lived experiences of people and the underlying meaning of their experiences through the provision, analysis and interpretation of participants’

narrative stories (Patton, 1990; van Manen, 2015; Rossman & Rallis, 1998; Creswell, 2009). Yin (2016) documented that, phenomenological studies emphasised interpretive analysis to capture the exclusivity of events. Yin (2016) stated that, a phenomenological study was not only concerned with attending the events, but it also studied the socio cultural, political, and historical and other contexts around the events or people's life. Phenomenological studies attempt to describe the life experiences in the participant's own words and gather the experiences from a variety of people (Yin, 2016).

According to Patton (1990), the goal of a phenomenological study was to identify the essence or variation of a particular experience. Patton (1990, p. 71) wrote that "a phenomenological study is one that focused on descriptions of what people experience and how it is that they experience what they experience." Patton (1990) recorded that the major data source of phenomenological study is the interview, and that the purpose of the interview is to collect or find out the differences in people's minds.

Phenomenology was described by Langdrige (2007) as a qualitative method, which focuses on people's experience as a subject in its own right. Langdrige (2007, p. 4) wrote that the aim of Phenomenology was to "to focus on people's perceptions of the world in which they live in and what it means to them; a focus on people's lived experience." Phenomenologists are interested in people's lived experiences and the meaning of those experiences.

Finlay (2011) documented that in phenomenological research, measures that need to be focused on are:

"The lived experience and meaning" (Finlay, 2011, p.17): - The aim is to describe an event, situation, or process through people's everyday experience which is called "phenomenon".

"The use of rigorous, rich, resonate description of lived experience" (Finlay, 2011, p.17): - This process seeks a full description of people's life experience using a systematic method on a particular issue or matter.

“A concern with existential issues” (Finlay, 2011, p.19): - Phenomenological research is concerned with existential issues or matters which focus on human concerns relating to life.

“The assumption that the world, body, and self are connected together.” (Finlay, 2011, p.21) - Phenomenological research focuses on the principle that we are part of the world (Finlay, 2011).

“The application of the phenomenological attitude” (Finlay, 2011, p.23): - The aim of phenomenological attitude is to link immediately with the world as it is experienced.

“A potentially transformative relational approach” (Finlay, 2011, p.24): - This indicates a relational process that applies to the researcher and participants engaging in the research.

There are two types of approaches to phenomenology; these are descriptive and interpretive. Edmund Husserl developed descriptive phenomenology and Martin Heidegger developed interpretive phenomenology (Connelly, 2010). Descriptive phenomenology was known as transcendental phenomenology (Spinelli 2005) and interpretive phenomenology was known as hermeneutic phenomenology (Langdridge, 2007; Crowther, 2016).

After the establishment of descriptive and interpretive phenomenology by Edmund Husserl and Martin Heidegger, other methodologists and philosophers became involved and added their ideas (Sloan and Bowe, 2014). For example, Max van Manen further developed the hermeneutic approach and focused on language, as he considered language a very important part of the interview process to understand the experiences of participants in the research as well as to clarify “phenomena” in the different fields of pedagogy (Langdridge 2007). van Manen (2007, p. 13) writes: “We have questions of how to act in everyday situations and relations. This pragmatic concern I will call the *phenomenology of practice*.” van Manen (2007 p.13) further wrote that, all phenomenology is concerned with “the practice of living”.

There are some differences between interpretive phenomenology (hermeneutic) and descriptive phenomenology. Reiners (2012) showed this difference in his study

when data was collected from two selected peer reviewed nursing articles based on descriptive phenomenological philosophy by Husserl (Papp et al, 2003), and interpretive phenomenological philosophy by Heidegger (Sidczak, 2007). Data was analysed by a systematic review of the articles. Reiners (2012) recorded that the main focus in the interpretive phenomenology developed by Heidegger was the relationship between the world and the individual. Heidegger wrote that people were not separated from the world (Sidczak, 2007). Their realities and life experiences were influenced by the world in which people or individuals live. The main focus in the interpretive phenomenology developed by Heidegger was being-in-the-world, which was different from the descriptive phenomenology developed by Husserl. Reiners (2012) came to the conclusion that the choice between using either Husserl's descriptive or Heidegger's interpretive phenomenology is very important to the reliability of the proposed research and that researchers need to make a decision according to the research aim and approach required to achieve this.

To provide an understanding of the reality of safety and health representatives' experiences, the phenomenological research method was the most appropriate method to use as it is "grounded in people's experiences of social reality" (Gray, 2013, p. 24). The purpose of phenomenology is to realise the principle of everyday experiences of individuals in the world. To assess the different experiences and the role of the safety and health representatives in Western Australian Mining industries, hermeneutic phenomenology was considered the best approach to use for this research as there was a need to interpret their lived in experiences.

This method enabled safety and health representatives to describe their work experiences and to reflect on the factors that assist and hinder them in performing their role effectively in the promotion of workplace safety and employee work related ill health prevention (Van der Zalm & Bergum, 2000). An advantage of using this method of research is that hermeneutic phenomenological research allows new information and meanings to emerge that can achieve significant advances in understanding the workplace experiences from the point of view of the safety and health representatives and what they consider is required to make their role effective (Gray, 2013).

This phenomenological hermeneutic approach allows the experiences of the occupational safety and health representatives working in Western Australian mining industries to be understood. van Manen (2007) described six elements of the hermeneutic process. These are:

- Turning to a phenomenon or lived experience of individuals.
- Individual's or participant's lived experiences are investigated.
- Researchers reflect on the vital themes of the phenomenon.
- Unfolding of the phenomenon by the researchers through writing and rewriting.
- A solid and oriented relation to the phenomenon is continued.
- The research setting is balanced by allowing for each part and the whole (Heinonen, 2015).

All of these elements above were applied in this research as the researcher interviewed the participants and asked for their experience as an occupational safety and health representative in their work place. Themes were extracted from the data collected from interviews with the participants. NVivo version 11 was used to identify the common themes.

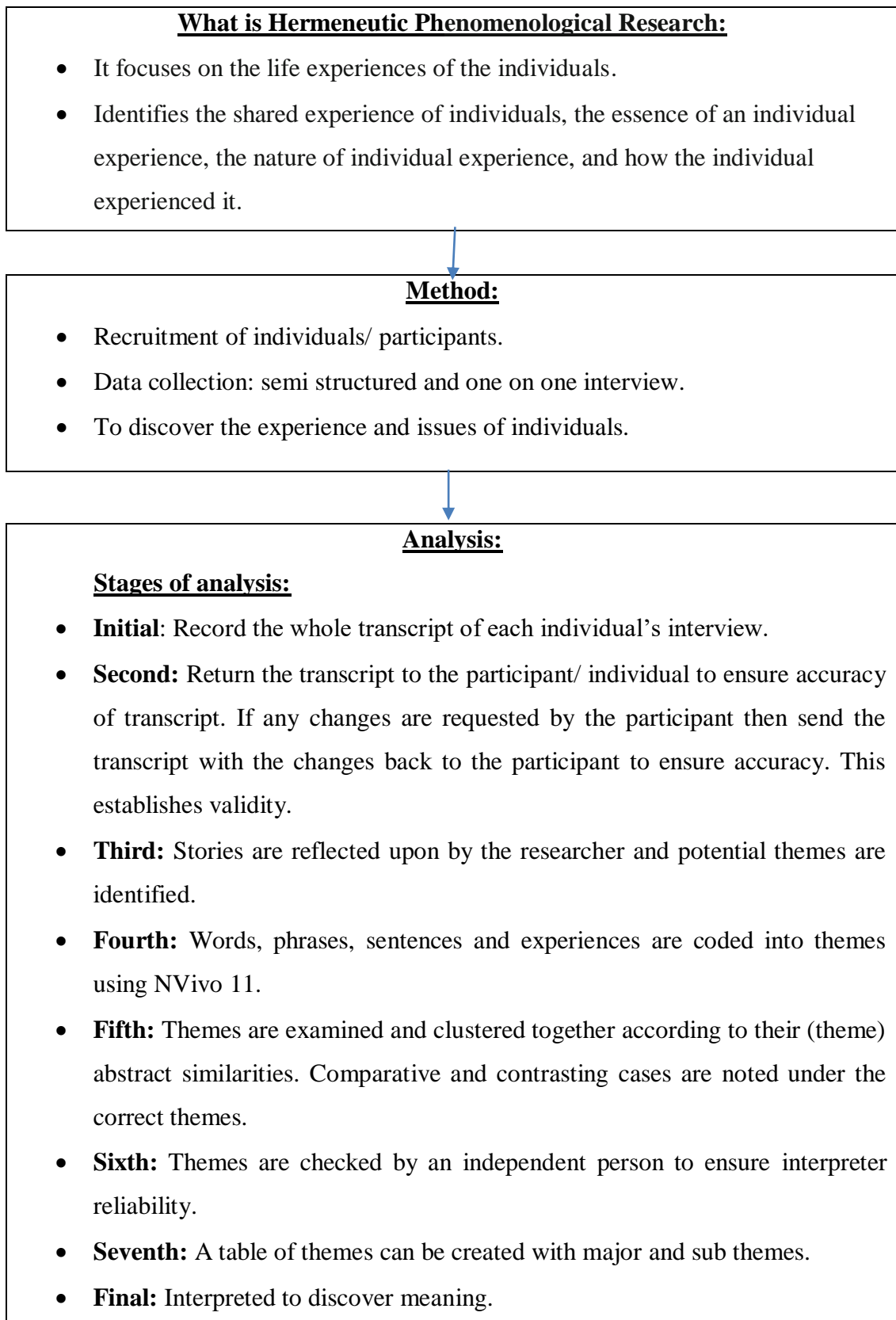


Figure: 5. Phenomenological Research Summary

“Sociology is a science which attempts the interpretive understanding of social action in order thereby to arrive at a causal explanation of its course and effects” (Bulmer, 2017, p.1). Sociology aims to explain a theory that the researcher generates about a social action, relationship or structure through generating and analysing data related to the population of concern, which in this case was safety and health representatives. The theoretical ideas in sociology research are those of the researcher about a target population. The population data can be collected through experimental methods conducted with independent and dependent variables; through questionnaire surveys; through being a participant observer; through ethnography to identify the characteristics of the studied population; through a longitudinal study where the same people are studied repeatedly, usually for years; through a cross-sequential study where the same individuals are tested more than once over a set period of time; as a case study of an individual or of a group of people with the characteristics of interest; through a cross sectional study where people with the same characteristics are studied at the same time; through interviews, or through correlational research where the researcher examines the correlation of two variables of interest. The methods used for sociology research can also be a secondary analysis of information already collected (historical research) and stored in a large data base by a government organisation, insurance company or another organisation. The method of data collection depends on which method will most effectively collect the population data of interest to solve the problem of interest (Bulmer, 2017). The process of sociology research includes generating a theory about a population to be tested, from this theory deciding on a hypothesis, collecting the population data to test the theory hypothesis, analysing the data and using inductive reasoning to decide if the theory is correct or needs to be changed based on the research results (Bulmer, 2017).

This research, on the influence of safety and health representatives in the Western Australian Mining Industries, had a research aim and three research questions. It did not have a research hypothesis. Similar to sociology research this research did examine a population of interest and, based on the research results, it did generate a theory that management support was important for safety and health representatives to be able to do their work effectively. For this research data was collected through the use of interview questions.

3.4 Development of the Interview Questions

Pilot study interview questions were developed based on the findings of a comprehensive literature review on the role of safety and health representatives and factors that affect their work. The comprehensive literature review helped to create content validity. Questions were then constructed with the assistance of two safety professionals and four safety and health representatives with mining industry experience through a focus group discussion with the researcher. After the demographic information the interview questions were semi structured and open ended (narrative response) to allow for an in depth discussion with the safety and health representatives. It was determined that sufficient information to achieve the research aim would not be obtained by having interview questions with:

- Fixed response
- True / False
- Yes / No.
- Rank ordering
- Agree / Disagree.
- Rating scale/continuum (such as a Likert-type scale)
- Multiple choice

Interview questions requiring these type of answers were not included as the researcher wanted to obtain narrative data to provide comprehensive information about the safety and health representatives' work, what affected this work and what made their work effective in promoting workplace safety and employee health.

Twenty-three questions were included in the pilot study with the questionnaire having three main parts. The first six questions asked for demographic information that included gender, age, year of experience as a safety and health representative, years of experience working in industry, employment position and size of company worked for (less than 100 employees, 100-999; more than 1,000). These questions were asked to allow the researcher to identify if any of these factors affected the work of safety and health representatives.

The second section included eight questions related to the duties performed, support received, powers, influence, barriers to their work and work related education received by the safety and health representatives. These questions were included to provide information to answer the first two research questions. The second section ended with an open ended question asking if there was anything else that should be considered, to allow representatives to add to the information already provided. The last section of the questionnaire asked about leading and lag indicators as these would help with understanding the effects that the safety and health representatives work had on company safety and health outcomes and answer the third research question.

After the draft questionnaire was created, the principal supervisor reviewed it. Several minor changes were made including correction of grammatical errors and minor changes such as including a definition, or examples, of leading and lag indicators to increase reliability before the interview questions were asked to the pilot study participants.

3.5 Pilot Study

To ensure the reliability and validity of the research interview questions a pilot study was conducted. Hertzog (2008) recommended that a pilot study have 10% of the number of participants anticipated for the research study, or 10 participants. This number was considered by Hertzog (2008) be sufficient to determine if the questions were understood by participants and to allowed the researcher to test the data collection instrument, measure the reliability of the study protocol, identify any problems with data collection methods and to ensure that the questions asked provided adequate information to allow the achievement of the research aim. Masato (2011) wrote that these were all advantages that conducting a pilot study provided.

The researcher contacted potential safety and health representative participants for the pilot study through an email. The aim of this research was clearly explained, information was provided about how the research would be conducted, confidentiality, the right to withdraw from the pilot study and pilot study participants' role in this research. The researcher contacted ten safety and health representatives from a healthcare organisation who had all expressed interest in being

involved in the pilot study. After reading the participant's information letter all 10 gave signed consent to participate in the pilot study. Pilot study participants examined the questions critically and answered the interview questions. Each answer was recorded by the researcher. After the interview, the researcher read their answers back to each participant so that the participants could verify and check the accuracy of what was written and make changes if required. The pilot study participants also assessed the validity and reliability of the pilot study interview questions. An analysis of the pilot study participants' answers is included in chapter 4.

The opportunities for improvements identified by the pilot study participants were made to the interview questions, with changes made to remove any industry jargon and to simplify questions asked. Please see Appendix 4 for a copy of the research interview questions.

3.6 Research Setting and Participants' Recruitment

The setting for this research was the Western Australian mining industry. The research participants were 41 elected occupational safety and health representatives who worked in the Western Australian mining industries. Resources Safety supported this research and invited elected safety and health representatives to participate in the research through an article published in their Resources Safety Matters Magazine (Resources Safety Matters, 2015. p.7). The magazine included information about the research and the researcher's contact details for representatives who would like to participate.

Mining industry safety and health representatives were able to contact the researcher either by email, telephone, or in person. The inclusion criteria for participants was being of 18 years of age or older who worked in the Western Australian mining industry as a safety and health representative.

A participant information sheet and consent form was developed by the researcher for this research. The participant information sheet provided an outline of the research so that participants had an understanding of the research and ethical considerations. Participation in this research was voluntary. Please see Appendix 2 for a copy of the participant information sheet. After reading the participant

information sheet, if the safety and health representatives wished to participate in the research, they were given a consent form to read and sign. Please see Appendix 3 for a copy of the consent form.

Research data collection was conducted over a five months period from August 2015 to December 2015. Data collection continued until data saturation was achieved. Collected data was not determined by the number of participants, but by the richness of the information obtained (O'Brien, 2002). Guest et al. (2006, p. 65) define data saturation more precisely as "the point in data collection and analysis when new information produces little or no change to the codebook".

Research conducted by Walter et al. (2014) on the role of worker's representatives in health and safety arrangements in coalmines in Queensland included interviews with 21 site safety and health representatives. The authors determined that the information obtained from this number of participants was adequate to provide a comprehensive understanding of their role in mining workplace health and safety arrangements.

Mason (2010) conducted research to identify the sample size for saturation in PhD studies using qualitative interviews only. For the phenomenological research method 57 PhD studies were found that had been completed in Great Britain and Ireland dating back to 1716. The range in the number of subjects for Phenomenology PhD research studies varied from 7 to 89 with the mode being 20, mean being 25 and the medium being 20. The standard deviation was 19.9. Based on the mean number of subject for qualitative research studies being determined by Mason (2010) to be 25. This research had a slightly higher number of participants as data saturation was reached with 41 participants. The researcher interviewed all participants. The interview was based on a list of written questions (see Appendix 4) answered by participants.

3.7. Interview Technique

For this research open ended questions were used for section two (questions 7 to 15) of the interview. An open ended question encourages the interviewee to participate in a detailed conversation (Doddy & Noonan, 2013). Open ended questions permit the participants more opportunity to elaborate their answers to provide rich data and

allows the researcher to ask follow up questions to explore the topic in more depth (Doddy & Noonan, 2013). Kvale (1996, p. 129) documented that, “A good interview question should contribute thematically to knowledge production and dynamically to promoting a good interview interaction.” In this research, open ended questions were asked by the researcher through typed questions, which were distributed to the participants before the interview so that they could prepare their answers, particularly for those questions related to the lead and lag indicator numbers.

In depth and semi structured interviews were organised for the participants by the researcher. A semi structured interview using open ended question is one of the most common methods of data collection in qualitative research. Doddy and Noonan (2013) describe the features of this method as follows:

- Questions can be related to the behaviour or experience of people or participants.
- Knowledge of participants.
- Demographic background of the participants.

Doddy and Noonan (2013) stated some benefits of the semi structured interview are that they are flexible, with researchers being free to seek clarification from the participants and to discover issues that may arise spontaneously during the interview. Semi-structured interviews allow researchers the freedom to word and order interview questions and provide them with the opportunity to explore participants’ knowledge about a relevant topic or issue (Doddy & Noonan, 2013). Researchers can gain knowledge about the topic from books, journals, articles, or from other published sources of information, but semi structured interviews allow the researcher to gain a more practical knowledge of real life experiences from the research participants (Doddy & Noonan, 2013).

Before each interview took place, the participant information sheet and consent form were distributed to the elected safety and health representatives who contacted the researcher by a phone call or through email requesting to participate in this research. Once the consent form had been signed, the interview was organised by the researcher with the safety and health representative.

Telephone or face to face interviews were conducted by the researcher with the participants. During the interview, participants were able to answer the questions as well as express their opinion and describe workplace experiences. Ten face to face interviews and thirty one phone interviews were conducted by the researcher with the participants. During each interview, all questions were asked according to their order on the interview sheet and the participants were able to describe their life experience.

Prior to the face to face interview taking place, a time and place for the interview was organised between the researcher and each participant through emails and phone calls. This process contributed to the initial trust and developed a rapport between the researcher and participants. All face to face interviews took place at Curtin University, which was chosen by the participants and agreed by the researcher. During the face to face interviews, the researcher explained verbally to the participants about the background of the research, interview, and shared a little information about the researcher. The researcher assured the participants that all their stories were valid and there was “no right or wrong answer”. Following each interview the researcher made some notes. These notes were related to additional information provided by the participants during the interview. All of these notes were transcribed into a word document and checked by the relevant participant for accuracy. With phone interviews the transcribed information was emailed back to the participant for checking.

Corbin and Strauss (2008), Patton (2002) discussed about the potential impact of the interview on the participants. Patton (2002, p. 405) stated: “Interviews are interventions. They affect people. A good interview lays open thoughts, feelings, knowledge, and experience, not only to the interviewer but also to the interviewee” No participants reported any adverse feelings after their interview.

All interview answers were reviewed by the researcher. All of the participants provided their email or phone numbers for future contact for them to check the accuracy of the transcription of their data and for the researcher to contact them to obtain any incomplete or missing information. If there was missing and incomplete information in the interview answers the researcher contacted the participant by email and through a phone call after which the transcript was provided to the

participant to check for accuracy, make any required corrections, and then email back to the researcher.

3.8 Method of Data Analysis

3.8.1 Introduction

In phenomenology research, information is collected through the use of an interview (Gray, 2013). In this research, the researcher asked interview questions to the participants that focused on achieving information related to answering the three research questions to enable the achievement of the research aim.

3.8.2 Steps taken for initial coding

Once all the interviews were conducted the following steps were implemented by the researcher:

- All Interviews were transcribed.
- All the transcribed interviews were read and reread several times by the researcher to check the accuracy of the answers according to the questions asked.
- Each transcript was then given to the relevant participant to check their answers to ensure that the information written was correct and had the meaning that they wanted it to have.
- After checking all the transcript by each of the participants, each transcript was sent back to the researcher by email.
- Figures, words, phrases, and experiences were coded according to the themes.
- Comparative and contrasting cases were noted under the correct theme.

3.8.3 Narrative analysis

The details and nature of the data collected allowed the researcher to use narrative analysis. Holloway and Jefferson (2000) said that, listening to a story from a person and the story itself help to develop a clear understanding of the subject matter. In this research, the participants spoke about their experiences, which were then compared with each other to enhance understanding by the researcher.

3.8.4 NVivo 11 data analysis

NVivo is software that supports qualitative research and “has features such as character- based coding, rich text capabilities and multimedia functions that are

crucial for qualitative data management” (Zamawe, 2015. p. 13). The qualitative interview data for this research was analysed using NVivo 11 for Windows. This computer package provided an all-inclusive set of visualisations that helped the researcher to achieve deeper insights when analysing the interview data.

Some of the main features of NVivo 11, and an explanation about these features, are as follows:

- **Coding and stripes:** Coding is a way of collecting all of the topic information, themes and references, which can help to make nodes. Stripes are a colourful bar that shows all coding.
- **Charts:** Provide visual coding, usually in the form of a bar graph.
- **Word tree:** Creates a tree map with words that are on the same branch having a relationship to each other.
- **Word cloud:** Displays the word frequency of participants’ responses or word frequency in documents and so on. with the most commonly used words being the largest in writing and at the centre of the word cloud.
- **Explore diagram:** Focuses on one item. This item is at the centre of the diagram with spokes radiating out from this central item to all items that are connected to it. This display enables the connection between items to be explored.
- **Comparison diagram:** Helps to visualise the differences and similarities between nodes and research items.
- **Mind maps:** A brainstorming tool used by the researcher in NVivo to define a key central topic and then create other ideas from this key concept to develop a map of related ideas using key words. At the start of the research a mind map can be used to generate analysis themes for the research proposal. The central idea is mapped in NVivo as a circle with spokes coming out to form other circles that contain related key word ideas. Related ideas then have spokes coming out from them to form other circles with more ideas applicable to the related ideas. During data analysis a mind map can be used in NVivo to explore themes and it can be used to generate main theme headings to include in the research report.

- **Project maps:** Has shapes that represent research items and uses spokes to show the links between these items. Project maps are used to explore and organise the research results, develop ideas, build theories, develop explanations and make decisions about the research findings.
- **Concept map:** Creates a map with knowledge and ideas, which connect with the theories in the research.
- **Cluster analysis:** An exploratory technique used to identify patterns in node contents. The more similar the contents in the nodes are, the closer the nodes are grouped together in the cluster map. This can be used to identify diversity and similarities in information included in each node, and provide a similarity index for words, coding and attributes.
- **Hierarchical chart:** This is a tree map diagram, or a sun burst diagram, which helps to compare, categorise and visualise themes and data in the form of a chart (Bazeley, 2015). A hierarchical chart can be developed in NVivo from coded nodes to display the research results as a series of nested rectangles. The hierarchical chart uses the size of the rectangle to display the amount of data contained in each node. The child and grandchild sub nodes are displayed as lighter colours to the parent (main idea) node. A hierarchical chart can be used in NVivo to visualise the main research themes and to identify areas that require further research if the amount of information in the node square display is not adequate.

Pattern matching, coding and modelling capacities of NVivo 11 were used to identify patterns of responses in interview question answers to determine the support that representatives received in their workplace, strategies used to facilitate workplace safety and health practices and their frequency. Corbin and Strauss (2008) stated that coding into categories and concept analysis from the collected data is an early data analysis process. During this data analysis process and progress the coding process moved from a dominance of descriptive categories to grouping.

Open coding commenced as soon as the researcher received all of the corrected and modified transcripts from the participants. The researcher began by reading a single transcript. The transcript was then transferred to NVivo 11. Where it was reread

with other associated field notes, and then existing codes were assigned with new codes, which are called ‘nodes’ in NVivo 11. Each free node was named separately. Several times, free nodes were re-checked by the researcher so that other appropriate nodes could be created. This coding process looked for similarities and differences across the transcripts.

3.9 Validity and Reliability

3.9.1 Introduction

According to Leininger (1985, p. 68), validity “refers to gaining knowledge and understanding of the true nature of a particular phenomenon and reliability focuses on identifying and documenting recurrent, accurate and consistent or inconsistent factors”. Validity is very important in scientific research. Without validity, there is no scientific basis to the research. Valid research data is accurate information (Leininger, 1985). One type of validity is content validity.

3.9.2 Content validity

Guion (1978) and Leininger (1985) documented that, to identify the complete range of underlying thoughts about the research question and problem, tools needs to be constructed on logical and theoretical grounds. To ensure content validity, a wide range of published literature was reviewed to develop the interview questions. These questions were discussed and reviewed by people with expert knowledge of the role of safety and health representatives and the work that they perform in the Western Australian mining industry.

3.9.3 Face validity

Face validity is when a question measures what it is supposed to measure (Leininger, 1985). The demographic questions asking about gender, age, years of work, employment position and company size have face validity because the answer is not open to interpretation. The pilot study results determined that the interview questions measured what they were supposed to measure and provided face validity to the interview questions.

3.9.4 Internal validity

Leininger (1985) documented that the aim of any research is to identify the cause of the result and internal validity is needed to identify the cause of the results. Maxwell (2009) developed a checklist to overcome threats to validity, which were followed by researcher. These include:

- Rich and detailed data collected from the participants to cover the interview question answers.
- Respondent validation used to obtain feedback from the research participants to ensure the accuracy of the data they provided and also the researcher's interpretation of their information.
- A search for any discrepancy in the evidence and negative cases followed through to test conflicting explanation.
- A comparison of the results followed through across the different settings, people, and events.
- Quasi statistics using actual numbers (descriptive statistics) instead of only adjectives.

3.9.5 Reliability

In this research, there were standard questions for all interviewed participants. Reliability was enhanced by having a pilot study to ensure that all questions could be easily understood by all research participants, and that participants provided the same answers to the same questions each time. The NVivo software was used to conduct data analysis in this research. Through node classification and 'Most Frequent Word Queries' the themes identified and compared in this research for similarity provided good correlation. This ensured data interpretation reliability. Coding of themes by the researcher were checked by the research supervisor as an independent person who had not been involved in data collection to ensure inter reliability.

3.10 Ethical Considerations

Ethics approval from the Curtin University Ethics Committee was obtained prior to the commencement of data collection for this research (see Appendix 5). Ethics approval number for this research was RDHS-94-15. The researcher did not ask any questions that could harm the participants either mentally or emotionally. The

conduct of interviews was undertaken with the principle of avoidance of harm and maintaining confidentiality.

3.11 Chapter Summary

The qualitative hermeneutic phenomenology approach was determined to be the best method to conduct this research as it was exploring the experiences of safety and health representatives' working in the Western Australian mining industry. The literature review, focus group work with experts who understood the role of safety and health representatives', as well as the pilot study, all helped to develop and refine the interview questions asked of the research participants. The use of NVivo 11 to conduct the qualitative analysis provided rigor for this research study.

The next section of this report includes the pilot study results, research participants' demographic information and the safety and health representatives' perception of management support for their safety and health representative work.

4. RESEARCH RESULTS AND DISCUSSION – PILOT STUDY, DEMOGRAPHIC INFORMATION AND MANAGEMENT SUPPORT

4.1 Introduction

This chapter contains the results of the pilot study, the research participants' demographic information, participants' responses about their role as safety and health representatives and their perceived support from management. This chapter answers the first research question, which is:

What support does workplace management provide to safety and health representatives in the Western Australian mining industries to enable them to work effectively in promoting occupational safety and health?

NVivo 11 software was used to create nodes, sub nodes, themes and word clouds to analyse the interview question answer results. Quotes from research participants are included to highlight important information related to the research findings. For some of the mining industry research participants English was not their first language, but all were able to communicate well with the researcher. To maintain confidentiality the participants' real names are not included. The chapter commences with a description of the pilot study results, which have been analysed using descriptive statistics.

4.2 Pilot Study's Demographic Information

A total of 10 participants were included in the pilot study. The participants were safety and health representatives who worked for a Western Australian health care organisation. For the pilot study safety and health representatives in a different industry to mining were chosen so that their interview results could be compared with the mining industry representatives results where appropriate. The responses of the participants were quantitatively analysed to determine their demographic profile. The first demographic factor considered was gender as shown in Table 5.

Table: 5. Pilot Study Participants' Gender

Gender	Number	%
Female	8	80
Male	2	20
Total	10	100%

Most pilot study participants were female, which is a representative sample for this industry as the Workplace Gender Equality Agency (2016) has recorded that 78.3 % of health care workers are female. The next factor reported was age (refer Table 6).

Table: 6. Age of Pilot Study Participants

Age	Number	%
Between 18-28 years	0	0
Between 29-38 years	6	60
Between 39-48 years	3	30
Between 49-58 years	1	10
Total	10	100%

All pilot study participants were over 28 years of age. Participants' years of experience in the role of a safety and health representatives is reported in Table 7.

Table: 7. Pilot Study Years of Experience as a Safety and Health Representative

Number of years	Number	%
1 - 2 years	0	0
3—4 years	5	50
5 – 6 years	2	20
7 –8 years	3	30
Above 8 years	0	0
Total	10	100%

All the participants in the pilot study had a minimum of 2 years and a maximum of 8 years' experience working as a safety and health representative. The Western Australian Occupational Safety and Health Act (1984, s. 32) states that the term of office for safety and health representatives is 2 years, and that they may be re-elected (and can continue to re-elected) after the completion of their term for a further 2 years. As shown in Table 8 most of the pilot study's safety and health representatives interviewed were experienced in this role as they had been elected to serve for more than one term.

Table: 8. Pilot Study Participants' Years of Working in Health Care

Work years	Number	%
0-6	2	20
6-8	6	60
8-10	2	20
Total	10	100%

Total years of working experiences in the healthcare industry of the pilot study participants indicated that most of them were experienced health care workers. Their employment positions are documented in Table 9.

Table: 9. Pilot Study Participants' Employment Position

Employment position	Number	%
Carer	6	60
Manual Handling Trainer	2	20
Nurse	1	10
Kitchen Staff	1	10
Total	10	100%

The most common employment title of the pilot study participants was carer. All 10 participants worked for one health care organisation that employed more than 1,000 employees.

4.3 Pilot Study Participants' Interview Responses.

Table 10 includes the themes that were identified in the pilot study participants' interview question answers. The first question asked was: *In your role as a safety and health representative what duties do you do?*

Table: 10. The Role of Safety and Health Representatives

Roles	Responses number	Percent of 10
Conduct workplace inspections for hazard identification.	10	100
Conduct risk assessments and implement workplace risk control measures.	4	40
Support, guidance and encouragement to staff to raise safety issues.	4	40
Attend safety meetings.	4	40
Conduct incident investigations.	2	20
Suggest the purchase of safety related resources to their manager.	2	20
Providing guidance to the staff about safety and manual handling training	2	20
Total	28	

According to the Occupational Safety and Health Act (1984, s. 33), the function of safety and health representatives is to:

- Conduct workplace inspections.
- Contribute to incident investigations.
- Report workplace hazards to their employer.
- Refer safety issues to the safety and health committee.
- Consult and cooperate with their employer to assist with maintaining a high standard of workplace safety and health.
- Liaise with the employees regarding safety and health issues at their workplace.
- To keep up to date with safety and health information provided by their employer.

All of the pilot study participants stated that their duties included conducting workplace inspections to identify hazards at their workplace. Pilot study results identified that most of the participants performed their role according to the legal requirements of the Occupational Safety and Health Act 1984. Outside of these requirements was the provision for manual handling training, as this was an employment related duty, rather than a representative duty.

To perform the role of safety and health representatives effectively most of them received support from their middle level of management. The pilot study question asked was: *What support does workplace management provide to you to enable you*

to work effectively in promoting occupational safety and health in your workplace?

Answers to this question generated the themes reported in Table 11.

Table: 11. Pilot Study Management Support

Management support	Number	% of 10	Management level
I do all my OSH work in my own time as management does not support me.	2	20	
I receive support from management to attend daily safety meetings	6	60	Line + Middle
Time off for safety work.	2	20	Line + Middle
Support for OSH training and education.	10	100	Line + Middle
Total	20		

According to the Occupational Safety and Health Act (1984, s. 35) the support that managers are required to provide to safety and health representatives is as follows:

- Provide information about workplace safety matters to the safety and health representatives.
- Ask, listen and involve the safety and health representatives prior to making safety related changes to the workplace, substances, or plant.
- Support by providing time for the safety and health representatives to conduct safety activities including workplace inspection, accident investigation in their designated workplace and keeping up to date with advance in safety information when related to their work.

All of the pilot study participants reported that management supported them to attend safety and health training. This was a 5 day mandatory safety and health course for safety and health representatives. As per Western Australia's Occupational Safety and Health Regulations (1996, r. 22) the participants had paid time off from their work to attend this course. The participants said that they did other occupational safety and health courses, which they paid to attend from their own pocket. They also reported using their own out of work time as management did not provide time and payment for other safety and health courses related to increasing their representative work related knowledge.

The pilot study participants reported that their line manager was either a coordinator or a supervisor. The care managers of the facilities (middle management) who were above the coordinators and supervisors, allotted resources and work time to the supervisors and coordinators for safety and health representatives. This was because the care managers had financial management powers and responsibilities. The participants stated that they did not have any direct contact with the care managers for any safety activities. With the approval of the care manager, most coordinators and supervisors provided safety and health representatives with time away from their normal work duties to attend training and educational opportunities related to their representative work, to attend safety meetings, and to do their representative work.

Two of the pilot study participants reported not being provided with work time to conduct their legally required duties. These two participants stated that this was due to a shortage of staff. They reported that budget cuts were one of the main reasons that care managers were not able to hire casual staff to replace the representatives' while they did their legally required representative work. The participants highlighted that their work load was too high, due to absence of staff, to complete their representatives' duties during working hours. Even if booked for time off by their coordinator or supervisor to conduct safety duties, non-availability of staff due to budget restraints meant that there was no reliever to allow them the working hours necessary to complete their representative duties. An example of this is described by one of the participants as follows:

My workplace inspection was overdue for one month. I know that OSH audit is due on next week. I reported to my coordinator about this and got some time off for tomorrow to conduct workplace inspection. Today, my coordinator said to me that I have to work, no time off for safety activities today because some staff are sick, patient's care is first priority, not safety activities.

These participants were also asked if anyone else could provide them with support. Table 12 includes participants' responses to this question.

Table: 12. Other Support

Other support	Number	% of 10
OSH Consultant	3	30
Other support from OSH Advisor.	3	30
Support from workers	2	20
Support from Work Safe	1	10
Support from Union	1	10
Total	10	100

Of the 10 participants (30%) stated that OSH consultants and OSH advisors (who were not their managers) provided them with a lot of support so that they could perform their safety and health activities smoothly at their workplace. This support included the provision of current information about safety from Work Safe, safety posters, how to write information on the incidents and hazard forms, the procedures to use to conduct workplace safety investigations, chemical risk assessments at the workplace, ergonomic assessments for sitting arrangement for workers, and so forth.

Two of the participants reported that workers supported them through telling them about perceived work related hazards including problems with lifting clients who required assistance to move in and out of their bed (manual handling). Co-workers had assisted participants to do their work when co-workers suggested modifications to improve safety for work procedures, raised items for the agendas of safety meetings and when co-workers voted for them to be elected as representatives for their workplace.

One participant described how WorkSafe helped her to perform her role successfully at her workplace. It was stated that WorkSafe provided information about safety topics and that the participant then organised multiple workshops on those topics to raise awareness of safety issues at the workplace.

One participant highlighted support from their union. This participant reported that the election of safety and health representatives was overdue at some facilities and that management was not very keen to conduct an election. This union provided information to the participant about the occupational safety and health legislation. The union guided the participant on how to raise this issue with their management so that new safety and health representatives could be elected. Other participants stated

that their union guided them on how an elected safety and health representative could inform their employer that they were legally required to attend the 5 day Safety and Health Representatives course. As an example of the problem one of the participants stated the following:

The Care Manager is very reluctant to conduct an election for Safety and Health Representative. She thinks this is waste of time for her. Verbally, I told the Care manager several times to conduct the election but she did not care. Now I am thinking that, formally I will give her notice and I will see what happen next.

Table 13 describes powers that the participants used to influence the achievement of a high standard of health and safety in their workplace.

Table: 13. Powers that Safety and Health Representatives Have

Types of powers	Number	% of 10
Use position power, information and expertise powers, coercive power, interpersonal power, Safety and Health Committee position power and consultation and cooperation powers.	4	40
Use consultation and cooperation power only	3	30
Use information and expertise power only	2	20
Use interpersonal power only	1	10
Total	10	100

In this pilot study, four participants reported using position power, information and expertise powers, coercive power, interpersonal power, safety and health committee position power and consultation and cooperation powers. Other participants used only a few of these powers.

Table 14 provides further information on the strategies the participants used to influence employees to work safely.

Table: 14. Powers used to Influence Workplace Safety

Power use	Number	% of 10
Use consultation and cooperation powers to influence employees. During workplace inspections, talk to the employees about what sort of hazards were found so that employees have an idea about the nature of hazards at their workplace and why it was important to report these hazards.	5	50
Use information and expertise power to influence employees. Discussed hazards with the employees, gave information about the nature of hazards and personal protective equipment (PPE), which helped employees to understand the nature of hazards at their workplace and to use their PPE.	2	20
Encouraged staff to bring issues to the morning meeting to the safety and health representatives so that these issues could be included in the safety and health committee's meeting agendas.	2	20
Being a safety and health representative, I used my position power to influence employees. Discussion was held with the employees on how to report hazards and an injury.	1	10
Total	10	100

Table 14 provides more specific details about how the participants use their consultation, cooperation, information, expertise and position powers through their communication abilities. The main topics of communication were about hazard identification, reporting and risk control measures to use.

Table 15 shows the participants' influence over having a safe workplace, safe equipment and products to use safe work processes and management practices.

Table: 15. Influence in Promoting Workplace Safety

Ability to influence and how	Number	% out of 10
YES. I am able to do the JSA	2	20
YES. Safe management practice through following the workplace safety and health policy correctly.	2	20
YES, for equipment. If I see that some equipment is broken or unsafe to use, I tag it and report to my manager.	2	20
YES. If staff ask for my opinion about workplace safety I take their query to my manager and we discuss ways we can make things safer.	2	20
NO. What management wants, we have to do that. I do not have much influence on workplace safety.	1	10
NO. Not much influence over safety. No safety culture. Management always focus on their profit.	1	10
Total	10	100

Eighty percent of the pilot study participants perceived that they were able to have a positive influence on workplace safety and health practices, and 20% perceived that management, rather than the safety and health representatives had the influence. The participants, who said management always directed what actions were to be undertaken for safety at the workplace, stated that sometimes management said that some issues were not related to safety, but were the responsibility of the human resources department. For example, one of the participants said:

As a safety and health representative, we believe it was wrong but we did not have the courage to challenge these issues because of fear of harassment at workplace. Management compromised with the quality of equipment when they purchased the equipment. As a safety and health representatives, management invited our suggestion for purchasing equipment but, ultimately it was management's decision what to purchase from profit point of view. Management was not keen to build a safety culture at workplace.

Table 16 documents the pilot study participants' answers regarding the factors that enable safety and health representatives to promote having a safe workplace, safe work processes and safe management practices.

Table: 16. Factors that Enable the Promotion of Workplace Safety

What enables Representatives to promote safety	Number	% out of 10
My knowledge about workplace safety and health	7	70
My manual handling training skills.	4	40
Management support	1	10
My knowledge about job safety analysis	1	10
My friendly relationship with the staff	1	10
My time and effort for safety activities	1	10
Continuous discuss about safety issues with my colleagues.	1	10
My initiative for safety activities	1	10
My motivation for safety activities	1	10
My hard work for safety activities	1	10
My knowledge about risk assessment	1	10
Good role modelling about safety.	1	10
Total	21	

In the pilot study there were 12 themes that emerged as factors that enabled safety and health representatives to promote workplace safety and health, with the most common being their knowledge about workplace safety and health.

Table 17 focuses on barriers that prevent safety and health representatives in performing their roles effectively at their workplace.

Table: 17. Barriers that Prevent Effective Role Performance

Barriers	Number	% out of 10
To implement new change for safety and health, barriers always come from management who do not provide the resources and money.	2	20
Sometimes I do not get the time for OSH activities. Not enough time to perform the role of a safety and health representative.	2	20
Managers always concerned about cost, not quality care for patients. They compromise with safety for cost cutting.	2	20
Sometimes, managers do not trust their safety and health representatives and they do not honour and understand confidentiality when occupational safety and health representatives raise safety and health issues to higher management.	1	10
Poor safety culture from management.	1	10
Harassment and bullying from manager to implement new changes for safety and health.	1	10
Sometimes barriers come from management and also solutions come from management! Safety and health representatives do not have any say.	1	10
Management talk about safety but are not interested in implementing 100% safety for staff. They ask for suggestions from safety and health representatives but we know that they will not implement those with the excuse of cost cutting.	1	10
Total	11	

The participants reported 11 barriers to performing their role as a safety and health representative at their workplace. Significant barriers were a lack of resources and money, lack of time to do the occupational, health and safety activities, lack of management trust and management compromising safety through cost cutting. All of the barriers at this workplace were caused by management indicating that management can have a powerful influence on the effectiveness of safety and health representatives.

Table 18 provides the answers to how safety and health representatives overcome these barriers.

Table: 18. How Safety and Health Representatives Overcome Barriers

Barrier removal strategies	Number	% of 10
Confidential call to Work Safe if serious workplace hazards were not fixed or remained for a prolonged time.	4	40
Keep reporting the hazard to the managers	3	30
Talk to union.	2	20
Report to HR department harassment and bullying from managers.	1	10
Total	10	100

In this pilot study the most common way participants overcame barriers was to call WorkSafe, if identified hazard risk control measures were not implemented by the management to make the workplace safe. This indicates that representatives needed to use outside enforcement to overcome barriers that management created. As well as using the legislator representatives also used union support and the human resource's department support.

Table 19 displays the views of the participants about the benefit of the safety and health representatives' introductory 5 day course they attended or training they received and how it helped them to improve their ability and skills in performing their roles at their workplace.

Table: 19. Safety and Health Representative Education

Education	Number	% of 10
Introductory course	10	100
Completed the introductory course to help me to perform my role as safety and health representatives. It included workplace inspection, incident investigation, etc.	4	40
Completed a Diploma of Safety and Health, which helped me to perform my role. Now I have a clearer understanding about the OSH Act and OSH management systems.	4	40
Completed a Certificate IV Safety and Health, which increased my OSH knowledge. As a trainer for manual handling I am very much aware of the OSH Act and Codes of Practice.	1	10
I did lot of research in my own time. This helped me to perform my role effectively. I know the different types of hazards at different workplaces, how to do a risk assessment and to conduct a job safety analysis.	1	10
Total	20	100

All of the participants in the pilot study said that they attended the 5 day safety and health representatives course that is required to be attended under the Occupational Safety and Health Act 1984 [section 35 (1a) (1b)]. Some of the participants had completed TAFE safety and health courses (Certificate IV Safety and Health course, Diploma of Safety and Health course) in their own time and paid for their own education while one completed self-directed learning through research. All of participants in this pilot study reported that the safety and health course(s) helped them to improve their ability and skills to work as a safety and health representative. Research conducted by Merriman and Cowley (2009) in Victoria (Australia) with 27 elected safety and health representatives identified that representatives were more confident to ask questions to their manager about safety, and that their quality of workplace inspections increased if they had undertaken further safety and health training, such as the Certificate IV OSH program, than if they had just completed the 5 day safety and health representatives course.

Table 20 displays the views of the participants about the additional needs to be considered for safety and health. Two of the participants had no comment. The responses from the remaining 8 participants are included in Table 20 below.

Table: 20. Other Factors

Other factors	Number	% of 10
Would like my employer to provide me with financial support and time to complete the Certificate IV Safety and Health at TAFE to increase my OSH knowledge	5	50
Would like my employer to provide me with financial support and time to complete the Diploma course (Safety and Health), which is in depth in providing more OSH knowledge.	3	30
No comment.	2	20
Total	10	100

Most of the participants were motivated to learn more about workplace safety matters to be more effective in their work. Table 20 documents how often the participants conducted workplace inspections.

Table: 21. Workplace Inspection Frequency

Workplace inspection frequency	Number	% of 10
Every 3 months	4	40
Sometimes	2	20
Every 3 weeks	1	10
Monthly	1	10
Occasionally	1	10
Some times and when required.	1	10
Total	10	100

All participants conducted workplace inspections; however, the frequency varied from being regularly conducted every 3 weeks to workplace safety inspections being conducted occasionally. The most common frequency for conducting workplace safety inspections was every 3 months. According to the Western Australian Occupational Safety and Health Act (1984, s. 33), safety and health representatives are required to inspect the workplace:

- (i) At such times as are agreed with the employer; or
- (ii) Where he or she has not inspected the workplace, or that part of it, in the preceding 30 days, at any time upon giving reasonable notice to the employer;
- (b) Immediately, in the event of an accident, a dangerous occurrence, or a risk of imminent and serious injury to, or imminent and serious harm to the health of, any person, to carry out any appropriate investigation in respect of the matter.

Another important function of the safety and health representatives documented in the Western Australian Occupational Safety and Health Act (1984, s. 33, s. 35) is to be notified of any safety incidents that occur in their workplace. Table 22 shows the role of the pilot study's safety and health representatives in the workplace incident investigations and whether corrective actions are discussed with or communicated to them.

Table: 22. Accident and Incident Investigation Involvement

Accident and incident investigation involvement.	Number	% of 10
NOT involved, and corrective actions were not discussed with OSH Representative.	6	60
NOT always involved in accident and incident investigation. Sometimes corrective actions discussed with OSH Representative.	3	30
YES, involved in accident and incident investigation but corrective actions always not discussed with OSH Representative.	1	10
Total	10	100

The majority of the participants were not involved with incident and accident investigations and neither were corrective actions always discussed with them.

Workplace safety and health performance can be measured using both lag and leading indicators (Pawlowska, 2015). Leading indicators identify what is being done proactively to manage workplace safety and employee health and include: hazard awareness training; percent of employee competencies; number of job safety analysis completed; number of task observations completed; number of pre-start and workplace inspections conducted; number of audits conducted; number of safety meetings; safety management plans; and the number of control measures to make the workplaces as safe as possible.

Table 23 displays the comments of the participants about the use of leading safety indicators in their company, their knowledge of, and involvement in, developing these indicators.

Table: 23. Workplace Leading Indicator Knowledge

Leading indicator knowledge	Number	% of 10
Do not know about this, and do not know who develops the leading indicators.	6	60
Yes, but OSH Representatives are not involved in developing company's leading indicators.	3	30
Sometimes OSH Representatives are involved in developing company's leading indicators, but not always.	1	10
Total	10	100

In this pilot study, most of the participants did not know about their company's leading indicators. All of the participants worked for the same company, so it was evident that they were not all provided with the same information or given the same amount of time for involvement in occupational safety and health related work, if they worked in different departments or had different employment positions. Table 24 provides information on the type of leading indicators used at this workplace.

Table: 24 Leading Indicators Used

Leading indicators used	Number	% of 10
Work place inspections	5	50
Audit reports.	2	20
Safety meetings	1	10
Safety management plans	1	10
Job Safety Analysis	1	10
Do not know any company leading indicators.	1	10
Total	11	

Some of the participants provided multiple examples but the most common leading indicator reported was the number of workplace inspections conducted. A study conducted in Poland with 60 companies by Pawłowska (2015), identified that for these companies the most frequently used leading indicator was employees' participation in safety and health training programs. None of the pilot study participants reported having training as a company leading indicator.

The pilot study participants were then asked if the leading indicator objectives and targets were displayed and discussed with the people in their workplace and the majority said no. Their views about this are recorded in Table 25.

Table: 25 Leading Indicator Communication

Leading indicator communication	Number	% of 10
NO. Leading indicator objectives and targets are not displayed and discussed with the Safety and Health Representatives.	7	70
Sometimes discussed in safety meetings but not displayed.	3	30
Total	10	100

Table 26 documents the participants' knowledge about the company's Total Recordable Injury Frequency Rate (TRIFR), which is a lag indicator. TRIFR is calculated by combining the number of all workplace fatalities, lost time injuries, alternative duty injuries and medical treatment injuries x 1,000,000 and divided by the total number of hours worked by company employees.

Table: 26. Company's Total Recordable Injury Frequency Rate

Sub Nodes: TRIFR	Number	% of 10
Do not know	4	40
Not sure	2	20
Heard about this term but do not know about this	2	20
Do not know. Management do not share this information with safety and health representatives.	2	20
Total	10	100

In this pilot study none of the participants knew the company Total Recordable Injury Frequency Rate. This was similar to their knowledge about the company's lost time injury (LTI) rate. The lost time injury rate is calculated by having the number of lost time injuries times 1,000,000 divided by the total number of hours worked by company employees (Refer Table 27).

Table: 27. Knowledge of Company's Lost Time Injury Rate

LTI knowledge	Number	% of 10
NO, no one has communicated this to me.	8	80
Heard about this term but do not know about this.	2	20
Total	10	100

This pilot study has highlighted that there was a communication gap between the safety and health representatives and the management, as none of them knew their company's Medical Injury Frequency Rate (MIFR). MIFR is the number of injuries requiring medical treatment per 1,000,000 employee working hours (refer Table 28).

Table: 28. Knowledge of Company's Medical Injury Frequency Rate

MIFR knowledge	Number	% of 10
Do not know	8	80
Management do not share this information with Safety and Health Representatives.	2	20
Total	10	100%

Statistics on leading indicators, total recordable injury frequency rate, lost time injury frequency rate and medical injury frequency rate should be an agenda item for all workplace safety and health committee meetings at least once a year; this committee has a responsibility to review health and safety monitoring reports for the workplace. The lack of consistent communication about these statistics indicates that either the safety and health representatives do not attend the workplace health and safety committee meetings, or these topics are not discussed at the meetings.

4.4 Summary

A total of 10 participants were included in the pilot study. The participants were safety and health representatives who worked in one Western Australian health care organisation. This pilot study identified that there was a variation in answers, according to the department the participants worked in, on the amount of support that safety and health representatives received from management and in the amount of time they were provided with to conduct their safety and health duties. This was particularly obvious when looking at the frequency of safety inspections conducted in the workplace. The number of safety inspections conducted was reported as the most frequently used leading indicator. The pilot study's participants had a minimal role in accident and incident investigations with only one of them reporting being involved in this. All of the participants attended the legally required introductory Safety and Health Representatives course. However, any other safety related education that they wanted to undertake to do their work effectively they had to pay for and do in their own time. That the participants completed extra occupational safety related education indicates that they were keen to learn and do as much as possible to improve work place safety and employee health.

Barriers to the participants being able to conduct their duties were connected to the organisation having a focus on cost cutting to increase profits. This resulted in participants not always having enough work time to complete their safety and health work and a lack of knowledge about what was happening in the workplace, particularly in relation to occupational safety and health statistics. Ways that participants used to overcome management inaction when there were serious hazards that did not have risk control measure implemented were to keep reporting the hazards to management. When this was not effective, strategies used were to make a

confidential phone call to Worksafe Western Australia (for legal enforcement of required risk control measures), ask their Union for advice and, when bullied, report to the Human Resource Department the harassment and bullying performed by management.

The participants did receive support from WorkSafe Western Australia and from workplace occupational safety and health consultants and advisors. This enabled them to provide workplace safety and health education to their co-workers. All of the participants reported conducting workplace inspections for hazards, but only some of them were able to implement risk control measures, suggest the purchase of safety related resources to their manager and attend safety meetings.

The powers used by the participants included position power, information and expertise power, coercive power, interpersonal power, consultation and cooperation power; but not all of them used all of these powers.

Conducting the pilot study enabled the interview tool to be tested with local safety and health representatives before being used for the research study with a population of safety and health representatives who worked in the Western Australian mining industry. The pilot study enabled the validity and reliability of the research data collection tool to be tested and the results indicated that all of the pilot study participants understood the questions asked and that the questions were valid (measured what they were supposed to measure) and reliable (the same answer was given repeatedly by the same person for the same question).

The following is a description of the demographic information concerning the research participants from the mining industries. Nodes, sub nodes, and themes were created by NVivo 11 to conduct the analysis.

4.5 Mining Industry Safety and Health Representatives Demographic Information

A total of 41 Western Australian Mining Industry elected safety and health representatives participated in this research study. The inclusion criteria for participants was being 18 years of age or older and working in the Western

Australian mining industries as safety and health representatives. The first demographic factor reported by the participants was their gender (Table 29).

Table: 29. Research Study Participants' Gender

Gender	Number	%
Male	25	61
Female	16	39
Total	41	100%

In the Western Australian mining industry 17.8% of the workforce are female (Chamber of Minerals and Energy, 2015). For this reason the percentage of female safety and health representatives who responded was high (39% of respondents). Table 30 provides information on the age of the participants.

Table: 30. Age of Mining Industry Research Participants

Age in years	Number	%
Between 18-28	4	10
Between 29-38	20	49
Between 39-48	5	12
Between 49-58	10	24
59 and over	2	5
Total	41	100%

All mining industry participant safety and health representatives were over 18 years of age, with the most common age being between 29 to 38 years old (49%). Table 31 includes information on these participants' years of experience working as safety and health representatives in the Western Australian mining industry.

Table: 31. Years of Experience as a Mining Safety and Health Representative

Number of years	Number	%
Less than 1 year	7	17.07
1-2 years	3	7.31
2-4 year	16	39.02
4-6 years	8	19.51
6-8 years	5	12.19
9 or more years	2	4.87
Total	41	100%

The most common length of time (mode) working as a safety and health representative was 2 to 4 years. According to the Mines Safety and Inspection Act (1994, s. 57), representatives are elected for a period of 2 years each time they are elected. This means that if a person had been elected as a representative for 8 years, they had been elected 4 times by their peers in their workplace. The following table displays the number of years these research participants had worked in the Western Australian mining industry.

Table: 32 Year of Working in the Western Australian Mining Industry

Work years	Number	Years	Number	%
9 months	2	<1	2	4.8
1 year and 9 months	1	1-5	10	24.3
2 years	3			
3 years	2			
4 years	2			
4 years and 5 months	2			
7 years	5	6-10	14	34.14
8 years	3			
9 years	3			
10 years	3			
11 years	1	11-15	5	12.19
12 years	1			
13 years	1			
15 years	2			
18 years	3	16-20	5	12.19
19 years	1			
20 years	1			
22 years	2	21-25	2	4.8
30 years	1	26-30	1	2.4
37 years	2	>30	2	4.8
Total	41		41	100%

The total number of years working in the industry by the research study participants was between 9 months and 37 years with the most common length of time being between 7 and 10 years. Results indicated that most of the participants were experienced in working in the mining industry. Table 33 shows their employment position.

Table: 33. Employment Position of Mining Industry Participants

Employment position	Number	%
Shift laboratory technician	5	12.19
Mine surveyor	4	10.00
Truck operator	3	7.31
Electrician	3	7.31
Process operator	3	7.31
Haul truck, bulk water cart & 330 cat excavator rock breaker driver	2	4.87
Maintenance	2	4.87
Mechanical engineer	2	4.87
Mobile plant operator	2	4.87
Senior surveyor	1	2.43
Relief production supervisor.	1	2.43
Mine geologist	1	2.43
Project geologist	1	2.43
Process engineer	1	2.43
PO6 Process operator	1	2.43
Plant operator	1	2.43
Production operator	1	2.43
Project officer	1	2.43
Fixed plant fitter	1	2.43
Underground shot firer	1	2.43
Warehousing and logistics	1	2.43
Contract and permanent for another company	1	2.43
Confidential (participants did not want to say)	2	4.87
Total	41	100

A total of 41 participants were included in the research study, however, only 39 were willing to let the researcher know their employment position. One of the participants worked for a contracting company while the rest worked in various positions in mining companies. There was a wide spread of employment positions with the most common being a shift laboratory technician (12.19%).

Participants most commonly worked in a large mining company. Table 34 shows the sizes of the companies in which the participants worked.

Table: 34. Mining Industry Company Size

Company size	Number	%
Less than 100 employees	1	2.4
Between 100 and 999 employees	17	41.46
More than 1000 employees	23	56.09
Total	41	100%

Most of the participants worked for companies that had more than 1000 employees. In 2015-16 Western Australian mining companies with more than 1,000 employees included BHP Biliton (36,957); Alcoa of Australia Ltd (7,120); Fortescue Metals Group (10,275) and Hamersley Iron Pty Ltd (12,168) (Government of Western Australia, 2016). In Western Australia 20 companies (6%) have 1,000 or more employees; 66 (19%) have between 100 and 999; 234 (67.5%) have less than 100 employees and 26 (7.5%) have no employees as they are at the planning stage (R. Miners, personal communication, 18th July 2017). There are also international companies such as Rio Tinto that have 67,000 employees in more than 40 countries with 23,000 mining industry employees working in Australia (Rio Tinto, 2014). The participants in this study were a representative sample as most mining industry employees worked for the larger mining companies.

4.6 Safety and Health Representatives Roles

The role of Safety and Health Representatives is described in the Mines Safety and Inspection Act, 1994 of Western Australia. Table 35 shows the roles that the participants reported performing.

Table: 35. Role of Mining Industry Safety and Health Representatives

Roles	Number	% of 41
Conduct all processes involved with hazard and risk reports through workplace inspection. (Hazard identification & risk assessment)	38	93
Conduct risk assessments. (Hazard identification & risk assessment)	12	29
Conduct job safety analysis. (Hazard identification & risk assessment)	10	24
Conduct workplace incident investigation. (Hazard identification & risk assessment)	10	24
I only really read and signed incident reports after the investigations were done. I often provided feedback on them, and added in elements of the investigation that were missing. (Hazard identification & risk assessment)	7	17
Raised information about hazards to management. (Hazard identification & risk assessment)	6	15
Conduct safety audits. (Hazard identification & risk assessment)	2	5
Attend monthly HSR committee meetings, site safety committee meetings. (Committee meeting work)	25	61
Conduct safety meeting, prepare agendas, and create minutes for the staff. (Committee meeting work)	25	61
Chair weekly safety meetings, communicate monthly safety topics to the safety committee, and Communicate the outcome of safety meetings to workers. (Committee meeting work)	10	24
Attend quarterly safety representatives meetings. (Committee meeting work).	2	5
Attend safety meetings and prepare management directed meeting agendas. (Committee meeting work)	2	5
Plan for resources for safety, prepare, conduct, chair and report monthly technical services safety meetings. (Committee meeting work)	1	2
Manage the weekly administration building pre-start meetings, distribute and post the minutes on the notice board. (Committee meeting work)	1	2
Accompany mines inspectors and/or management for site inspections as required and liaise with mines inspectors when on site in regards to current PIN notices, meet and greet. (Communication)	4	10
Communicate issues or concerns raised by other crews and departments to my crew about safety issues. (Communication)	3	7
Follow up and action on any concerns brought to my attention with the appropriate department for any safety issues. (Communication)	3	7

Liaise with OHS Advisors and OHS Administrator to ensure safe work practices are being followed and act as a mediator between staff and manager for safety issues. (Communication)	2	5
Proactively promote safety ideas, safety culture and safety KPI's. (Communication)	2	5
Representation and guidance for any safety issues for crew. (Communication)	2	5
Share the findings from incident investigations in our weekly team meeting. (Communication)	2	5
Encourage and provide to staff safety culture information. (Communication)	2	5
Review and discuss work practices. (Communication)	2	5
Review and report on work procedures. (Communication)	2	5
Interact with key stakeholders about safety issues. (Communication)	2	5
Reviewing OHS policies and procedures and providing suggestions for improvement. (Communication)	1	2
Ensure all safety alerts, general alerts, inspection reports, minutes, documents and notices are posted promptly on the safety notice board. (Communication)	1	2
Liaise with other SHRs. (Communication)	1	2
Liaise with the Shire for any maintenance items required within the boundary of their lease. (Communication)	1	2
Discuss incidents, injuries and safety topics and corrective actions at pre-start meetings. (Communication)	1	2
Provide tool box meetings (Education)	12	29
Advisor and mentor to workers (Education)	3	7
Development of site based training packages. (Education)	2	5
Participate in OSH training. (Education)	2	5
Educate and enforce company procedures and policies. (Education)	1	2
Attend regional safety conference. (Education)	1	2
Organise and present at bi-yearly 'Safety Day' (100+ participants, safety focused booths and activities). (Education)	1	2
Development of safety management plans. (Document writing)	2	5
Development of site procedures for safety. (Document writing)	2	5
Safe operating procedures review and updates. (Document writing)	2	5
Maintain the safety data sheets register. (Document writing)	2	5

Assist manager with safety policy and procedures writing. (Document writing)	2	5
Data entry of hazard reports. (Document writing)	1	2
Develop reports on monthly hazard reporting. (Document writing)	1	2
Conduct research on safety issues (Research)	2	5
Research and develop answers and resolution for any safety issues raised by the staff. (Research)	2	5
Conducting drug and alcohol testing where required.	2	5
Provide and maintain emergency showers and first aid kits.	1	2
Total	220	

The participants reported completing many different types of duties with the most common being conducting workplace inspections to identify and report work related hazards (reported by 93% of participants) and to attend safety and health committee meetings (reported by 61% of participants). There were 220 different answers provided by the participants, which covered six (6) main themes:

- Hazard identification and risk assessment activities (85 responses).
- Committee meeting work (65 responses).
- Communication (with co-workers, management, resource safety inspectors and with the Shire; 28 responses).
- Education (22 responses).
- Document writing (12 responses).
- Conduct research (4 responses).

The Mines Safety and Inspection Act (1994, s. 53) records that the main roles of the safety and health representatives are to inspect their mine for hazard identification, be part of their workplace incident investigation team and cooperate and consult with the managers or mine operators and employees about any safety issues. Document writing was not included in the legislation as a safety and health representative's role.

Similarities in duties performed by the participants were found in both the pilot and main study. These were: involvement in conducting workplace inspections; hazard

identification and risk assessment and conducting incident investigations and attending safety meetings. What was different about the two studies was that the pilot study participants reported providing support, guidance and encouragement to staff to raise safety issues, suggested the purchase of safety related resources to their manager and provided manual handling training and guidance to staff. The mining industry participants were less proactive and just reported safety concerns to management.

One of the themes identified in this research was hazard identification and risk assessment. This was also identified as safety and health representative duties in Britain (Walters et al., 2001); New Zealand (Harris, 2010); Norway (Hovden et al., 2008); Sweden (Tragardh, 2008); Italy (Dazzi, 2008); Spain (Espluga et al., 2014) and in Canada (Hart, 2006; Hall et al., 2006). This indicates that identifying and assessing hazards is an important part of safety and health representatives work worldwide.

Having committee meeting work was less commonly reported as a duty with only representatives in Britain (Dimond, 2002; Walters et al., 2001) and Norway (Hovden et al., 2008) reporting this as a duty.

Communication was reported as an important part of safety and health representatives' work world-wide in relation to bringing employees' safety and health concerns to management (Walters et al., 2001; Harris, 2010; Walter & Frick, 2000; Hovden et al., 2008; Dazzi, 2008; Hart, 2006). Other important communication was managers' communication of workplace health and safety information to the safety and health representatives (Walters, Wadsworth, Johnstone & Quinlan, 2014); safety and health representatives communicating to co-workers (Wright & Spaven, 1999; Harris, 2010) and safety and health representatives communication with Inspectors or their legislative authority (Harris, 2010; Tragardh, 2008). These were similar to the duties reported by the Western Australian mining participants in this study.

Safety and health representatives in both the Western Australian mining industry and internationally reported receiving safety and health representative work related to

education (Hovden et al., 2008) and providing safety and health education to employees in their workplace (Hart, 2006).

Both document writing and conducting research were not reported as safety and health representatives' work in the published literature reviewed. Therefore this is new knowledge. Other tasks reported by this study's participants were conducting drug and alcohol testing, providing and maintaining first aid kits and emergency showers. These duties, and document writing, were outside of the legally required safety and health representatives' duties and were given to them to perform by workplace management.

In Canada safety and health representatives were reported as establishing standards to protect employees' safety and health at their workplace. The participants in this research did not report this as a duty. In New South Wales (NSW) in the coal mining industry health and safety representatives, under section 43 of the Work Health & Safety Mines Act 2013 NSW, reviewed the contents of their workplace safety management system and implemented this safety management system in their mine. This was another duty not reported by the research participants.

4.6.1 Hazard identification and risk assessment activities

In this study 85 responses were related to safety and health representatives conducting hazard identification and risk assessment activities. The activities were: workplace inspections to identify and assess work related hazards; risk assessment; job safety analysis; incident investigation; safety audits and involvement with hazard risk control management. After identifying the hazards in the workplace it was important to assess the level of risk associated with the particular hazard or each hazard which most of the research participants did. During the interview one of the participants reported:

I learn from my OSH course that purpose of the risk assessment and hazard control is to identify the hazards in the workplace and to implement control through hierarchy of control to eliminate or minimise the risk at workplace. I am involved with workplace inspection, during this process if I find any hazard, I follow the hierarchy of control process with my management support (if necessary) to eliminate that hazard from workplace.

According to the Mines Safety Inspection Act (1994, s. 53) one of the roles of a safety and health representative is to inspect their workplace. A study by Patrick (2016) in the health care environment and commercial construction industries was conducted to assess the well-being of employees. Using a workplace inspection instrument, the aim of the study was to identify workplace hazards and to reduce the risk of injury through risk control implementation. Patrick (2016) concluded that workplace inspections identified hazards and if appropriate risk control measures were implemented. This was an important part of workplace safety management in making the workplace safer for the employers and employees.

Walters et al. (2016a) documented that in Queensland the functions and rights of safety and health representatives are described in the Coal Mining Safety and Health Act 1999. In the Coal Mining and Safety and Health Act (1999, s. 1), the functions of the safety and health representatives are mine inspections; risk control procedures review; identifying any unsafe conditions and practices at their workplace and investigating miners' complaints and undertaking appropriate actions to protect mine workers. Safety and health representatives in Queensland can participate in accident investigation (part 8, in the Coal Mining Safety and Health Act, 1999, Queensland). This is similar to the role that the research participants had in this study under Western Australian legislation.

Similarly in New South Wales under the Work Health and Safety (Mines and Petroleum Sites) Act No 54 (2013, part 5 & s. 29, one of the main functions of a safety and health representative is to inspect their workplace. In the other Australian states and territories (Northern Territory, South Australia, Victoria, and Tasmania), health and safety representatives were given a legal right to inspect their workplace but the employer was responsible for implementing risk control measures for hazards identified by representatives in their workplace (Work Health & Safety [National uniform legislation] Act 2016, Northern Territory; Work Health & Safety Act 2012, South Australia; Occupational Health & Safety Act 2004, Victoria; Work Health & Safety Act 2012, Tasmania).

In Sweden safety and health representatives can appeal to the authority of the Swedish Work Environment, if they considered that the measures taken by their

employer are inadequate to reduce the risk of a workplace hazard causing harm to employees and can stop work if a hazard causes a dangerous workplace situation (Tragardth, 2008). Under the Work Health and Safety Mines Act of NSW (2013, s. 30) health and safety representatives can issue a suspension notice to the mining operator if there is a failure to comply with legal requirements and can issue a Provisional Improvement Notice (s. 34). Western Australian mining industry representatives have the same powers, but this was not mentioned by any of the research participants as something that they used.

In Western Australia mining industry safety and health representatives do not perform all of the functions that their counterparts do in Queensland under the Coal Mining Safety and Health Act (1999, part 8). Safety and health representatives in Queensland perform the following extra functions:

1. To control the risk at the coal mines they review procedures.
2. Take actions if they detect any unsafe practice and condition at the coal mines
3. Investigate safety related complaints from miners
4. Can make inquiries about the about the operations of their coal mine if they think this is in the safety interests of the coal miners.
5. To achieve an acceptable level of risk for the miners, they can examine any safety documents
6. Can inform the site senior executive if they believe that the safety and health management system and hazard management system documents are not adequate or ineffective to manage the safety at their mine
7. Can inform to the inspector if they believe that the site senior executive is not taking adequate actions for the safety management system at their mine.

This provides the representative in the Queensland coal mining industry with significantly more powers and involvement in workplace safety and health than the research participants have in the Western Australian mining industry.

Twenty four percent of the mining participants reported being involved in incident investigation. While others stated that they were not actively involved with the incident investigation and had only read and signed incident reports after the investigations were completed. Some participants said that they only provided

feedback and added in elements of the investigation that were missing. For example one of the participants said to the researcher:

My supervisor asked me to sign the incident report after the investigation was done. I often provided feedback on them, and added in elements of the investigation that were missing on that investigation report.

There was a similar finding with the pilot study participants in that only 20% of them reported being involved in an incident investigation. According to the Mines Safety Inspection Act (1994, s. 53, p. 103)

in the event of an accident, a dangerous occurrence, or a risk of imminent and serious injury to, or imminent and serious harm to the health of, any person, immediately to carry out an appropriate investigation in respect of the matter.

In this context, safety and health representatives should be fully involved with the investigation process rather than just providing feedback or adding missing information in the investigation report.

Being involved in an incident investigation has been a legal requirement since the Western Australian Mines' Regulation Act 1906 when there were workmen inspectors. However only 24% of the mining industry research participants reported being involved in an incident investigation. A further 17% stated that they signed the incident investigation form but were not involved in the actual investigation. Fifty nine percent of the research participants did not report any involvement in workplace incident investigations.

Internationally in the British Safety and Health at Work Act 1974, safety and health representatives are required to take part in the investigation of workplace incidents and hazards (Dimond, 2002; Walters et al., 2001; Wright & Spaven, 1999). This is also a representative's duty in New Zealand (Johnson & Hickey, 2008), Italy (Dazzi, 2008) and in Norway (Hovden et al., 2008). In Norway representatives also investigate individuals' complaints against the company (Walter & Frick, 2000) which is something that was not reported by the research participants. Hovden et al. (2008), also reported that in Norway representatives had a duty to inspect relevant

documents related to workplace safety and employees' health; this was not reported as a duty by the research participants.

In summary, there were research participants who took a leading role in incident investigations in their workplace, some of who provided feedback on completed incident reports. Some participants reported no involvement at all in workplace incident investigations. Similarly there were participants who were involved in committee meetings and others who were not.

4.6.2 Committee meeting work

According to the Western Australian Mines Safety and Inspection Act (1994, s. 65, s. 66), on request of a mine's employees the employer is obliged to establish a safety committee at the work site. The main functions of this committee are to assist cooperation and consultation between the employer and employees related to implementing safety and health measures at the mine (s. 63). Furthermore, a mining company's safety and health representatives can refer any matter to the safety and health committee if they believe it is related to a safety and health issue at their workplace (s. 53).

In this study 65 research participants' responses were related to attending meetings. Meetings attended by Western Australian mining industry Safety and health representatives included: monthly safety committee meetings; site safety committee meetings; quarterly safety representatives meetings; monthly technical services safety meetings and weekly administration building pre-start meetings.

One of the duties reported by research participants in relation to safety and health committee work was to prepare the meeting agenda. As an example a participant described how he prepared the safety and health committee agenda.

During preparation of agendas for safety committee meeting, I always include different issues to discuss which I collected from the employees as well from my managers. Also I include the previous outstanding issues to discuss to get to know the latest status of the outstanding issues.

Meeting committee work reported as being the duty of safety and health representatives included: communicating monthly safety topics to the safety

committee; preparing the agenda for safety committee meetings; chairing and conducting the meeting; writing and distributing the committee meeting minutes; posting minutes on the workplace notice board and communicating the outcomes of the safety meetings to workers.

In the pilot study 40% of the participants reported attending workplace safety and health committee meetings, but did not report doing the extra committee meeting work that the mining industry research participants reported. In Britain and in Norway safety and health representatives reported attending workplace safety and health committee meetings (Walters et al., 2001; Hovden et al., 2008). One of the roles of the representatives was to prepare the agenda for the workplace safety and health committee meetings (Dimond, 2002). There was no published literature identified that described safety and health representatives doing all of the other committee work that the Western Australian mining industry representatives reported completing.

4.6.3 Communication

Under the Mines Safety and Inspection Act (1994, s. 53), it is documented, to maintain a high standard of workplace safety, safety and health representatives are expected to communicate and consult with their managers and employees as follows:

- Liaise with the department, other sectors, private bodies and managers to keep informed about safety and health information.
- Report to their manager hazards, which can be a cause of harm to the employees.
- Refer any matter or issues to the safety and health committee, which they considers necessary.
- Cooperate and consult with their employer, mine manager, and employees relating to any safety and health issues.

In summary, the functions of the safety and health representatives include consultation and cooperation with their employer to assist with maintaining a high standard of workplace safety and health, liaising with the employees regarding safety and health issues at their workplace and keeping up-to-date safety and health

information provided by their employer. Communication is an important part of the representatives' work. The importance of communication was clearly described by one of the participants who stated:

Communication helps me to create a trust relationship, avoid conflict with all of my co-workers and managers. Using verbal communication with my co-workers helps me to understand clearly about the hazards at workplace.

The participants in this study reported 16 different situations in which they used communication as part of their safety and health representative work. This included: communicating safety related information to other departments; interacting with management and other key stakeholders about safety issues; communicating with other representatives to share safety related information; communicating with the Shire in relation to maintenance items required within the boundary of their lease and liaising with safety professionals and acting as a mediator between managers and other employees for workplace safety and health issues. Similarly, Hoven et al., (2008) reported that in Norway safety and health representatives participated in discussions with their employer about safety, health and welfare on behalf of the employees. Hart (2006) stated that in Canada safety and health representatives were required to make recommendations to their employer for safety management at their workplace. This was not one of the actions that the participants in this study reported on.

In Italy the role of a safety and health representative was to consult with their employer in the design stage of the workplace, work processes and prior to the purchase of equipment and products to prevent the risk of workplace hazards causing harm to employee's health and well-being (Dazzi, 2008). The research participants did not report this; however, they did state that safety and health representatives reviewed workplace safety and health policies and procedures and provided management with suggestions for improvements.

Harris (2010) reported that in New Zealand the role of the safety and health representative was to consult with inspectors about safety and health issues in their workplace. In this research 10% of the participants reported communicating with the mines' inspectors. As an example one of the participants stated that:

My manager always notify me when the mine inspector is coming to visit the mine because he allocates time for me to accompany the mine inspector. My manager also provides information if I need to get prepare myself to answer the questions of Mine Inspector about any safety issue.

One of the roles of the employer, in relation to working with their safety and health representatives, is to provide them with information to assist them with their work (Walters, Wadsworth, Johnstone, & Quinlan, 2014). Walters et al. (2001) wrote that an important part of a representatives' work is to raise safety issues with management. Most of the communication reported by the participants was one way with information being provided by the safety and health representatives to management. However some participants did report that management provided to them relevant safety information related to their area of work.

A large part of the mining industry safety and health representatives' communication was with employees, which included: communicating safety issues raised by other crews and departments with the employees in their area of work; promoting safety ideas; promoting a safety culture; sharing findings from incident investigations in weekly team meetings; reviewing and discussing work practices as well as reviewing and reporting on safety matters related to work procedures and ensuring that all safety and other alerts, inspection reports, safety meeting minutes, safety related documents and notices were placed promptly on the notice board to communicate this information to employees.

There was very little information provided by the research participants about them bringing the safety concerns of employees in their area of work to management. Hovden et al. (2008) wrote that in Norway the role of a safety and health representative was to participate in discussions with the employer about safety, health and welfare on behalf of the employees and to be a spokesperson for employees. In Italy, a safety and health representative's role was to prioritise workers' safety requirements when raising workers' workplace safety and health concerns to management (Dazzi, 2008). While in Canada, safety and health representatives were expected to receive occupational safety and health complaints

from employees and keep a record of these complaints (Hart, 2006). The research participants did not provide any information about performing any of these actions.

Wright & Spaven (1999) reported that in Britain one of the roles of workplace safety and health representatives was to encourage workers to follow safety rules. This was also one of the roles of the safety and health representatives involved in this study. Harris (2010) wrote that in New Zealand safety and health representatives assisted with fostering positive workplace safety management and communication with their employer about workplace safety and health matters. This was also a finding in this research study.

4.6.4 Education and other activities

One of the roles Safety and health representatives undertook in Canada was to provide safety education to employees (Hart, 2006). One of the most common educational activities provided by representatives (29%) in this research study was tool box meetings. Tool box meetings are an informal meeting and are usually conducted on site prior to the commencement of a work shift, or during a break, or at the end of a work shift. Tool box meetings usually focus on issues such as safe work practices, workplace hazards, health promotion, etc.

The participants in this study reported being involved with: developing training materials or packages (5%); being an advisor and mentor to workers (7%); participating in workplace occupational safety and health training (5%); organising and presenting information at a workplace Safety Day (2%) and in educating workers on company procedures and policies (2%). This demonstrates that, in the Western Australian mining industry the most common educational activity undertaken was providing tool box meetings. There was no published literature found that described safety and health representatives providing tool box meetings as a workplace safety and health educational activity to their co-workers. In the pilot study only the participants who were employed as manual handling trainers reported providing employee workplace education to their co-workers. No other educational activities were reported as being provided by the pilot study safety and health representatives.

A small number of the research participants reported that that they were involved in document writing. Documents that they reported having involvement in writing included: safety management plans (5%); site safety procedures (5%); reviewing and updating safe operating procedures (5%); maintaining a safety data sheet register (5%); assisting management in writing safety policies and procedures (5%); hazard report data entry (2%) and writing the monthly hazard report (2%). A research participant reported that:

Sometimes I involved with developing draft safety management plan, procedures writing as my manager encourage me to write it. I did my Diploma course of OSH, which helps me to do this job and also my manager always encourages me.

This indicates that, for a few safety and health representatives who had additional safety and health related education, their role had expanded into assisting management with their safety and health document development and reporting.

In the pilot study, participants were not involved any activities related to document writing. However, in the Queensland Coal Mining Safety and Health Act (1999, part 8) safety and health representatives are responsible for reviewing procedures and examining any documents relevant to the safety and health at their mine to check that appropriate risk measures are in place for the work that will be performed. Research conducted by Harris et al. (2012) in New Zealand identified that representatives employed as administrators provided secretarial support to their managers and were involved in the implementation, operation and improvement of their workplace occupational safety and health management system.

Two participants used research to assist with identifying solutions to workplace safety and health problems and to keep up to date with currently available workplace safety and health information. As an example one participant said:

I am very much interested to research regarding safety and health issues at mining industries. To keep up to date my knowledge about safety and health issues and solution of issues, safety management system helps me to argue/convince workers as well as managers about issues and solutions.

The Mines Safety and Inspection Act (1994, s. 53, 1c) states that one of the most important responsibilities of safety and health representatives is to keep up to date with information about safety and health provided by the employer or managers at their mine and to liaise with the other bodies and government. None of the pilot study safety and health representatives reported being involved in research. No published literature was found about other safety and health representatives being involved in research work.

Other activities that the research participants stated as part of their safety and health representative role were conducting drug and alcohol testing (5%) and providing and maintaining emergency showers and first aid kits (2%). It is likely that these were part of their normal employment duties rather than being part of their safety and health representative duties, as conducting this work was reported by very few of the participants and there was no published literature related to this being part of a safety and health representative's role.

4.6.5 Safety

To identify the most common words used by the participants in relation to their role as a safety and health representative in the WA mining industry a word cloud was developed. The word cloud (refer Figure 6) identified that the work of the safety and health representatives was focused around safety.

diploma course in his own time. He reported that in the diploma course he learnt how to implement a safety management plan at a workplace and how to motivate employees to work safely through communication. What he learnt during his studies made him more confident in performing his work as a safety and health representative at his workplace.

4.7 Management Support

As management support is important for safety and health representatives, the first research question was:

What support does workplace management provide to safety and health representatives in the Western Australian mining industries to enable them to work effectively in promoting occupational safety and health?

Table 36 provides the participants responses to this question.

Table: 36. Support that Workplace Management Provide

Sub Nodes: Management support	Num.	% of 41	Level
Very strong focus on safety by our Chief Executive Officer (CEO).	1	2	Top management
Training for safety course.	15	37	Middle
Do presentations on health and safety during weekly meetings and the development of a monthly toolbox-style safety meeting. Management provide resources.	7	17	Middle
Support from management for daily meetings.	3	7	Middle
Research and edit presentation information.	2	5	Middle
Enough time to prepare and conduct mining safety meetings.	1	2	Middle
Quarterly safety reps meetings with safety reps from across each site.	1	2	Middle
Upper management are informed of any matters, which require further discussion and support operational improvements.	1	2	Middle
Very strong and participative support from my manager.	1	2	Middle
Very strong and participative support from my superintendent.	1	2	Middle
Very strong and participative support from my compliance manager	1	2	Middle
Time off for safety work or to prepare for safety meetings.	24	58	Supervisor
Resources: videos, PPE, information about safety, unlimited access to external sites i.e. DMP – Resources Safety, SAI Global, general internet access, unlimited access to company's health and management safety systems. Computer access, data base access, and communication devices.	15	36	Supervisor
Time to attend monthly meetings.	10	24	Supervisor
Provision of suitable PPE for any task.	1	2	Supervisor
Management encourages sharing task with other OSH Representatives.	1	2	Supervisor
Management provide time and encourage going to different workplaces to observe my colleagues doing a task and providing feedback.	1	2	Supervisor
Provision of free flu vaccinations for all staff.	1	2	Supervisor
Site safety committee meetings.	1	2	Supervisor
Time out of the truck to enter hazards into the database.	1	2	Supervisor
Immediate supervisors and managers are not supportive of my SHR role (do not provide safety information, time off for safety work, not encourage to attend safety meeting). We have to do our safety activities in our own time.	3	7	No management support
Safety consultant provides some support but it does not work because management does not support.	1	2	No management support
Total	93		

The majority of the participants received their support from the middle management and from their workplace supervisor. Only one participant reported receiving support from top management. There were 93 different answers provided by the participants, which covered three (3) categories of management who provided support for safety and health activities.

4.7.1 Top management support

Top management normally includes the Chief Executive Officer (CEO), mine manager, and so forth. This level of management is involved in formulating the company's policy, philosophy and strategies to successfully run and achieve the goals of the company (Top Notch Consultancy, n.d.). In the pilot study, no participants reported receiving support for their safety and health work from top management, however, in the mining industry study, one participant did report receiving support from top management. This participant said:

Our Chief Executive Officer (CEO) has very strong focus on safety. He keeps up to date information about safety in the mining industries. I think it is possible for him because, he worked as a Safety Manager before and our company is very small. But I think it is an advantage for me because, sometimes he calls me to get the information about safety issues in the workplace which is a very rare chance for Safety and Health Representatives for other companies.

The research of Walters et al. (2014), identified that safety and health representatives had mixed experiences (positive and negative) of support for their workplace representative duties from senior management. Some representatives stated that they received time, resources, and facilities from their senior management to perform their role successfully and that sometimes it took time to build a relationship with senior management (Walters et al., 2014). Other representatives experienced conflict with their mine manager when performing their legal duties (Walters et al., 2014).

A study by Galvin (2016) showed that in companies that have a board of directors the board have the ultimate responsibility for workplace safety and health. He conducted research in the Australian mineral industries and concluded that:

A board needs to have a good understanding of the risks that it is charged with controlling and have policies and procedures in place that provide it with assurance that management has developed and implemented systems that are effective for managing these risks. (Galvin, 2016. p. 59)

Safety and health representatives can assist top management with understanding work related safety and health risks provided good communication exists between them.

Sinclair and Cunningham (2014) expected that top management would be more proactive in promoting workplace safety and employee health in small rather than middle and large size companies. In the Western Australian mining industry research study it was noted that the one safety and health representative, who reported interaction with the company CEO, worked for a small company where communication between the two was functional.

Sinclair, Martin, and Sears (2010) stated that top management has a major financial interest in safety when safety and health issues signify a huge productivity and financial cost at the workplace. This indicates that for all workplaces safety and employees' health are important factors.

Walters et al. (2016b) conducted qualitative research with 18 site safety and health representatives in the Queensland mining industry. One of their research findings was that by

careful use of their statutory powers, representatives operate effectively in identifying and requesting corrections to address fatal risks; reviewing and suggesting modifications to OHSM systems where necessary; and very occasionally ordering the stoppage of work in situations where consultative approaches have failed or serious and immediate risks are evident. (p. 392)

This study identified that some senior management in the participants' workplaces offered *reasonable help* to assist them in performing their role as safety and health representatives. While other participants reported: not having adequate resources or facilities from senior management; poor responsiveness from the senior management

when they raised and communicated safety and health issues at the workplace and lack of consultation about workplace safety and health issues by senior management.

Milgate, Innes, and Loughlin, (2002) reported that some organizations include safety and health agendas for day-to-day management, which demonstrated support and commitment from top management for safety and health at the workplace. This is because top management influences the culture and practices in their organization and the support that is provided to the safety and health representatives enables them to be more proactive about safety and health issues at their workplace.

Sinclair, Martin, and Sears (2010) in the United States of America conducted research that identified that the central stakeholders for workplace safety are top management, the immediate supervisors, the workers and their labour union; with the most important being top management and the workers' immediate supervisors as their actions and activities set the priorities regarding safety and health at the workplace.

Research conducted in Australia by Biggins et al. (1991), Langford et al. (1993) and Biggins et al. (1998); in the United Kingdom by Walters et al. (2001); in Sweden Tedestedt (2014) and in Norway by Hovden et al. (2008) identified that cooperation from management can impact positively on the effectiveness of the roles of safety and health representatives in the workplace. Shannon et al. (1997) identified that, according to safety and health representatives, cooperation and safety empowerment from top management enhanced their capability to participate in the decision making process about safety at their workplace. The results of this research suggested that as well as having support from the top management it was important for safety and health representatives in the Western Australian mining industry to have middle management support to allow them to perform their roles effectively.

4.7.2 Middle management support

Research participants described the support they received from middle management who included area managers, superintendents, and compliance managers. The highest level of support received by the research participants from middle management was allowing representatives to attend the 5 day introductory Safety and

Health Training course as required in the Western Australian Mine Safety and Inspection Act 1994. On this topic a participant said:

My workplace provides me with a five day Safety Rep course along with ongoing training throughout the year. Every Monday we are able to attend a two hour safety development course concentrating on different aspects of safety around our site. We are given any time we need to complete investigations and any other safety related issues.

Another participant stated that the:

Five day OSH training makes me aware about the knowledge of Safety and Health Act, risk assessment, hazard management, and whole safety management system. I implemented all my knowledge to mentor the employees at workplace.

These two quotes both identify that the safety and health representatives used the knowledge that they gained to improve workplace safety.

Although some middle managers were supportive (middle management support was provided to 37% of participants) it was noted that 63% of the participants did not report receiving any support to attend the 5 day Safety and Health Training course to learn about their roles as safety and health representatives and how to perform it.

Leopold and Beaumont (1982); Beaumont, Coyte, and Leopold (1981), Walters and Nichols (2006) all wrote that managers who actively participated in occupational safety and health generally focused on their legal obligation for workplace safety and valued having a safe workplace, safe work procedures and worker's safety and health. Attending the 5 day introductory safety and health representatives' course was a legal requirement that two thirds of the middle managers did not support. Tedestedt (2014) stated that safety and health representatives' rights are included in legislation. Under the Work Environment Act of Sweden (2001) safety and health representatives are entitled to participate in training for safety and health, which is supported by their management to enhance the effectiveness and performance of the representatives.

Some participants revealed that middle level managers supported them by allowing work time off to do a presentation on health and safety during weekly meetings and

for the development of a monthly safety meeting (17%). In this context, one of the participants made positive comments about middle management to the researcher and said:

Management gives me guidance when I run/organise the weekly safety meetings. They will help me convey ideas, or step in if I am not quite getting the idea across. They encourage me to get out into different workplaces to observe my colleagues doing a task and provide feedback. They have provided me with some appropriate training.

One participant reported receiving strong support from middle management, another from the superintendent and a third participant reported receiving strong and participative support from their compliance manager. This indicates that three middle managers did provide a high level of support for safety and health representatives. Studies by Zohar (1980) and Mearns et al. (2001) found that the nature of the workplace safety culture is an indicator of management's commitment to safety and safety culture, which can impact on the participation and effectiveness of the roles of safety and health representatives at their workplace. Therefore, three of the middle managers were promoting a positive workplace safety culture.

Cho and Park (2011) research results identified that employees' trust in their managers and supervisors enhanced overall safety at their workplace because honest communication about reporting incidents and hazards by safety and health representatives was more likely to occur.

4.7.3 Supervisor support

The highest level of support received by participants was from supervisors who allowed representatives to have work time to perform their duties. Fifty eight percent of the participants in this research study reported being allowed by their Supervisor to use work time to do their safety and health representatives' work while 42% reported not being allowed any work time for performing these duties.

The next most common type of support provided by supervisors was to provide resources to enable the safety and health representative to be able to do their safety and health work (36%), and to attend monthly safety meetings (24%). There were 6

other tasks that individual participants recorded during their interviews receiving support from their supervisor to do, indicating that this support was related to the individual's workplace and was not common across the Western Australian mining industry. These tasks were:

- Upper management are informed by my supervisor of any workplace safety and health matters that I bring to my supervisor's attention which require further discussion and support operational improvements.
- Allowed work time to research and edit safety and health presentation information as required.
- My supervisor encourages sharing work related safety and health tasks with other Safety and Health Representatives.
- My supervisor provides time and encouragement for me to go to other workplaces to observe colleagues doing a work task safely and providing feedback on what was learnt.
- Provision of free flu vaccinations for all staff by workplace supervisor.
- Time out of the truck to enter hazards into the database is provided by my supervisor.

The most common support from the workplace supervisor for safety and health representatives was to provide time and resources, but it was evident that some of the mining research participants received other work related support from their supervisor. Supervisors control the day-to-day work in an area (Victorian WorkCover Authority, 2014). They normally allocate work tasks to be performed, ensure employee competency in performing work, provide information, instruction and training in performing the work safely and supervise the performance of the work (Victorian WorkCover Authority, 2014). There is a responsibility for good two-way communication and consultation between the supervisor and the safety and health representative to enable both to perform their work effectively (Victorian WorkCover Authority, 2014). It was evident in this research that some supervisors were meeting their legal responsibilities.

Some participants made positive comments regarding support from their immediate workplace supervisor. As an example a safety and health representative said:

Management gives me guidance when I run/organise the weekly safety meetings. They help me by conveying ideas, or step in if I am not quite getting the idea across. They encourage me to go out into different workplaces to observe my colleagues doing a task and provide feedback. They have provided me with some appropriate training.

Supervisors are responsible for the day-to-day management of work in their area of responsibility. These first line managers may coach, mentor, and advocate for employees whose work they supervise (Authenticity Consulting, LLC, n.d.) For example, one participant stated that:

Our supervisor plays dual role. During production time, we see they play as part of management, but other time, he is coach, mentor, and friend of us.

This participant stated that he believed his supervisors were very knowledgeable about production. Supervisors were aware that production was the first priority but at the same time the supervisor provided friendly advice and suggestions about safety especially in relation to how they (safety and health representatives) could maintain a safe work environment. As a coach the supervisors helped the employees to perform their role well as mining employees in a safe work environment.

Sinclair, Martin, and Sears (2010) in the United States wrote that supervisors may worry about safety at their workplace because safety related issues can affect subordinate staff, slow production and increase costs, particularly if work related fatalities occur. Joint consultation between management and safety and health representatives enables managers to understand workers concerns and assists with employees' commitment to a positive safety culture (Nichols et al., 2007; Nichols & Walters, 2009; Walters & Nichols, 2006).

Watson et al. (2005) research results identified that employee's trust in their supervisors and other managers can enhance overall safety at the workplace, because honest communication about reporting incidents and hazards in an organisation can impact on the effectiveness of the role of safety and health representatives. Holland et al. (2017) conducted a study with 1,039 Australian nurses. The aim of their study was to examine the relationship between the role of supervisors' support and

engagement of employees. This study examined “the direct voice mediated by trust in management” (Holland et al., 2017, p. 925). Data was collected through an online survey and concluded that “supervisor support and direct voice are positively associated with employee engagement, and these relationships are mediated by both supervisory and senior management trust” (Holland et al., 2017, p. 925).

In the pilot study 60% of the participants reported receiving support from management to attend daily safety meetings while 20% were allowed time off work to perform their safety and health representative work. In comparison 7% of the mining industry participants reported receiving support from management to attend daily meetings (less support than in healthcare). However 58% of the participants were provided by their supervisor with work time to complete their safety and health representative work, an indication that the mining industry safety and health representatives were better supported by management than their healthcare counterparts.

Of the 3 levels of management the mining industry participants reported receiving the most support from the persons who controlled their daily work, their supervisor, who allowed time to do safety work, followed by receiving support middle management who allowed them to receive their role related education.

Table: 37. Management Support by Participant’s Gender

Gender	Number	Top		Middle		Supervisor		No support
		YES	NO	YES	NO	YES	NO	
Male	25	0	25	7	18	12	13	4
Female	16	1	15	5	11	11	5	0
Total	41	1	40	12	29	23	18	4

When considering management support by gender it was noted in the above table that one female, and no male participants reported receiving top management support. For middle management support 72% of males and 69% of females reported having *no* management support for their safety and health representative work. The most support was reported as being received by their immediate supervisor with 69% of females and 48% of males receiving this support. There were 4 participants who received *no* support from any level of management. The

employment position was also considered in relation to management support. The following table shows management support by employment position.

Table: 38. Management Support by Employment Position

Employment Positions	Numbers	Top Management Support		Middle Management Support		Supervisor Support		No Management Support
		YES	NO	YES	NO	YES	NO	
Shift laboratory technician	5		5	4	1	1	4	
Mine surveyor	4		4	2	2	1	3	1
Truck operator	3		3		3	1	2	2
Electrician	3		3		3	3		
Process operator	3		3		3	3		
Haul truck, bulk water cart & 330 Cat excavator rock breaker driver	2		2		2	2		
Maintenance	2		2		2	1	1	1
Mechanical engineer	2		2		2	2		
Mobile plant operator	2		2		2	2		
Senior surveyor	1		1	1			1	
Relief production supervisor.	1		1	1			1	
Mine geologist	1		1		1	1		
Project geologist	1		1	1			1	
Process engineer	1		1		1	1		
PO6 Process operator	1		1		1	1		
Plant operator	1		1	1			1	
Production operator	1		1		1	1		
Project officer	1	1		1		1		
Fixed plant fitter	1		1	1			1	
Underground shot firer	1		1	1			1	
Warehousing and logistics	1		1	1		1		
Contract and Permanent for another company	1		1		1	1		
Confidential	2		2		2	2		
Total	41	1	40	14	27	25	16	4

In the above table the employment position with top management support was a Project Officer. This participant was the only one to have support from all levels of management. Employment positions with middle management support were shift laboratory technicians (80%), mine surveyors (50%) and the project officer. A senior surveyor, relief production supervisor, project geologist, plant operator, fixed plant fitter and an underground shot firer only had middle management support for their work as safety health representatives.

Some of the employees with middle management support were senior mine staff while others performed production work. When conducting research with 3,578 Australian employees, some of whom worked in the mining industry, Sheehan et al. (2016) research results identified that middle managers attitude and actions was the strongest predictor of the organisation's safety climate, as they had a higher status than workplace supervisors and middle management worked closely with employees.

Participants with supervisor support worked as shift laboratory technicians (20%), mine surveyors (25%), truck operators (33%. 100% did not have any other level of management support), Maintenance workers (50% had supervisor support. 100% did not have any other level of management support), the Project Officer, Warehousing and Logistics Safety and Health Representative.

The following employment positions had supervisor support, but did not have any other level of management support: electricians; process operators, haul truck workers, bulk water cart & 330 cat excavator rock breaker driver; mechanical mobile plant operator; mine geologist; process engineer; PO6 process operator; production operator and a safety and health representative who had contract and permanent employment in another company. For many of the participants there was only one level of management support for their work and this was most commonly their immediate supervisors' support.

There were 4 participants who reported that they received no management support from any level of management for their safety and health representative work. These participants worked as a mine surveyor (1 of 4 mine surveyors), truck operator (2 of 3 truck operators) and maintenance worker (1 of 2 maintenance workers).

4.7.4 No management support

Ten percent of the mining industry participants stated that they did not receive any support from their managers or supervisors. Under the Mines Safety and Inspection Act (1994, s. 62), safety and health representatives are permitted to take time off from work with pay to do their safety activities. These participants did not get time off for safety work, to attend the safety meetings and reported not getting any safety information from their managers. These participants had to do all of their safety and health representative work in their own time. In the pilot study 20% of the participants also reported not having any support from management and having to do all their safety and health representative work in their own time.

Similarly Walters et al. (2014) in their study in the Queensland mining industry reported that some of the safety and health representatives indicated that they were allowed work time and were provided with the required resources from their management to perform their work. While other representatives said that they did not receive any time, resources or support from their management to perform their roles.

The following are comments from the four male mining participants who reported a lack of support from management at any level. The first example is as follows:

My supervisor is not supportive at all for my safety activities. I do not get time off to do my safety activities, not getting resources for safety activities, or no time to attend the safety meeting. My supervisor thinks that it is waste of time for him and for me.

Another participant said to the researcher:

I am frequently denied the time I require for hazard investigation and have to complete a lot of my investigations in my own time outside of work. Some hazards I raise are also dismissed or not rectified by the managers until I present them to the Safety and Compliance Manager or higher management. I am also discouraged from promoting or presenting safety related education or training at safety meetings due to time constraints.

Similarly a third participant said:

I was provided the 5 day training shortly after being elected. I was provided with some time to attend meetings when they fell during work time, but pretty much everything else was to be done in any spare time around normal duties

or at the beginning or end of shift. There were no specific additional time allowances to complete the duties.

The fourth participant reported:

Do not get support very often. We are not trusted or appreciated, mainly by the middle management rather than at the top. The role once again is not valued and respected as it should be therefore it does not reflect the importance of a Safety Rep. Because of this many personal won't even take on the role as it is believed to be just a waste of time as on many occasions your input falls on deaf ears.

Similarly research by Hillage et al. (2000) and Walters, Kirby and Daly (2001), found that some workplace managers were focused on increasing production and failed to implement requests from safety and health representatives for workplace safety related changes. Hovden, Lie, Karlsen, and Alteren (2008) in Norway stated that safety representatives reported not having the time, competency, training or resources to be able to do their representative work. Representatives also informed the researchers that they lacked management support when issues were raised and that management were unwilling to listen to them and that this resulted in poor motivation to improve workplace safety. According to these researchers the representatives perceived they had minimal influence on long term planning, workplace changes that influenced safety and on workplace safety generally. Managers however saw themselves as supportive of safety representatives and valuing their work (Hovden, Lie, Karlsen, & Alteren, 2008). These three research studies illustrate that the lack of support given to safety and health representatives by some managers is not localised to the Western Australian mining industry. Rather it is an international problem, with managers not perceiving how important their support of the work safety and health representatives do is.

4.7.5 Word cloud for management support

A word cloud was developed to identify the most frequently used word by participants when stating the *support that workplace management provide*. The word cloud identified that the most frequent word was *safety*.



Using Word Frequency queries the word cloud (Figure 7) identified that *safety* was the most frequent word used by the participants when describing the support that was provided to them by top, middle and first line supervisor managers. The word *health* was not mentioned indicating that these participants mainly had management support for safety related activities.

As well as receiving management support for their representative work the participants reported receiving work related support from other sources.

4.8 Other Support for Safety and Health Representatives.

Table 39 shows the support provided by other employees to safety and health representatives.

Table: 39. Other Support Provided to the Safety and Health Representatives

Sub Nodes: Other support	Number	% of 41
Support from co-workers	9	22
All the team leaders for the warehouse department provide support and openly discuss any matters which are relevant to safety	8	20
Support from other Department Safety and Health Representatives	2	5
Safety Consultant	3	7
Safety Department	3	7
OHS Advisors and OHS Administrator	4	10
Site Safety Advisor	1	2
Total	30	

Besides management support, the participants said that they received support from: co-workers (22%); other safety and health representatives (5%); safety and health advisors; consultants and administrators (27%) and the team leaders from the warehouse department (20%). (This was not where the participants worked). The team leaders from the warehouse department worked with the safety and health representatives to conduct the workplace inspections. In this study of safety and health representatives who worked in the Western Australian mining industry the highest level of support, apart from management support, was from safety and health professionals and from their co-workers.

A study by Walters et al. (2014) showed that safety and health representatives received support from their co-workers for identifying and raising work related safety and health issues. As they are elected by their co-workers representatives are usually employees that the other workers in their workplace feel comfortable talking to, and therefore have their support in implementing safety and work related health improvements (Walters et al., 2014).

Walter and Haines (1988) stated that sometimes safety and health representatives had difficulty in resolving occupational safety and health issues at their workplace. According to the authors, this was because the representatives were unable to influence management. The representatives found that it was easier to gain management co-operation towards resolving workplace safety and health issues if the

issues were brought to the management's attention with collective co-workers support (Walter and Haines, 1988). Safety and health representatives also received support from co-workers to identify workplace hazards and through co-workers' suggestions for hazard risk control measures (Beaumont, 1981; Espluga et al., 2014).

Safety and health representatives know the specific hazards and risks in their workplace, but are not responsible for having expert knowledge, solving problems or implementing risk control measures. This expertise is the responsibility of the safety and health professionals who can include safety and health advisors, ergonomists, occupational hygienists and so on. Safety and health representatives can bring their findings and concerns of employees in their workplace to the safety and health professionals for advice and action. In this research study the Western Australian mining industry safety and health representatives reported doing this and receiving support in their work from the safety and health professional staff. Safety and health representatives can also assist the safety and health professionals when investigating any accidents that occur in their workplace. When safety and health professionals provide information and education to representatives there is good two-way communication between them, which helps both to be more effective in their work (Biggins & Philips, 1991).

In this study examining the role of safety and health representatives in the Western Australian mining industry the safety consultant, safety department members, occupational safety and health advisor and the OSH administrator provided support to the safety and health representatives. They provided research participants with safety and health related information to keep up to date with current safety and health knowledge available for the Australian mining industries. Safety professionals and other safety and health representatives provided advice to the research participants on how to analyse their workplace safety data in the existing workplace data base; provided information about the contents of the safety and health management system in their workplace, Material Safety Data Sheets explanation, job safety analysis, workplace inspection and other factors related to their safety and health representative's work. The Safety Consultant and Safety Department were reported by representatives as guiding them on how to do the risk assessment when new equipment arrived at workplace.

One of the participants reported receiving support from a safety consultant, but was unable to do anything related to workplace safety and health because there was no management support. This participant told the researcher:

Our safety consultant is very helpful if we go to him and ask for help. My Supervisor does not like this. He does not like to allow us to use the resources for safety activities if safety consultant says to use any resources. My supervisor always says about money and cost cutting for resources.

This highlights how important management support is to the role of safety and health representatives. Soehod (2008) undertook a study to assess workers' involvement in safety and health at their workplace. He concluded that workers' involvement was very important, but also important was support from management, training, legal support and trade union support to contribute to having a high standard of safety and health in the workplace (Soehod, 2008).

The pilot study identified that healthcare safety and health representatives had support from their union for their representative activities. The main study's mining industry safety and health representatives did not report any support from their union. One of the mining industry participants said:

I have had continual conflict with certain members of the union. I am not entirely sure what has warranted their immediate disgust and hatred toward me. Even though I am a member and have been a member of the union since first starting my job, they have always managed to find one way or another to belittle/ degrade me and my work. So far I have just documented these events as a record but at the time of doing this survey, I am in the process of lodging formal grievances against certain parties for harassment/ bullying/ sexual discrimination. I have never been one to play the female card but as informal processes have reaped no reward this is the only avenue remaining for me to pursue. Thankfully the company has a very good management plan/ policies/ procedures relating to such matters.

In Western Australia 98.5% of mining workers do not belong to a union with the majority of the union members working in the coal mining industry in the south west of the state (CFMEU, 2013). In the Western Australian coal mining industry members of the Construction, Forestry, Mining and Energy Union (CFMEU) went on strike for 184 days and returned to work on the 14th of February 2018 when they

were offered work at their pre-strike rate of pay. The reason for their strike was due to the Griffin mine owners reducing 29 maintenance workers' wages by 46% (Gooding, 2018). In this situation the miners were supported by their union, however, the support was related to maintaining wages, not workplace safety and health.

A study conducted by Walter and Johnstone (2017) was based on the involvements of safety and health representatives in five countries: Canada; Australia; Indonesia; India and South Africa. These researchers conducted interviews with: trade unions, regionally and nationally; government inspectors; mining workers and other key parties. The authors discovered that safety and health representatives did not get support from mine management. Rather, it was the trade unions that provided support to the representatives to resolve safety and health issues in their workplace (Walter and Johnstone, 2017). This was different to the findings of this study in the Western Australian mining industry.

In Queensland, Walters, et.al. (2016a) conducted a qualitative study with 18 safety and health representatives from the coal mines. This study highlighted that in a hostile or aggressive labour relations climate both the union and safety and health representatives can play a positive role.

Research conducted by Walters et al. (2014) in Queensland identified that the mine inspectorate provided support to the safety and health representatives. The participants in this study did not mention if Resource Safety or its inspectors were used for support in their safety and health representative duties. The pilot study participants however did report receiving support from the legislator, WorkSafe Western Australia.

The words that the research participants said in their interview were put into NVivo 11 and analysed using NVivo's Word Frequency queries. From this analysis of words related to the support that the research participants received the following word cloud (Figure 8) was created. The most frequently used word was *support* followed by *participant*. This support was from another department, co-workers, safety professionals and from other safety and health representatives.



Figure: 8 Other Support Provided to the Safety and Health Representatives

This *support* was for the person with the next most common word used being *participant* indicating that this support was more a two way support process and was freely given support, rather than meeting legal requirements for support. It was again shown in the word cloud that the support was more for safety work than employee health as safety and not health was mentioned.

4.9. Summary of Safety and Health Representatives' Support

The first research question was: *What support does workplace management provide to safety and health representatives in the Western Australian mining industries to enable them to work effectively in promoting occupational safety and health?*

Based on the findings of this research the answer is that not all safety and health representatives reported being supported by their managers.

Support provided by top management was to promote a strong safety culture throughout the organisation. If the safety and health representative received support from top management then this person received support from all levels of management. See table 38.

Support provided by middle management was perceived as allowing safety and health representatives to attend a mandatory safety training course and to allow representatives to share their safety knowledge with co-workers. More safety and health representatives reported receiving support from middle managers than from top management.

Safety and health representatives received the most support for their role from their supervisors. This support was in the form of allowing representatives work time and resources to undertake their duties and to attend safety meetings.

Apart from what was required by legislation most of the participants in this study received very little additional support from management. As well as receiving management support a few of them received support from safety professionals, staff in another department, co-workers and other safety and health representatives.

4.10 Chapter Summary

This chapter has reported the results of the pilot study and compared those results with those of the main study on safety and health representatives working in the Western Australian mining industries. A major difference between the two groups was that the participants in the pilot study reported receiving positive support from their union related to making their role more effective. Two mining industry research participant reported interaction with their union. This interaction was reported as being non supportive with one of the participants lodging a formal grievance complaint for harassment, bullying and sexual discrimination against certain union members.

One mining research participant identified support received by top management, but none of the pilot study participants did. The pilot study participants reported receiving legislative body support, but this was not support that the mining industry participants included. However the mining industry participants did report meeting and accompanying mines inspectors when visiting their workplace, accompanying them for site inspections and liaising with them when the inspectors were on site in regard to PIN notices.

This chapter examined the role of mining industry safety and health representatives. Their main duties were reported as being involved in: hazard identification and risk assessment; attending meetings; communicating workplace safety and health information and providing, or receiving, safety and health education. This research has identified that representatives, in some workplaces, were also doing management work, particularly in relation to document writing and research.

The next chapter reports on the powers the Western Australian mining industry safety and health representatives have and the methods they use to influence the achievement of a high standard of health and safety in their workplace.

5. RESEARCH RESULTS – SAFETY AND HEALTH REPRESENTATIVES INFLUENCE

5.1 Introduction

The previous chapter included the results of the pilot study, Western Australian mining industry research participants' demographic information and responses about participant's role as a safety and health representative and their perceived support from management. This chapter presents the research results that were used to answer the second research question:

What power and methods do safety and health representatives in the Western Australian mining industries use to influence the achievement of a high standard of health and safety in their workplace?

To answer this research question, Western Australian mining industry research participants expressed their opinion about what powers they use to influence the achievement of a high standard of health and safety in their workplace; how they influence employees to work safely; their influence over the purchase of equipment; products used; safety of work processes; safe management practices and what factors they considered influenced their effectiveness in promoting safety and preventing employee work related injury and ill- health at their workplace.

5.2 Powers and Methods Used

5.2.1 Power to Influence

To be effective in improving and maintaining a high standard of workplace safety as well as preventing work related employee ill health, safety and health representatives in the Australian mining industry need to have the power to be able to influence their co-workers, management and other people who are involved in workplace safety (Walters, Wadsworth, Johnstone, & Quinlan, 2014). Dahl (1957) [cited in Antonsen, 2009, p. 185] defined power as the “individual's ability to carry out their will in a given situation”, while Lukes (2005) [cited in Antonsen, 2009, p. 186] defined power as promoting people “to have the desires that you want them to have”.

The mining industry research participants were asked what powers they used to influence the achievement of a high standard of health and safety in their workplace. Their answers are included in the following table.

Table: 40. Safety and Health Representatives Powers Used

Types of powers	Number	% of 41
Use consultation power	8	19.5
Use safety & health committee	7	17
Position power	6	14.5
Use consultation and cooperation powers only	5	12
Use information and expertise powers only	5	12
Establish a level of trust through being an effective role model	4	10
Use interpersonal power	4	10
I listen to employee's concerns and take them seriously judging each case on its merits and not being judgemental	2	5
Use coercive power	2	5
Use position power, information and expertise powers, coercive power, interpersonal power, consultation and cooperation powers and work through the safety and health committee	2	5
Use of Department of Mines and Petroleum guidelines and safety shares	1	2.5
As a SHR, none	5	12
Total	51	

The use of power varied: from participants who stated that they did not have any power to influence the achievement of a high standard of health and safety in their workplace (12%) to those who reported using position power, information and expertise powers, coercive power, interpersonal power, consultation and cooperation powers and work through the safety and health committee (5%).

In the pilot study none of the participants stated that they did not have any power. Comparing the pilot study participants and mining participants experiences it was clearly demonstrated that support from management was very important for safety and health representatives to perform their roles effectively. Both the principal employer and the mine manager have the employer responsibilities documented in the Western Australian Mine Safety and Inspection Act 1994. A study by Walters et al. (2014) identified that some safety and health representatives in the mining industry in Queensland received support from their top management to perform their duties; while others experienced conflict with their mine manager when performing

their legal duties, indicating that not all representatives had management support. Harris et al. (2012) conducted research that reached the same conclusions. In this study the lack of management support may have been a key reason why 12% of representatives reported having no power to influence the achievement of a high standard of health and safety in their workplace (Harris et al., 2012).

The most reported powers by the mining participants in this study were consultation [36.5% (19.5% +5% +12%)], their work on the safety and health committee [22% (17% + 5%)] and their position power as a safety and health representative [19.5% (14.5% + 5%)]. The Mines Safety and Inspection Act, 1994 (s. 53, p. 105) documents that one of the function of safety and health representatives is “to consult and cooperate with the manager of the mine and employers on all matters relating to the safety or health of persons at the mine”. Walters et al. (2014, p. 18) wrote that “consultation made a significant contribution to improved health and safety arrangements, awareness and performance”.

Being part of a workplace safety and health committee is a source of power, as its members initiate, develop and implement strategies to ensure the safety and health of employees (Wyatt, 1987). Safety and health representatives are able to table items to include on the committee agenda to be discussed so have the ability, through these meetings, to highlight health and safety concerns for their area of work, offer risk control solutions and to share best practice ideas (Aickin, et al., 2012). Safety and health committee meetings allow its members to: develop trust in each other; consult, cooperate and work together to enable positive change management strategies to be implemented and to develop networks that cover the organisation so that appropriate ideas can be implemented across the organisation (Wyatt, 1987; Work Health Department of Industries & Business, 2000; Aickin, et al., 2012). Kim and Cho (2016) identified that the safety committee at the researched workplace in Korea made an effort to promote workplace safety and employee health. They concluded that the safety committee was effective in a non-union workplace, as the work completed by this committee reduced the occurrence of workplace accidents (Kim & Cho, 2016).

The Mines Safety and Inspection Act, 1994 (s. 53), described the position power of safety and health representatives in the mining industries. The participants in this study reported using interpersonal power and that being an effective role model provided the power to establish trust between safety and health representatives and employees. Interpersonal power comes from a person's "ability to read and understand people and situations at work and to translate that knowledge into goal-directed influence over others" (Treadway et al., 2013, p. 1531). Interpersonal power also comes from the person's ability to form friendships, to build strong coalitions with co-workers, managers and other relevant people in the workplace for mutual beneficial outcomes and to present and be perceived as being competent in their work (Antonsen, 2009).

In addition to using normal workplace issue resolution procedures, since March 2005 safety and health representatives who have completed the mandatory training required in the Mine Safety and Inspection Act 1994, can issue a Provisional Improvement Notice (PIN) that requires a breach of this Act or a breach of the Mine Safety and Inspection Regulations 1996 (s. 31) to be corrected by the date set by the representative. Before using the coercive power of issuing a PIN the representative is legally required to consult with the person that they intend to issue the PIN to and with another representative in the workplace, if this is practical. The representative must also provide a copy of the PIN to the mine manager who must display the PIN in the relevant workplace and include a copy of the PIN in the record book for the mine (s. 31BO). It was noted that only 4 of the mining industry participants reported using this coercive power.

Walters et al. (2014) when conducting research in the Queensland mining industry undertook a documentary review of regulatory reports for all work suspension notices provided to the regulator. It was identified by Walters et al., that since the Queensland coal mining safety and health representatives were given the power to stop unsafe work in 1999, only 80 notices (an average of 5 a year) had been served on their employer for unsafe work or conditions. Leading Walters et al. (2014) to conclude that the safety and health representatives' coercive power was rarely used.

Table. 41. How Safety and Health Representatives Influence Employees to Work Safely

Power use	N	% of 41
I used my position power	5	12
Used my Information power	5	12
Used Interpersonal power.	4	10
Use my expertise power to influence employees.	4	10
Used the safety and health committee's power	4	10
Cooperation power	4	10
I do not believe that I have any influence on employees to work safely	4	10
Use consultation power to influence employees	3	7
Used my flexible nature. Making myself available for workers and management always, especially new and inexperienced or young workers	2	5
Networking with others for safety issues.	2	5
By approaching issues with an open mind and teaching crew members the safe way to perform work tasks	1	2.5
Always I reminded staff about safe work practices at the toolboxes and the pre-start meetings	1	2.5
Used diplomatic power	1	2.5
Coercive power	1	2.5
Total	41	100

The above table results indicate that there was not a consistent power that all the participants used to influence workplace safety and health practices. There were 10% of research participants that stated that they did not have any influence on employees in relation to safety.

Hovden et al. (2008) conducted a study to identify the dilemmas and challenges that influence safety and health representatives in the off-shore petroleum industry. Their key findings reveal that representatives reported not having the time, competency, training or resources to be able to do their safety and health work, lacked management support. When issues were raised management were unwilling to listen to the representatives, which resulted in poor motivation to improve workplace safety. The representatives perceived they had minimal influence on long term planning, workplace changes that influenced safety and on workplace safety generally (Hovden et al., 2008). Walters et al. (2014) in their mining industry research found that some of the representatives in their study reported similar

problems.

Position and information were the most used powers (12% each), followed by expertise power, interpersonal power, cooperation power and the power that comes from being a member of the workplace safety and health committee (10% each).

Position Power

Western Australian mining industry safety and health representatives' position power comes from the sections of the WA Mine Safety and Inspection Act 1994. However representatives may also have position power from their employment position role (Watterson, et al., 2014). A study by Harris et al. (2012), discovered that representatives who were administrators focused on operation and the implementation of the workplace safety and health management system and that their secretarial employment position helped them to have a positive input into the safety management system at their workplace. The participants of the pilot study also identified the role of safety and health representatives as providing a way to positively influence workplace safety and health.

Information Power

Employees who have worked for many years in mining with the same co-workers and for the same company have information and expertise power through their understanding of the work processes and the people that they work with (Lundgren & McMakin, 2013). Regarding information power one of the mining industry participants said:

I used my Safety presentation or group activities with staff. Display of safety posters. Maintaining a good awareness of what people are doing and discussing with them any aspect of the job that may present a risk, what measures they have in place – or could be put in place to reduce any risks. Raising awareness of issues in the workplace that could also be relevant in the home or leisure environments for our employees or their families.

This trained representative had control of information about workplace safety and health through being able to share personal knowledge with other people in his area of responsibility. Information and expertise power is gained from knowing how to

share information and what information should be shared with people in the workplace (Antonsen, 2009).

One of the reasons that employee inspectors are no longer used in the Western Australian mining industry is that these employees were not provided with occupational safety and health training, whereas safety and health representatives are. The 5 day role orientation training that the representatives receive provides them with information about hazard identification, risk assessment, accident investigation, workplace inspections and an industry specific knowledge of the health and safety functions that they are legally allowed to perform (Gilroy & Jansz, 2014). Representatives who are interested may continue to gain more occupational safety and health knowledge to increase their expertise (Bahn & Barratt-Pugh, 2012).

In the pilot study information power was used by the participants to provide other employees in their area of responsibility with information about workplace hazards; so that they understood the nature of hazards in their workplace and the risk control measures to employ and when to use personal protective equipment to work safely.

Interpersonal Power

Interpersonal power comes from a person's "ability to read and understand people and situations at work and to translate that knowledge into goal-directed influence over others" (Treadway, et al., 2013, p. 1531). One of mining industry participants described using his interpersonal powers to influence safe work practices and stated that:

I always gave my positive feedback about safety during safety meeting, during discussion with the employees about safety issues.

Interpersonal power also comes from the person's ability to form friendships, to build strong coalitions with co-workers, managers and other relevant people in the workplace for mutual beneficial outcomes and to present and be perceived as being competent in their work (Antonsen, 2009). The above safety and health representative used appropriate positive feedback to be able to influence workplace safety through supporting the decision makers. None of the healthcare pilot study

research participants reported using their interpersonal skills to influence workplace safety.

Expertise Power

The safety and health representatives in this research study explained how they used their expert knowledge as a power to influence employees to work safely. A participant said:

I used my safety and health knowledge to build a safety culture at workplace. Primarily I set up an example by following the rules through my expertise knowledge, asking questions to the employees about tasks or practices that may pose a risk, and encourage them to follow safe work process.

Another participant stated:

I observe my co-workers when they perform their task, questioning them the nature of hazards associated with the task.

Both participants used expert knowledge about hazard identification, risk assessment and risk control to assist other employees in their work area to work safely and to assist with building a positive workplace safety culture through their advice and actions.

Harris et al. (2012) identified a total of four safety and health representatives' role types. These were the workshop inspector, problem solver, administrator and technical expert. Representatives that mainly took the role of being a workshop inspector, as identified in the findings of this research, helped to improve employee's attitude to occupational safety and health at their workplace through taking a safety and health monitoring and compliance role. Strategic occupational safety and health decisions in the workplace were identified by Harris et al. (2012) as being influenced by safety and health representatives who had technical knowledge about the work processes being undertaken by employees, the equipment used and other technical aspects of the work. The company's production and occupational safety and health management system was improved by administrator type representatives who were also good problem solvers and who had the power to implement risk control measures to eliminate, or minimise, workplace hazards. Each of these types of

representatives used a different type of expertise power to improve workplace safety and health outcomes.

Cooperation Power

About 10% of the participants in the Western Australian mining industry study reported using cooperation power with other people in the workplace to improve workplace safety and health. The people that they reported cooperating with were managers, other employees, safety and health professionals and Resource Safety inspectors. By cooperating with other relevant people safety and health representatives were often able to use the powers of the people that they cooperated with, such as the Resources Safety inspectors, to improve safety and health at their workplace.

In the pilot study this was the most used power to positively influence workplace safety with 50% of the participants reporting using their consultation and cooperation powers. These strategies were particularly used when the safety and health representatives consulted employees to ask about any workplace hazards and for other safety and health information when conducting workplace inspections, when reporting the results of their workplace inspection and by working cooperatively with management and other employees to recommend risk control measures for identified hazards.

Cooperation is mutually beneficial in improving workplace safety and health as the combined power of people can often achieve more than an individual working on their own (Antonsen, 2009). This was identified in the early trade union movement, which began with employees grouping together to improve their workplace, work processes and employment conditions (Johnsson & Partanen, 2002). In Sweden cooperation with their employer enabled safety and health representatives to work effectively to improve workplace safety practices (Frick & Walters, 1998).

Safety and Health Committee Power

In this research 10% of the mining industry participants reported being part of the workplace safety and health committee was a source of power for making positive workplace safety and health changes.

Being part of a workplace safety and health committee is a source of power as the members of this committee initiate, develop and implement strategies to ensure the safety and health of employees (Planek and Kolosh, 1994). This committee reviews workplace safety performance and sets future directions for improving work safety and preventing employee ill health (Work Health Department of Industries & Business, 2000).

As part of this committee the safety and health representatives interact with workplace managers who have the authority to finance required resources, make workplace and work process changes to improve occupational safety and who control employee rewards (Aickin et al., 2012). This enables committee decisions to be implemented. Representatives are able to table items to include on the committee agenda to be discussed so have the ability, through these meetings, to highlight health and safety concerns for their area of work, offer risk control solutions and to share best practice ideas (Reilly and Holl, 1995). One of the research participants when talking about the safety and health committee as a source of power to influence workers at the workplace and said:

I use the safety and health committee's power. I discussed the outcomes of the meeting and speaks up with safety topic in morning meeting.

Safety and health committee meetings allow their members to develop trust in each other, consult, cooperate, work together to enable positive change management strategies to be implemented and to develop networks that cover the organisation so that appropriate ideas can be implemented organisational wide (Wyatt, 1987; Aickin, et al., 2012; Kim and Cho, 2016).

In the pilot study the participants reported asking fellow workers to tell them about any workplace safety and health issues in their morning handover meetings. This was undertaken so that the issues could be put on the agenda for discussion at the next organisational safety and health committee meeting. This brought the issues to the attention of management who were also committee members so that these workplace safety and health issues could be discussed and resolved.

Consultation Power

Consultation power was used by only 7% of the mining industry participants.

In published literature it was stated that safety and health representatives with good interpersonal skills may be more effective in consulting with employees and managers in their workplace (Treadway, et al., 2013). Consultation and effective communication between all stakeholders (internal and external) is considered a way to resolve workplace safety and health issues (Pfeffer, 1992). Consultation between managers, workers, safety and health representatives, other stakeholders (internal and externals) and occupational safety and health advisors can resolve the health and safety issues at workplace and can promote healthier and safer workplaces (Comcare, 2014).

Other Powers Used

Antonsen's research (2009, p.185-186) identified that power to influence people in the workplace came from eight major sources which were position power, information and expertise, control of rewards and resources, coercive power, alliances and networks, personal power, access to and control of agendas and being part of a dominant group. The powers that the mining industry participants reported using were similar with the exception that none of them mentioned having any ability to control rewards and resources. For example, one participant said that he used his coercive power to influence employees at his workplace:

I can use coercive power because I am in the position to use this power to influence employees who does not follow the safety rules at workplace to perform their task.

The knowledge that representatives have the ability to use a Provisional Improvement Notice (PIN) as a coercive power, when management refuse to make a workplace or work processes safe may assist them in achieving compliance in their workplace with occupational safety and health legal requirements (Merchant, 2014). However, none of the mining industry participants reported using PIN notices in their workplace to influence employees to work safely.

In relation to how safety and health representatives influence employees to work safely, the key themes created through the word cloud (see Figure 10) showed that the most frequently used word appeared as *power*.



Figure: 10. How Safety and Health Representatives Influence Employees to Work Safely

The second most frequently word appeared as *used* followed by *influence employees*. This was because the techniques and powers reported as used by participants were mainly to influence employees. The word cloud provides validity for the question answers.

5.2.3 *Safety promotion at the workplace*

A safe workplace, safe equipment, safe work processes, and safe management practices are important and part of the whole safety management system (Brownlie, 2014). The Western Australian mining industry research participants were asked if they had any influence over safety for these. Table 42 provides a detailed record of their answers:

Table: 42. Influence on Workplace, Work Processes and Management Safety

Influence:	N	%41
Hazard identification and use of the hierarchy of risk control measures. Conduct all processes involved with Hazard, risk reports, i.e. logging, editing and closing.	11	27
<i>Do not have any influence.</i> I tried to influence having safe equipment and products to use but it does not happened as we have a low budget.	10	24
Consultation with management and stakeholders to find a resolution for equipment, work process, and any safety issues.	8	20
Engaging staff in a program so that they should aware of all aspects of safety.	5	13
I have input on safe procedural design and safety management but my recommendations are poorly executed in practice.	4	10
Normally issues come to me as information. Issues brought to me are researched, then I consult management and stake holders to find a resolution. As an example if management would like to purchase equipment all information comes to me about this equipment such as the operation & safety manual. I research all this information and offer suggestions to management.	4	10
Compiling reports for safety.	4	10
Developed and involved with the development of site safety procedures.	4	10
Developed and involved with the development of site based training packages.	4	10
I have a great influence on using safe equipment and processes. Everyone does what we call field leadership, which is about going out onto the plant while or before a job starts to have a conversation with workers about how they are planning to do the job.	3	7
Implement corrective actions for hazard management.	3	7
Management control workplace safety and decide <i>if</i> they will use my safety suggestions or not.	2	5
As SHRs we have the ability to assign corrective actions to individuals, both workers and managers, to ensure that hazards are rectified in an appropriate time frame.	2	5
Experience and knowledge of what is required to undertake specific tasks and what equipment is required to perform these tasks safely.	2	5
Tagged the faulty equipment so that employees cannot use	2	5
Any safety issue related to equipment, work processes and practices can be brought up at a committee meeting.	2	5
I think the things that enable me to do this are being approachable and instilling confidence in the crew to feel comfortable about speaking up when they think something is unsafe.	2	5
Sometimes I am involved with the job safety analysis process, equipment safety processes or how to use equipment safely.	2	5

The avenues to do this are via the hazard reporting process, pre-start meetings, toolbox meetings etc. However I am approached daily before work and in my breaks regarding safety issues the crew members have.	2	5
We have a culture whereby people are free to speak up about an issue and ask questions about equipment safety, product safety and the overall safety of our workplace.	2	5
We have a system called AIRS, which is an incident reporting system, which allows any safety issues we have with equipment on site, work procedures and practices to be entered.	2	5
Total	80	

Not all the mining industry participants agreed that they were able to influence having a safe workplace, safe equipment and products to use, safe work processes and safe management practices. The most common action for the participants to be involved with was hazard identification, assessment and suggesting risk control measures (27%). Twenty percent did report using consultation with management and stake holders to find a resolution for safety issues, however 80% did not use consultation and 24% of the participants reported having no influence on workplace, work equipment, work processes or management practices for safety at their workplace.

This was a similar percentage to the Pilot Study where 20% of the healthcare participants reported having no influence over workplace safety and health because they reported that their managers were not supportive and focused more on profits than safety.

Both the mining industry and healthcare research participants' who made negative comments, focused on to the lack of management support, lack of resources, and lack of teamwork. In this context a mining industry research participant said:

I do not have much influence over safety for these things. Management always focus on their profit. If some equipment are not working properly and slow down the production, management will be acting too fast to fix that problem only

A second mining industry participant stated:

Biggest thing is raise the issues that management don't want to hear. Often we don't know the answer immediately, but often this becomes a barrier to asking the question on how we fix it or just pretending the hazard doesn't exist.

A third mining industry participant reported that:

I do workplace inspection which very much covers all these things but what control I recommend for safety (if necessary), sometimes it controlled my management.

The comments from the mining industry participants indicate that some of them felt that they were blocked from being able to work effectively and to positively influence safety in their workplace. They attributed this to a lack of management support for their suggestions for risk control of identified hazards and that company profits were more important than workplace and work processes safety. Twenty four percent of the mining industry participants reported not having any influence over their company having safe equipment and products used because the company had a low budget.

Another mining industry participant considered that it was not just the safety and health representatives who could make the workplace safe but that team work was required to achieve this. This participant said:

I can start the conversation to move towards safe equipment and processes. Creating and maintaining a safe workplace isn't the responsibility of one person or a collective of safety representatives, it's a team effort.

To implement a proactive safety and health management system, team work is very important as the safety and health representatives need support and assistance in risk control from their co-workers, supervisors, safety professionals and so forth. (Biggins & Philips, 1991).

Some mining industry participants did have a strong influence over improving workplace safety and health. This influence was provided through their ability to identify hazards, report and record the risk and implement risk control measures. In this context a participant said:

Any unsafe practice, equipment or products that are identified and brought to my attention, I will ensure are ceased or tagged out of service, barricaded etc. until controls are set into place to mitigate any hazards identified.

Other strategies used to promote safety by the mining industry participants were involving people in the workplace in safety activities, being involved in the development of site procedures, training materials and in field leadership. The healthcare participants reported that they made their workplace safe by conducting job safety analysis for all workplace tasks, by following the workplace safety policy, by tagging and reporting to their manager any broken or unsafe equipment, by taking any staff safety concerns to their manager and working with their manager to resolve any workplace safety and occupational health issues.

Experienced safety and health representatives may have more influence on workplace, equipment, products, work processes and management practices safety. This is supported by a study conducted by Jian and Jansz (2010) who identified it as a factor which may influence the effectiveness of a safety and health representative. They contended that it may be the length of time that employees have worked in their area that affects their effectiveness as a representative as longer serving employees may have a more comprehensive knowledge of the workplace, work processes and people. This may enable them to be better at identifying hazards and having more influence over the people that they work with in relation to safety and health practices.

The following word cloud (see Figure 11) in relation to what enables safety and health representatives to be able to influence having a safe workplace, safe equipment and products to use, safe work processes and safe management practices displayed that the most frequently used word was *safety*.

Table: 43. How Safety and Health Representatives Promote Safety

What enables Representatives to promote safety	Number	% of 41
My motivation, initiative, time, hard work and effort put into safety activities	19	46
My special knowledge about workplace safety and health, including job safety analysis, tool box meetings, risk assessment and workplace inspection	13	32
My friendly relationship with the staff	4	10
Continuous discuss about safety issues with my colleagues	3	7
Good role model for safety	2	5
Total	41	100

All participants described how they promoted workplace safety. Almost half of them said that they did this through being motivated, using their initiative and working hard. Other factors that enabled the participants to promote workplace safety were using their work related safety and health related knowledge, having a friendly relationship with the people that they worked with, and through being a good role model for working safely.

A study conducted by Jansz (2008) with 60 Western Australian safety and health representatives, including those who worked in the mining industry, identified that 80% of the representatives were motivated to learn what to do to make positive changes to improve workplace and work processes safety for their co-workers and to prevent work related accidents. This is similar to the findings in this study where the mining safety and health representatives' motivation enabled them to improve work related safety. In the pilot study the findings were similar in the ways that the healthcare safety and health representatives promoted safety at work.

Using Word Frequency query key themes were created through the word cloud (see Figure 12) to identify the factors, which enabled safety and health representatives to promote safety at their workplace.



Figure: 12. What Enables Representatives to Promote Safety

The Word Frequency query identified that the most frequent word used was *safety*. Other frequent words were *activities*, *knowledge* and *workplace*. The themes identified through the word cloud (Figure 12) provide validity to the participants' answers.

5.2.4 Preventing work related injury and ill health

The research participants were asked to describe the factors that they considered influenced their effectiveness in promoting safety and preventing employee work related injury and ill health in their workplace. Table 44 provides their answers.

Table: 44. Factors that Influence Effectiveness in Preventing Employee Work Related Injury and Ill-Health

Effectiveness:	Number	% of 41
Knowledge of the legislation, safe work management systems, workplace procedures and safety and health policies. (Knowledge)	7	17
Access to training. (Knowledge)	6	15
My personal strong safety focus, which is instilled in employees. (Personal focus on safety)	5	13
Consultation with all stakeholders in relation to change management. (Communication)	5	13
Access to resources e.g. Australian Standards and legislation. (Knowledge)	4	10
Completing safe work observations and discussing the job at hand with the employee. (Communication)	4	10
Being friendly and courteous to all members of the crew so that they feel comfortable in approaching me. (Interpersonal skills)	3	8
Leadership, support and understanding about safety. (Management support)	2	5
Great support from most of the other managers and the staff. (Management support)	2	5
Management attitudes, cooperation and consultation for safety. (Management support)	2	5
My interpersonal skill with the employees motivates employees to think about safety. (Interpersonal skills)	2	5
My personal communications style and safety skills. (Communication)	2	5
Promoted workplace safety culture with my safety experience and motivated staff to make their individual and group commitment. (Communication)	2	5
My expertise motivated staff to identify hazards, report incidents and accidents at their workplace. (Risk management)	2	5
Always communicate identified hazards. (Risk management)	2	5
Reviewing duties and investigating if there's a better and safer way of completing tasks. (Risk management)	2	5
Safety meeting information, presentations, and encouraging staff to get involvement with safety presentations. (Communication)	2	5
Confidence in speaking publicly about safety and health. (Communication)	2	5
Providing a judgement free safe space for people to discuss their concerns about safety. (Interpersonal skills)	1	3
Total	57	

There was no one consistent way that all the participants used to assist with preventing work related employee injuries and ill health, however 6 main themes were identified as helping to prevent work related employee injuries and ill health. These themes were: good communication (41%); knowledge (41%); management

support (15%); interpersonal skills (15%); risk management (15%) and a personal focus on safety (12%).

Good Communication

As an example of good communication skills a mining participant reported:

I always focus on to safety. I always talk to the workers about safety which motivates people to think about their own safety. I continuously seek out any injured employees just to discuss how they are going with everything and if there is anything I can do further to help them.

Another example of the importance of good communication skills in preventing work related injuries and ill health was provided by the mining industry participant who stated that:

I always encourage them to speak to me about their ideas and we explore them fully. Some of our procedures have been updated as a result of these ideas which were initially thought to be trivial by the person who raised them.

Safety and health representatives with good interpersonal skills may be more effective in consulting and communicating with employees and managers in their workplace (Treadway, et al., 2013). Consultation and effective communication between all stakeholders (internal and external) is considered a way to resolve workplace safety and health issues. Consultation between managers, workers, safety and health representatives, other stakeholders (internal and externals) and occupational safety and health advisors can resolve the health and safety issues at the workplace and can promote healthier and safer workplaces (Comcare, 2014).

Knowledge

As well as having good communication skills the participants perceived having knowledge of the legislation, safe work management systems, workplace procedures and safety and health policies and access to training to gain this knowledge were of equal importance. In this context, a mining research participant said:

Good knowledge of procedures and policies help me ensure that when I observe somebody doing a task I know what is the safe method of doing that task is therefore allowing me to recognise when somebody is not doing the task safely.

As well as having workplace knowledge the 5 day introductory safety and health representatives' course assists representatives with learning about what to do in their role (Aveling, 2014) and they may then continue their education by enrolling in and completing other occupational safety and health courses (Bahn & Barratt-Pugh, 2012). Milgate, Innes, and Loughlin (2002) identified that the effectiveness of safety and health representatives' at their workplace is improved when management provides them with time and financial support to gain basic and additional occupational safety and health knowledge.

Management Support and Risk Management

Other factors that mining industry research participants considered assisted in preventing employees having work related injuries and ill health were management support and risk management.

In relation to management support and risk management, Walters, et al. (2014) and Tedestede (2014) identified that management support facilitated safety and health representatives' work in improving workplace safety for everyone who came to the work site. From the time of the United Kingdom Coal Mine Regulations in 1872 employees have been used to identify hazards in their workplace as they have the best knowledge of how work processes are actually performed.

Personal Focus on Safety and Interpersonal Skills

Having a personal focus on safety and good interpersonal skills were also considered by the mining research participants as one of the methods used to prevent employees having work related injuries and ill health. As an example of the use of good interpersonal skills one participant said:

Staff seem comfortable coming to me to raise any OHS concerns. Any employee that comes to me with a grievance for any matter I instruct them to go through the appropriate processes and if they require any assistance be a witness or someone to speak on their behalf I always gladly present on behalf of them.

Being there for co-workers and assisting them in resolving their safety concerns is an important part of the role of the safety and health representative (Pfeffer, 1992). Some interpersonal power comes from the ability of the safety and health

This word cloud (Figure 13) provides validity for the mining participants' responses as it highlights the key focus of safety and health representatives (safety) and the factors that influence their work when promoting safety.

5.2.5 Barriers

The next question asked the mining industry participants if there were any barriers that prevented them from performing their role as a safety and health representative in the mining industry effectively. Table 45 details the answers of the participants.

Table: 45. Barriers to Safety and Health Representative Performing their Role Effectively

Barriers	Number	% of 41
Sex—being a female, sometimes I feel that workers and management do not bother to listen when I raise safety issues. (Discrimination + Management)	9	22
Equal opportunity and anti-discrimination policies are not enforced by higher management to prevent sex discrimination. (Discrimination + Management)	6	15
Age and gender can create discrimination at the workplace (Discrimination + Management)	4	10
Harassment, bullying, and sexual discrimination. (Discrimination + Management)	4	10
Mining industries downturn. (Lack of resources)	7	17
Managers always think about profit which is a real barrier to maintaining safety, especially when people fear losing their employment position. (Lack of resources + Management)	5	13
Safety issues compromised with production and revenue. (Lack of resources + Management)	5	13
Shortage of time to perform OSH role. (Lack of resources + Management)	5	13
The need to honour and understand confidentiality when OSHRs raise safety and health issues to management. (Management)	5	13
Lack of trust between SHRs and managers/ supervisors. (Management)	4	10
Sometimes barriers come from management and also solutions come from management. (Management)	4	10
Non-cooperation from management on safety issues. (Management)	4	10
Managers' attitudes are largely based on their personalities. (Management)	4	10
Poor safety culture of Managers. (Management)	4	10
Lack of consultation and cooperation between manager and SHR reduces their ability to promote a positive safety and health culture at their workplace. (Management)	3	8
Sometimes employee's personal culture conflicts with the organisational safety culture. (Management + Employees)	5	13

A degree of complacency in workers and some management is not always overcome but dogged reiteration sometimes works. (Management + Employees)	4	10
Barriers from Managers and staff to implement changes to improve safety. (Management + Employees)	4	10
Very little knowledge about work related injuries at the mine. (Knowledge)	4	10
Poor communication skills among people about safety. (Knowledge)	4	10
Lack of public speaking skills of SHRs prevent them presenting or discussing safety issues and solutions properly. (Knowledge)	2	5
Career aspirations of SHRs.(Personal)	4	10
Lack confidence to voice opinion in group settings, especially to employees with more experience. (Personal)	3	8
Continual conflict with certain members of the union. (Union)	2	5
Total	105	

The barriers that prevented safety and health representatives from doing their work had more responses than any of the other questions asked to the research participants with the most common barrier ($78/105 = 75\%$) being the workplace manager.

Management

Discrimination in the workplace due to their gender and/or age which resulted in harassment and bullying was reported by the mining industry research participants. There were complaints from some of the participants that equal opportunity and anti-discrimination workplace policies were not enforced by top management. There were a total of 23 reports related to discrimination. One of the mining industry participants explained that:

Being a female sometimes I feel that workers and management do not bother to listen about safety issues. Being a female in the mining industry is still a relatively new thing. Mining is still so male orientated. Will always have those that believe that females are not up to the task of performing the same roles as a man.

Another participant reported that:

I also feel that my age and my gender are barriers to my effectiveness due to some subtle discrimination towards me. I am female and 33, and my managers are in their 40s, 50s, and 60s and male. I am also one of only two females in a work area of 40 male. I experience age and gender discrimination. Being only

thirty three, there are many that believe that I do not hold the knowledge or experience to perform the functions for the positions I currently hold.

A third participant stated that:

Although the company's policies are reflective of a positive safety culture and practices, as well as equal opportunity and anti-discrimination, but the policies are not enforced by higher management successfully for unknown reason.

One of the healthcare pilot study participants also reported harassment and bullying from management, but this was not in relation to gender or age, which is what the mining industry safety and health representatives (participants) were reporting. In the mining industry there were more male workers. Young females did not seem to receive the respect that they required to be able to do their safety and health related work effectively. On paper the mining companies looked good as they had policies that included meeting all of the antidiscrimination legal requirements, but these policies were not enforced to overcome the discrimination barriers reported by the mining industry research participants.

Research conducted by Gao et al. (2016) in China with 13,624 firms and large corporations investigated whether female executives were affected by gender discrimination. The findings of this research were that there was less or lower participation of female executives in higher management employment positions and that these females were often allowed less critical decision making powers than the male executives. According to Gao et al. (2016) firms were not keen to recruit female executives as part of the top management team and were more interested in removing them from their management teams. This study also found that female executives who reached a top management position were paid less than male executives in the same position. Conclusions were that there was discrimination towards female executives in corporations in China (Gao et al., 2016). This is similar to the Western Australian mining industry as most of the executives in China were also male and the minority gender (females) was discriminated against. In the Western Australian mining industry 18% of the workforce are female and 82% are male (The Chamber of Minerals and Energy of Western Australia, 2017).

Research conducted by Botha (2016) identified that female workers were exploited

and harassed in the mining industries in South Africa. Similarly discrimination against female safety and health representatives was evident in the findings of research conducted by Espluga et al. (2014) in Barcelona, Spain. This research was conducted using in-depth interviews with 10 Safety and Health Representatives who belonged to one of the 4 main trade union confederations (Espluga et al, 2014).

Other management related barriers reported by the Western Australian mining participants in this study included: management not providing the resources; including time, that the safety and health representatives required to be able to do their work; lack of management confidentiality; lack of trust; no management consultation; cooperation or support and the workplace having a poor safety culture.

As an example of why there may be a lack of resources provided by management for safety and health representatives to do their work in the mining industries a research participant said that:

The current mining downturn favours employers. Employees tend not to want to speak up or rock the boat. Those powers given to OSH Reps is rarely exercised for this reason. Always think about profit is a real barrier at workplace to maintain safety, especially now, mining is not a boom, lots of people losing their jobs.

Having enough resources is important for safety and health representatives to perform their roles successfully (Harris, 2010). Safety and health representatives are required to conduct workplace inspection and perform other safety activities to keep their workplace safe. If management does not allocate adequate time to complete their legally required safety activities, representatives are not able to perform their roles properly (Harris, 2010).

A reason for decreasing employment in the Western Australian mining industry is that in 2014 the industry transitioned from the construction phase to the production phase which requires less employees. Between June 2013 and August 2017 there were about the same number of employees working in the Western Australian mining industry but there was a decrease in contractor employment (Department of Mines, Industry Regulation and Safety, 2017).

Lack of knowledge about the occurrence of work related injuries at their mine was reported as a barrier to their work by 10% of the mining industry participants.

Walters (1985, p.64) wrote in a article:

Lack of access to information also hampers workers' efforts to organize around health and safety issues. Employers control workers' access to information as well as their participation in the collection of data on the workplace. Several representatives claimed that it was a continuing struggle simply to exercise their right to inspect the workplace in order to identify potential hazards.

Some mining industry participants spoke about the poor safety culture at their workplace and their manager's personality. For example a participant said that:

Management don't lead by example. Management only focus on profit, compromise with low standard resources for safety Management, talk about safety but are not interested to implement 100% safety for staff. I believe that the managers contribute to the poor safety culture of employees in the workplace.

Another participant stated that:

Managers' attitudes are largely based on their personalities. Some of them are friendly, people can talk to them about safety, and some of them are not friendly and I cannot approach about any safety issues to them.

Similar to the healthcare safety and health representatives in the pilot study the mining industry safety and health representatives looked to management to set the example to promote a positive workplace safety culture. Research conducted by Harris (2010, p. 31) found that "within the context of declining union membership and a lack of external enforcement, the effectiveness of HS Representatives is increasingly dependent on the motivation and capacity of management to engage with, and facilitate, participatory OHS management." The reason behind this differentiation was the manager's training and education. Managers who had formal safety and health training were more likely to be keen to implement their legal obligations towards occupational safety and health than managers who did not have this formal education (Harris, 2010). It was noted in the research study that the Western Australian mining industry CEO who promoted a positive workplace safety culture had worked as a safety manager before being employed as the company CEO.

Some of the mining industry participants reported that they had a higher level of occupational safety and health training than their managers, especially middle management. Harris (2010, p. 33) stated, “the impact is often negative as HS representatives report that their immediate managers undermines their efforts to improve safety by demanding increases in production or failing to co-operate with their requests for change.” Similar results were found in this research study.

A study conducted by Walters and Nichols (2006) in five British chemical manufacturing companies identified that the safety and health representatives did not receive support from management and employees were not given the opportunity to participate in workplace safety and health matters or given the basic resources (time and training) to perform safety activities at their work place. This influenced the safety culture in the workplace negatively (Walters & Nichols, 2006).

Co-workers, Knowledge and Personal Factors

Some of the mining industry research participants found that their co-workers were a barrier. Research conducted by Harris (2010) identified that safety and health representatives expressed frustration when co-workers were not interested in occupational safety and health and just focused on maximising their bonuses. In this context Harris (2010, p. 40) wrote that “workers are resentful of them for encouraging compliance with rules that increase inefficiency and jeopardize the earning of bonuses which is perhaps a criticism best directed at the organisational reward system”, instead of the safety and health representatives that are working hard to make their work processes as safe as practicable for co-workers.

Research was conducted by Espluga et al. (2014) to identify how safety and health representatives establish and perceive their interactions with workers and their influencing factors. Research conclusions were that safety and health representatives had less support from co-workers when there was a threat of management retaliation; that representatives who covered multiple work sites had a non-existent relationship with co-workers who were not at their work site and that they had less support from their co-workers when the latter had a temporary work contract, were self-employed and when there was frequent site rotation (Espluga et al., 2014).

There were mining research participants who stated that the employee's personal culture sometimes created conflict with the organisational culture. For example, one participant said that:

Sometimes employee's personal culture also conflict with organisational safety culture, because some people think that safety is common sense. We do not need to follow the rules and regulations at workplace for safety. These people are from different culture and sometimes they do not accept the implementation of new changes for safety.

This problem was not identified in the pilot study. The pilot study workplace was not as multicultural as the mining industry. The multicultural nature of the Western Australian mining industry did cause a barrier to the work of the safety and health representatives when aiming to make the work processes safe. In Western Australia 31% of the population was born overseas and workers in the mining industry were no exception (Employment Service Group, 2018).

Part of a safety and health representative's role is to communicate. In this context, one of the mining industry participants said:

I'm not good or confident doing public speaking, but a part of my development plan is become better at it. It's a constant cycle of speaking in front of 12-25 people, seeking feedback and using that feedback to improve. So when the meeting happens a week intelligent conversation with managers and staff instead of ranting and raving usually helps.

Another participant had a similar problem and reported that:

Poor communication skills can make it hard to deal with people in management that generally have a high level of communication skills and have often received formal training.

Lack of communication skills was perceived by some of the mining industry participants as a barrier to their work and they were keen to overcome this barrier.

Being a safety and health representative was seen as a barrier to career development by one participant who said that:

Career aspirations: If you're not the best at your job or if you're looking for a promotion soon, this can make a safety representative uncomfortable to stand

up for the tough issues. Sometimes it is very hard for the safety and health representatives to stand up and to be persistence about a safety issues, particularly if the safety and health representative wants to progress in their career. Sometimes, safety and health representatives raised the safety issue to their manager but decided not to solve or resolve that issue because if they followed it through their career aspirations would be ended. If safety and health representatives is in doubt or in suspicious that if they were very much persistent or determined to solve the safety issues, they have to challenge to the management which is not good for their career development or promotion, so sometimes Safety and Health Representatives left their challenge behind and looked after their own interest.

From the comments made by this participant it seems as if they were not well supported by workplace management and that following through with persistence in making the workplace and work processes safe was not encouraged. It was because of the need for individual support that employees first banded together to form trade unions (Johansson & Partanen, 2002).

Union

Two of the mining industry participants said that, they had continuous conflict with their union and reported this as a barrier. For example one participant said:

I have had continual conflict with certain members of the union for different issues. I do not know why they are not happy about me.

None of the participants had anything positive to say about union support. This is in contrast with what has been written in the published literature where trade unions are portrayed as giving positive support to safety and health representatives (Ochsner & Greenberg, 1998; Walter & Frick, 2000; Johansson & Partanen, 2002; Walters, 2005; Garcia, Jacob, Dudzinski, Gadea, & Rodrigo, 2007; Donado, 2014). In the pilot study the healthcare participants used their union support to overcome barriers to having a safe and health workplace and work processes and as support people when they had difficult managers to work with.

At the Western Australian Colie coal mine their union supported the maintenance workers when their employer wanted to cancel their enterprise agreement, which would have resulted in a 46% pay cut. This dispute lasted for 180 days and ended on the 12th of February 2018 with the miner's union achieving a win and the enterprise

This word cloud (Figure 14) provides validity to the research findings on this theme as the focus of the barriers were to safety; with the most common barrier to having safety and health representatives promote workplace safety being management. The next question asked was how the safety and health representatives overcame their identified barriers? Table 46 presents the research participants' answers:

Table: 46. How Safety and Health Representatives Overcame Barriers

Barrier removal strategies	N	% 41
I do not feel that I am able to overcome these barriers.	7	17
My proactive approach to safety motivates employees and managers to solve the safety issues at my workplace.	6	15
Always prefers to talk and consult with the staff.	6	15
I have found that if you have a valid case, enough evidence to support your claim, a set of standards, you can get things rectified.	5	13
My safety knowledge and experience help to motivate employees to raise the hazards identified repeatedly so that managers or supervisors will solve the safety issues.	5	13
Need to identify the perfect opportunity to find areas for development in the safety space and to influence and promote safety.	5	13
Understanding what is required to run the monthly HSEC meetings within my work group.	3	7
Use minimum resources to solve safety issues.	3	7
CEO has made safety such a high profile focus that safety is no longer an issue.	1	2
Total	41	100

The mining industry participants' responses indicated that 17% (7) of them were unable to find any way to overcome the barriers to doing their safety and health representative work effectively. One participant reported having no barriers to completing work as, due to the CEO leadership, there was a strong positive safety culture in the workplace. The other 33 participants used being proactive and motivating people, consultation, their knowledge or used minimal resources for workplace safety and employee health to overcome the barriers.

Harris (2010, p. 40) wrote

in situations where representatives find it difficult to convince management to address OHS issues, they have been found to rely on the collective support of workers to influence negotiations with management. Workers' support for HS representatives tends to be strongest in situations where they too perceive that management fail to adequately address OHS issues of concern.

In the Western Australian mining industry the research participants did motivate their co-workers to raise workplace safety issues repeatedly to motivate management to solve them.

The mining industry research participants could not always understand why there were barriers to them doing their duties. As an example one said:

I do not understand why management are not serious about safety at workplace. Every time if I give any idea or suggestion to resolve the safety issues, management always make an excuse and says that, they do not have money or this is not a life threatening hazard.

Using Word Frequency query a word cloud was developed to identify the most frequent word query for how safety and health representatives overcame the barriers. The most frequent word used was *safety*. The next most frequent word was *solve*. Many other words were used, but these were much smaller, so were less used. This word cloud (Figure 15) provides validity to the answers recorded for this question.



Figure: 15. Barrier Removal Strategies

5.2.6 Education

A frequently occurring theme that the participants raised was that they required the knowledge to be able to complete their safety and health representative's work effectively. The next question asked if they had attended the mandatory 5 day introductory course for safety and health representatives, and if they had completed any other occupational safety and health education. Table 47 presents their answers to this question:

Table: 47. Safety and Health Representatives Education

Education	Number	% of 41
Completed the 5 day Introductory SHR course.	41	100
Completed Certificate 4 in Work Health and Safety	6	15
Completed Diploma in Safety and Health or other not previously stated safety and health education course.	4	10

All of the mining industry research participants had completed the 5 day introductory course showing that workplaces were meeting their legal requirement. A quarter of the mining participants, in their quest to further their knowledge, had completed a tertiary qualification in occupational safety and health so that they had a higher level of understanding to be able to perform their role competently.

Safety and health representatives that attend additional educational opportunities to keep up to date with the latest information and to gain additional safety and health knowledge, or those who were mentored by a safety and health professional to gain additional knowledge, may be more effective in improving workplace safety and health (Langford et al. 1993).

Following the question on their education the mining participants were asked whether this education had improved their ability and skills related to performing their safety and health representative's role. Table 48 presents their answers.

Table: 48. Effect of Education on Skills

Benefits of the OSH course	Number	% of 41
The 5 day introductory course increased my knowledge of how to perform my safety and health representatives work more effectively.	33	80.5
I have a better understanding of safety after completing the introductory 5 day course; but I don't use this knowledge.	5	13
Completed both the 5 day introductory course and Certificate 4 in work health and safety. Both courses improved my knowledge of legal requirements and risk management.	6	15
Completed Diploma of Work Health & Safety + 5 day introductory course. Both courses helped me to understand the whole safety management system as well as risk management.	4	10
Completed the 5 days' introductory course. This formal safety training had negligible effect on my ability to perform as an OSH Rep. I have found soft people skills are more important.	5	13
Total	55	

The responses recorded show that 10 of the participants did not think that completing this course made any difference to their ability to perform their safety and health representative duties. Five of these ten did consider that attending the course had increased their knowledge, but they did not use this knowledge. The reason for not using this knowledge may have been due to some of the barriers that they experienced in trying to perform their safety and health representative duties. Therefore, training alone may not be enough for some representatives to be able to perform their work effectively.

All mining participants who completed further safety and health studies thought that both the 5 day course and their further occupational safety and health studies had increased their knowledge and skills. Eighty seven percent of the participants found that they did increase their knowledge by attending the 5 day course. Increases were reported in: general safety knowledge; theory that helped with understanding their safety and health representative role and how to perform these activities to achieve the best outcomes; understanding the basic concepts of their work; how to search for and find relevant Acts, Regulations and other legal requirements; how to deal with people as part of a team; how to focus on safety; understanding laws related to their role as a safety and health representative; be more diligent in their role and to have more ability to be able to influence management. This 5 day course was reported by participants as

providing them with the confidence to perform their safety and health representative functions due to their improved knowledge and abilities. Past research findings agree with this and identified that trained safety and health representatives showed more confidence and abilities, carried out a variety of workplace safety activities and were more ready to work with management and other employees to make their workplace safe and healthy (Garcia et al. 2007; Vanderkruk, 2003; Hillage et al, 2000).

All mining industry and pilot study healthcare participants reported attending the 5 day introductory course. This demonstrates that the legislation for safety and health representatives' work related education was a powerful way of ensuring that they had a basic knowledge on how to perform their legally required duties. Both the mining industry and health care participants in this study stated that they also benefited from other sources of safety and health education. As an example, a mining industry participant said:

I have been trained and coached by former Safety Representatives. The coaching from former Safety Representative was one of the most useful training for me. They gave me more direction and further understanding as to what is expected of me. I have found that I have more undertaking about the role of Safety and Health Representative now.

Another mining industry participant reported benefits from occupational safety and health training and said:

The education I have received has initially improved my ability and skills in performing my role, also the range of positions I have held over the years in mining company have also assisted to understand the safety issues. Company has daily safety briefs that cover all the safety issues. This course is fair starting point but I can see to be effective more training should be undertaken.

These comments indicate that the mining participants were proactive in gaining additional knowledge about how to perform their safety and health representative duties and continued to learn after completing their 5 day course.

Using Word Frequency query a word cloud (Figure 16) was developed to identify the most frequent word query for the benefits of work related education. It appeared that the most frequent word was *course*, followed by *introductory*. This word cloud (Figure 16) provides validity to the question results.

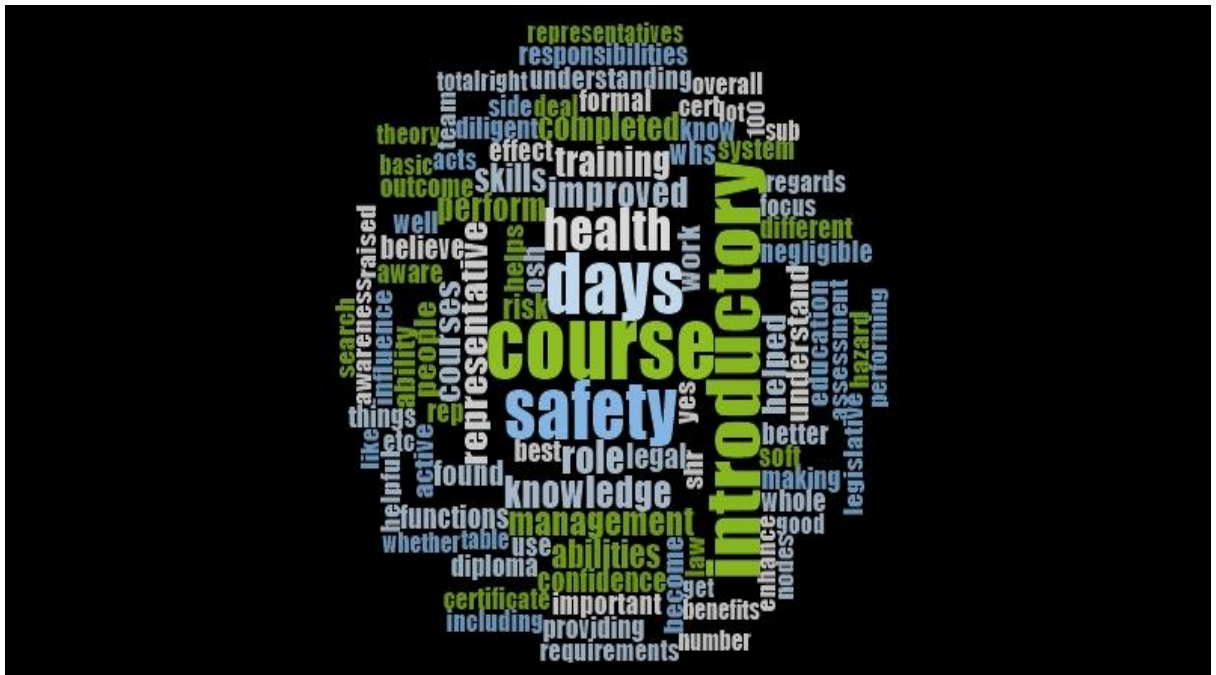


Figure 16: Benefits of Education on Skill Development

5.2.7 Factors that promote workplace safety

Following this question research participants were asked if there was anything else that should be considered. Table 49 presents their answers:

Table: 49. Factors that Promote Workplace Safety and Health

Other considerations	Number	% of 41
Now mining condition are not good people are losing their job and thinking about keeping their employment so do not think about safety. (Resources)	9	22
I think that proper resources need to come from management for safety issues. (Resources)	8	20
Not only providing training but also providing time and resources to SHRs is important. (Resources)	8	20
Provision for me to attend the SHR introductory course was difficult to negotiate with my managers because of associated costs and time off work. (Resources)	4	10
To maintain safety and health at the workplace the work culture needs to be changed towards safety. Management needs to be more focused on safety, not only profits. (Culture)	8	20
Sometimes people's own culture effects safety (workers, managers, supervisors). (Culture)	6	15
On the surface safety is seen to be overriding production, but, in real terms the need to achieve targets and productivity will always win over zero tolerance harm and safety. (Culture)	6	15
People have got to take a first-hand approach to safety instead of relying on others. It is everyone's responsibility to the point that if you don't want to play don't, as it may injure others. (Culture)	4	10
We have a strong safety culture already in this work place so many of the systems are already in place. (Culture)	3	7
More cross checking to ensure personnel complete their training. (Education)	8	20
More of a focus on the refresher training. Many don't do it. (Education)	7	17
More information provided before attending the five day course to have a bit better understanding before attending the course. (Education)	5	13
To attend other safety courses (ICAM incident investigation training) as well as this 5 days course is always a time and money factor for my manager. (Education)	2	5
It is important for the person who undertakes the role as a SHR be given the full support of management and to be trained so as to be effective in the role. I believe the role requires a high level of local site knowledge, good communication and full knowledge about safety. (Education + communication)	4	10
Legislation, policies, procedures needs to be written with simple English so that everyone can understand and follow. (Communication)	4	10
A formal communication system should be maintained at workplace so that safety reps can communicate with staff about safety issues. (Communication)	2	5
Formal safety training has had a negligible effect on my ability to perform as an OSH Rep. I have found soft people skills are more important. (Communication)	2	5
Total	90	

Other factors that the mining industry participants thought were important to consider were categorised into 5 main themes. There were 29 responses related to the need to provide enough resources for safety and health representatives to be able to do their work, 27 responses that considered that the workplace safety culture affected their ability to do their work, 26 responses that were related to education and 12 responses related to good communication being required.

Enough Resources

There was a concern from the mining participants about resources, as they perceived that with the down turn in the mining industry there was also increased job insecurity in many other industries in Western Australia. This employment insecurity was for management and all employment positions. In an effort to minimise costs and maximise profits some managers were reported as providing insufficient resources for safety, employee education and insufficient time away from production work for safety and health representatives in an effort to maintain the mine production at a high enough level to keep their employment position. This was similar to the findings of Gilmore (2018) who wrote about coal mining in the Mingo County in the United States of America.

A decrease in Health and Safety is reflected during operations where the local community is desperate for jobs. The Health and Safety at the Ragland Mine reflected the economy: if it's too expensive, we won't do it. For the record the mine workers were a major contributor to the company's decisions. Poverty by then was reaching pre-coal boom standards (Gilmore, 2018, p.3).

Harris (2010, p. 36) stated that, "at a basic level HS representatives need resources to engage in the participatory process. For instance, they require access to OHS information about hazards that workers are exposed to". Harris (2010) also stated that one of the resources safety and health representatives' need is time to conduct their work. There was a need identified by the mining industry participants for managers to realise that good safety and health practices improved company profits.

Safety Culture

Some of the mining industry participants reported that their workplace had a culture

of focusing only on profits, so it did not matter if employees had to work in unsafe conditions. However the participants also recognised that this attitude was affected by the individual's own values and beliefs. Other participants stated that workplace safety was each person's responsibility and if the work could not be made safe then it should not be undertaken. Safety and health practices were described as being influenced by an individual's mental state of mind as one of the participants explained.

Safety must be applied practically and in consultation with all stakeholders. Building a safe healthy work culture helps both the employer and employee not just with incident and injuries but just as important each individual's mental state of mind.

Three of the participants reported having a very good safety culture at their workplace. Safety culture is described as representing "an organisation's core values about the importance of safety and the underlying beliefs and assumptions that guide behaviour and decision making" (Casey et al. 2017, p. 344). In this context a mining industry participant stated the following.

There is always room for improvement on any site but safety is of the highest importance at work and I believe we are doing everything in our power to teach crews members the correct practices to send them home safe every day.

Part of developing a positive safety culture at the workplace was providing employees with enough education to be able to perform their duties to a high standard.

Education

The comments about education were related to the participants wanting more safety and health education before attending the 5 day orientation course, requesting refresher training to keep up to date with current knowledge, and to be allowed to attend additional educational courses to expand their safety and health knowledge, particularly in relation to incident investigation. All of these statements show how committed these participants were to having the knowledge needed to perform their role effectively. Safety and health representatives can obtain expert power from a combination of sources that include formal qualifications and skills, work competencies, workplace knowledge and work experience (Walters & Frick, 2000;

French & Raven, 2001; Hall et al., 2006).

Communication

Some of the mining industry participants considered that the safety and health representative should have good interpersonal skills, be a good communicator and have a formal communication system in their workplace to be able to communicate effectively with other employees about workplace safety and health issues. Good communication skills and channels are important to maintaining and improving workplace safety (Espluga et al., 2014). Mining industry participants also reported asking for workplace policies and procedures as well as legal requirements to be written in a simple language that could be understood by the people in the workplace. For example a workplace one participant said:

Mining operators, i.e. the individuals that make up the greatest portion of the mining industry, are generally uneducated people, i.e. lacking year 12 competency or post high school educations. A lot of legislation etc. is written by educated individuals which is not very easy to understand by mining operators and for some Safety and Health Representatives.

Many of the mining industry employees the participants reported as having low educational levels, which made it difficult for them to read written information. Consequently, the participants in order to communicate the message more effectively in the workplace found themselves having to rewrite the information in simple English.

The following word cloud (see Figure 17) was developed by Word Frequency query to identify the most frequently used word for whether anything else needs to be considered for workplace safety and health.

showed that consultation was the most commonly used power by safety and health representatives. Both safety and health were included in the word cloud, with safety being the largest word indicating that the representatives spoke more about the use of their powers for workplace safety than for health.

5.3.2 *Methods used*

When reporting on the methods that safety and health representatives used to achieve a high standard of workplace health and safety and influence people in the workplace 10% of the mining participants did not believe that they had any influence. The remaining participants reported that the methods that they most used were their safety and health representative position, information and expertise powers, followed by using their interpersonal skills, being a member of the workplace safety and health committee, using cooperation, consultation, networking and caring for people skills (Table 40).

When discussing how they promoted safety in their workplace none of the participants spoke about using their powers. Instead they described how they used their own motivation, their initiative, time, knowledge, friendships, being a good role model and hard work as ways to promote safety in their workplace (Table 42). All of the mining participants described ways that they promoted workplace safety.

Twenty four percent of the participants reported that they did not have any influence on workplace safety practices, or safety related to workplace equipment, products used, work practices or safety management practices. There were however 73 responses about the methods used by the participants to influence these factors with the most common being through involvement in hazard identification, risk assessment and recommending risk control measures, consultation, engaging workers so that they were aware of all aspects of safety related to their work, being involved in developing site safe work procedures and in safety education, taking a role in field leadership to implement safety in the design stage of work processes, being approachable and promoting a positive workplace safety culture (Table 41). All of the methods spoken about the word cloud showed were focused mainly on safety, equipment and management. Health was not shown in the word cloud.

For these methods to be used the participants stated that they required enough resources, which included education and work time to be able to perform their safety and health work (Table 43). Having management support for their work was rated as being very important. Participants stated that management needed to focus on safety as well, not just profits. It was noted that where the CEO supported workplace safety there was a positive safety culture that enable the safety and health representatives at this workplace to perform their role effectively.

Other factors that were reported as enabling the methods used to be effective included the safety and health representatives having safety and health knowledge, particularly in relation to legal requirements, having good communication skills and having an active involvement in risk management. Education (which included the 5 day introductory safety and health representatives course, Certificate 4 in Work Health and Safety and the Diploma in Safety and Health) was reported by 88% of the participants as enabling them to perform their work more effectively as they had the knowledge of how to perform their duties. Five percent of the participants stated that having 'soft people skills' was more important than having formal safety and health representative training (Table 48).

The most common barrier to the methods that safety and health representatives used to perform their legally required duties was management. Of the 105 responses related to what were the barriers preventing them from being able to do their safety and health work, 66% were related to management prevention. Bullying, harassment and gender discrimination were common. Other barriers were safety and health representatives feeling that they had a lack of knowledge about what was happening in their workplace, conflict with union personnel and having a lack of confidence to talk in group situations with more experienced workers (Table 44). A further barrier was that people were losing their employment positions when mining was not profitable enough so they put continuing employment as more important than workplace safety. The word cloud related to barriers showed safety in large letters and health in small letters, indicating that the mining industry participants spoke mostly about the barriers to promoting workplace safety.

The most common ways that the participants reported using to overcome these barriers to them performing their legally required safety and health work was through using good communication skills with managers and other employees, using their safety knowledge and experiences, interpersonal skills and using the minimum amount of resources required for occupational safety. Seventeen percent of the participants were not able to overcome the barriers to them being able to do their safety and health representative work (Table 45). In the word cloud for overcoming barriers safety was in large letters indicating that it was spoken about the most frequently. Health was not included in this word cloud.

5.4 Summary

In answering the second research question it was determined that not all safety and health representatives in the Western Australian mining industries felt that they had any power to influence the achievement of a high standard of safety and health in their workplace. Of the mining industry participants who did report having power the most common power used was consultation. Other powers were gained from being a member of the workplace safety and health committee where they could talk directly to management employees, through their position power as being their workplace safety and health representative, through their workplace safety and health expert knowledge and / or through having good interpersonal and diplomacy skills. Safety and health representatives in the Western Australian mining industry have the power to issue Provisional Improvement Notices (PIN) when there is a safety hazard that management are refusing to implement risk control measures to make the workplace safe. One participant reported using coercive power to influence employees to work safely (Table 40) and four reported using coercive power to influence the achievement of a high standard of health and safety in their workplace (Table 39). No participants reported issuing a PIN Notice.

The strongest barrier preventing safety and health representatives from being effective was lack of management support. Where the company CEO supported the safety and health representatives their work was effective and their workplace had a strong positive safety culture.

Ten percent of the participants did not report any method used to influence a high standard of safety and health in their workplace as they stated that they had no influence. Of the participants that did have influence the methods used were their position as a safety and health representative, information and expertise powers, interpersonal skills, being a member of the workplace safety and health committee, cooperation, consultation, networking, their employment position, workplace safety and health knowledge and caring for people skills.

This chapter examined the power and methods that safety and health representatives in the Western Australian mining industries use to influence the achievement of a high standard of health and safety in their workplace.

The next chapter focuses on providing information to answer the last research question about the strategies used in the workplace by safety and health representatives to maintain the highest level of workplace safety and health and the leading and lag indicators results at their workplace.

6. RESEARCH RESULTS – STRATEGIES USED FOR WORKPLACE SAFETY AND HEALTH AND OUTCOMES.

6.1 Introduction

The previous chapter answered the second research question which was: what power and methods do safety and health representatives in the Western Australian mining industries use to influence the achievement of a high standard of health and safety in their workplace? This chapter provides the research results, which will be used to answer the final research question:

Which strategies are used in the workplace by safety and health representatives to maintain the highest level of workplace safety and health according to leading and lag indicators?

6.2 Workplace Inspections

Organisations may use a variety of leading indicators to prevent accidents and incidents occurring at their workplace and to maintain a high standard of workplace safety and health. The number of workplace inspections conducted by safety and health representatives can be used as a leading indicator. Leading indicators are a measurement of the proactive safety management activities used to prevent incidents and accidents at workplaces (Cieri, Sinelnikov, Inouye, & Cooper, 2015; Sheehan, Donohue, Shea, Cooper, & Cieri, 2016; Shea, Cieri, Donohue, Cooper, & Sheehan, 2015; Lingard, Hallowell, Salas & Pirzadeh, 2017).

In Western Australia's Mine Safety and Inspection Act, 1994 [s. 53 (1)]

The functions of a safety and health representative are, in the interests of safety and health at the mine for which the representative was elected:

- (a) to inspect the mine, or any part of the mine
 - (i) at such times as are agreed with the manager of the mine; or
 - (ii) where the representative has not inspected the mine, or that part of the mine, in the preceding 30 days, at any time upon giving reasonable notice to the manager.

The following table provides information on the mining industry participants' involvement in workplace inspections.

Table: 50. Workplace Inspections

Sub Nodes: Workplace inspection frequency.	Number	% of 41
No I am not involved with workplace inspections.	8	20
Yes, but not a formal documented inspection. I do conduct a walk around and report any issues, which I notice. 1 walk around each week.	6	15
Yes, but it is not a formal workplace inspection. I conduct general plant short interval control logs that are documented.	3	7
Yes, but it happens very rarely.	2	5
Yes, but it is ad hoc and on a low priority list for my employer.	2	5
Yes, occasionally.	2	5
Yes, I am involved in workplace inspections about once a quarter (3 monthly).	2	5
Yes, every 2 or 3 months.	2	5
Yes, every six weeks, or if requested to conduct additional inspections in the interim.	4	9
Yes, every 5 weeks.	3	7
Yes, Monthly	2	5
Yes, fortnightly.	2	5
Yes, weekly on site.	3	7
Total	41	100

Only 17% of the participants said that they conducted regular workplace safety inspections at least monthly; while 20% indicated they had no involvement in conducting any inspections in their workplace. According to current state legislation safety and health representatives are able to perform a safety inspection at times agreed with by their manager if they had not conducted one in the preceding 30 days.

Some participants reported conducting their worksite safety inspections weekly. For some there was formal documentation of their inspection and a report written. Other participants stated that they only conducted informal walk around inspections and reported the hazards that they identified. For example one participant who did conduct regular safety inspections said:

Yes, I assist with the inspection of my own workplace (laboratory) every month. I also assist with inspections of other departments' workplaces on a 3-monthly basis.

He explained, that he conducted a daily visual hazard check to ensure that there were no risks for identified hazards to cause harm to employees when performing their daily work and that he used to inspect the laboratories on a weekly basis. His inspections focused on: storage of materials; correct labelling of materials and chemicals; effective spill control measures; corrosive materials storage; presence of material safety data sheets for all chemicals in his workplace; adequacy of personal protective equipment for fire and evacuation; all other equipment used in his workplace; building safety; potential for employee hazardous exposures and so on. This participant said that, he was not involved with incident investigations if an incident occurred in the laboratories. The participant stated that management helped him to do all his safety and health representative duties effectively by providing time and external resources. This included: providing professional expertise; training; computer access; time to consult with other safety and health representatives in different departments as well as providing any other support that he required to perform his role. Walters et al. (2014) had similar findings that safety and health representatives in the mining industry were able to work more effectively when management were supportive.

Other mining industry participants were involved with a monthly workplace inspection but pointed out that workplace inspections were part of everyone's duty in the workplace. As an example a participant stated:

Formally I do workplace inspection on monthly basis but, informally it's constantly part of everyone's duties of care to be vigilant and safe at all times.

This participant explained that although she only conducted monthly workplace inspections she was always concerned about the daily safety of the employees at her workplace. She explained that, before starting any work, a prestart meeting took place with the supervisors and the safety and health representatives leading this meeting. The daily prestart meeting focused on any daily safety issues for machinery to be used that day, the daily monitoring of safety procedures and practices at her workplace that were to occur, a discussion on the applicability of any safety alert that had been issued by company management and anything else that was relevant to ensuring that the work would be performed safely. All of the employees in her work area actively participated in the daily pre start meeting. This safety and health

representative's experience showed that the employees who worked there were very concerned about workplace and work processes safety, had a great commitment towards safety and protecting employee health and that this workplace had a good safety communication system.

A study conducted by Sinelnikov et al. (2015) also found that leading indicators were used to prevent adverse incidents or outcomes, to improve organisation occupational safety and health management and to develop a proactive and positive safety and employee health culture. Sinelnikov et al. (2015) identified that leadership commitment, support, engagement and a company-wide good communication system were required for successful workplace safety and health management.

Some safety and health representatives also spoke about audits. As an example, one participant said:

Official audits done on different departments 3 times a year. Each person on site is required to partner with someone and complete 3 audits of a randomly selected section each year and workplace inspection is included with audit.

This participant said that for him a workplace inspection and safety audit did not exist separately so an inspection was only conducted 3 times a year. He explained that he thought that a workplace inspection was an examining process to identify the hazards at the workplace. A safety audit, he considered, was a documented method of reviewing safe work processes, practices, health and safety related documents and the safety system used at the workplace through inspections, examinations and through conducting interviews with people at the workplace. This was to ascertain whether the organisation complied the occupational safety and health Acts, Regulation and all legislative requirements related to workplace safety and employee health. As a summary he said that an audit is conducted to check compliance. Reese (2016) wrote that, "the use of safety and health audits has been shown to have a positive effect on a company's loss control initiative" (p. 90).

Workplace safety inspections however are conducted to identify if there are any workplace hazards and as such can be done through a checklist. Inspections can be conducted daily, weekly, monthly or every 3 months (Reese, 2016). According to the

Mine Safety and Inspection Act, 1994, there is no provision for safety and health representatives to take part in an audit. However, they are encouraged to conduct workplace inspections to identify workplace hazards and have the requirement to report any identified workplace hazards to their management.

Some participants said that, they were rarely involved in conducting a workplace inspection because their supervisor conducted the workplace inspection. In this context, one participant said:

I rarely involve and only in an informal way – this task is dedicated to the area supervisors. However I am in charge of collecting the work place inspection and filing them. Occasionally I went with a DMP inspector on their rounds when they did a site visit.

This safety and health representative explained that he did not participate in any formal workplace inspection on a regular basis, although his workplace supervisor conducted workplace inspections regularly. The participant reported he was only in charge of carefully filing copies of workplace inspection reports and ensuring that they were available if required. He commented that he learned a lot about safety issues from the Department of Mines and Petroleum (DPM) inspectors because sometimes he accompanied them when they conducted a site visit at his workplace. This experience was different to the described role of safety and health representatives in the Mines Safety and Inspection Act 1994. According to the Act (s. 53), one of the main roles of the safety and health representative is to inspect the mine for hazards.

Using Frequency Word query the following word cloud (Figure 18) was developed to identify the most frequently used word for whether safety and health representatives were involved with workplace inspection as well as the workplace inspection frequency rate. The most frequently used word was *yes*.



Figure: 18. Involvement in Safety Workplace Inspections

Twenty percent of the mining industry participants reported not conducting any workplace safety inspections. However 80% reported that they were involved directly or indirectly, formally, informally, regularly or on an irregular basis with workplace inspections. The next most common words after *yes* were *workplace* and *inspection*. The word cloud results provided validity for the participants' answers.

6.3 Involvement in Incident Investigations

Section 53 (1) (b) of the Mine Safety and Inspection Act, 1994 records that the role of the workplace safety and health representatives is:

in the event of an accident, a dangerous occurrence, or a risk of imminent and serious injury to, or imminent and serious harm to the health of, any person, immediately to carry out an appropriate investigation in respect of the matter.

To identify how much involvement safety and health representatives had in meeting this legal requirement the mining industry participants were asked if they were involved in accident and incident investigations. Table 51 presents their answers:

Table: 51. Accident and Incident Investigation Involvement

Accident and incident investigation involvement.	Numbers	% of 41
NO	15	37
Just starting to be involved	6	15
Yes, but only once	5	12
Sometimes	5	12
Yes, on regular basis	10	24
Total	41	100%

Not all workplaces included safety and health representatives in accident and incident investigations as 37% of the mining industry participants reported no involvement while 63% reported some involvement. The level of involvement varied from just starting to be involved (15%) to being involved regularly (24%). As an example one participant said:

Yes I was involved with the investigation but most of the time company's views will be getting more important than safety rep's views about investigation.

During the interview this participant said that she had formal ICAM training on how to conduct an incident investigation. After completing this course she had been involved in two incident investigations for her work area, which included submitting an incident investigation report with her findings and recommendations. This participant was disappointed that most of the time management did not agree with her findings and recommendations. However, when she discussed her investigation results with management they then usually agreed.

Another participant reported a positive experience with incident investigation and said:

I recently participated to a safety investigation which involved creating a time line, finding root causes and contributing factors. I was involved in the corrective actions for this specific investigation.

This participant stated that he participated in a safety investigation at his workplace after his supervisor spent time teaching him how to conduct a root cause analysis as part of an incident investigation. The five steps he was taught were to include:

- An event description. In this step, he was taught to investigate in detail the

problem or incident as much as possible.

- Time line. This was used to uncover the potential primary causes of the event or incident. Information was collected on what had happened before, during and after the incident occurred. It included all the names of the parties involved, date, time and place of the incident.
- Investigative method. This included the safety and health representative (participant) learning about interview techniques, taking photos and making phone calls to collect the information about the incident.
- Finding the cause included identifying the contributory and the root cause of the incident.
- Corrective action. With the root and contributory causes identified the manager taught the participant to recommend appropriate corrective actions that included the resources required, the cost of the recommendations to prevent the incident occurring in future due to the same or similar circumstances.

Due to his manager taking the time to educate him this safety and health representative was developing good incident investigation skills and was very keen to use these skills.

Some of the participants who were not involved with accident and incident investigations provided an explanation with one of them stating that:

This has been a problematic area on my site for many years of which we have raised many times in our meetings on our lack of participation. People seem to have a difference of opinion on what an investigation is or how to carry one out effectively.

This research participant stated that, as a safety and health representative, he asked in staff meetings to be involved with the incident investigations for his area of responsibility. However, his supervisors believed that all the issues or incidents did not need to be investigated or that issues may be resolved through informal ways without any investigation. This participant also said that there were different opinions between people in the workplace about what a proper investigation was and how it would be carried out to assess the root cause of each incident. Walters et al. (2014, p. 61) wrote:

While the SHRs were sometimes involved in the investigation of an accident, they were mainly informed of their occurrence and the reports of investigations undertaken on behalf of the company. For the SHRs, involvement in the investigation of accidents was uncertain and often depended on mine management.

Similarly a study by Sinelnikov et al. (2015) found that management support was required for employee participation in workplace safety and health practices, such as incident investigations.

The following word cloud (Figure 19) was developed to identify the most frequent word for answers to a safety and health representative's involvement with accident and incident investigation at their workplace. The most frequent words in the word cloud were *regular basis*. The word cloud provided validity for the reported research results.



Figure: 19. Involvement in Accident and Incident Investigation

The following table shows the results of the participants' answers about whether corrective actions were discussed with, or communicated to safety and health representatives.

Table: 52. Corrective Actions Communications

Corrective action communication	Number	% of 41
No.	25	60
Sometimes.	8	20
Yes, on a regular basis.	8	20
Total	41	100

The majority of the participants stated that they were not aware of the corrective actions that were taken after the accident and incident investigation because this was not discussed with them. The level of communication with the remaining participants varied from sometimes (20%) to regularly (20%). When describing accident and incident investigation corrective action and timely completion of the investigation report one of the mining participants said:

Yes, I do incident investigation on regular basis. I always discuss the corrective actions with my manager but it depends on the management finally. The corrective actions are usually just put in the system and if we are required to follow anything up then we will get an email notification.

Other participants reported less frequent involvement and less management support. As an example one participant said:

Occasionally a safety rep was actively involved in an investigation. I wasn't but maybe wasn't on site or on night shift when they occurred. We just signed the reports once complete, but most reps didn't read them, just signed them. I tended to try and add. Not always, but sometimes I get the feedback from management.

This participant explained that if she was asked to sign an incident investigation report, she contacted the investigator to ask questions if she thought that there was any confusion in the report and sometimes added her own comments. Occasionally the participant received feedback from management about the investigation but not in detail.

Some negative comments were made by other mining industry participants about not being allowed to be involved with accident and incident investigations and not receiving any communication regarding any corrective actions that were taken to

prevent future accidents, or incidents, due to the same, or similar, causes. For example, one participant said:

I am not invited to be involved in accident or incident investigations despite my entitlement to consultation by managers. No corrective actions are discussed with or communicated to me.

This safety and health representative was frustrated as he said that even when he was present, when a workplace incident occurred he was not allowed to be involved in the incident investigation. He also stated that his manager was not keen to discuss the recommended corrective actions to be taken. This participant reported not feeling sure about what sort of hazards or risk were associated with any incident. Many of this person's work colleagues had asked for him to be re-elected as a safety and health representative. However the participant informed the researcher that he will be finishing his two years term very soon and was not interested in being re-elected in the future because he was not allowed to perform the safety and health representative work as required by law.

Another participant said to the researcher:

I am only just starting to be involved. I am trying to encourage the managers to ensure that there is a safety rep there for every investigation. Corrective actions are never discussed with me, only with the people they affect.

This participant stated that he was a new safety and health representative and had just started to be involved in incident investigations at his workplace. He said that he encouraged his managers to involve him in incident investigations so that he could gain more workplace safety experience. However he found that, following the incident investigation, corrective actions or risk control measures were not discussed with him.

For both mining industry and pilot study healthcare safety and health representatives 60% of them did not have corrective actions communicated to them after an incident investigation had been conducted so could not share risk control measures with their co-workers to improve workplace safety. The amount of information provided to the participants depended on their manager with 20% of the mining industry safety and health representatives reporting receiving feedback on a regular basis. Good communication can be a leading indicator if it is measured.

6.4 Leading Indicators.

6.4.1 Introduction

The Department of Mines, Industry Regulation and Safety (2018) states that safety performance in a workplace can be measured by using lead and lag indicators. Lag indicators measure the outcome after an adverse event has occurred, while leading indicators measure what is being done in a workplace before an incident to make the workplace, work processes and actions of people safe. Examples of some activities that could be used as leading indicators in the Western Australian mining industry include tool box meetings, pre start meetings, safety meetings, near miss reporting, job safety analysis, workplace inspections, safety audits, hazard awareness training, workplace safety and health training, safety management plans, annual safety audit by crews and so on.

There are three main types of positive performance indicators. These are: input activity measures, such as the number of safety inspections completed by safety and health representatives; process focus measures, such as monitoring work processes to check that the risk control measures implemented are effective and output action plan measures, such as whether all goals have been met, for example to have 100% of workplace supervisors attend occupational safety and health training (The Chamber of Minerals and Energy Western Australian, 2004).

6.4.2 Knowledge of leading indicators

The mining industry participants were asked if the mining company that they worked for had leading indicators. Table 53 displays the knowledge and comments of the participants about their company's leading indicators.

Table: 53. Leading Indicators Knowledge

Leading indicator knowledge	Number	% of 41
Yes	15	36.5
Not sure	6	14.5
Do not know about this	20	49
Total	41	100

Not all of the mining industry participants were provided with information about leading indicators. Some stated that they knew that their company had leading indicators, but they were not sure about the nature or type of leading indicators used. The most commonly reported leading indicators were workplace inspections and incident investigations. About half of the participants (63.5%) stated that they did not know anything about company leading indicators. There was a communication gap between the employees and management about the use of leading indicators. This was similar to in the Pilot Study where 60% of the safety and health representatives did not know what a leading indicator was and if their company used leading indicators.

The employees most likely to have a knowledge of leading indicators were employees who worked for mining companies with less than 100 employees (100%) and employees who had worked in the Western Australian mining industry for more than 26 years (100%). This may have been because there is better communication in small companies and with employees who had worked in the industry for longer periods of time. The following table includes factors that affected participants' knowledge of leading indicators.

Table: 54. Factors Affecting Knowledge of Leading Indicators

Age	YES NO	Years worked as OSH Rep.	YES NO	Years worked in mining industries	YES NO	Company employee size	YES NO
18-28	1 3	Less than 1	4 3	Up to 9 months	1 1	Less than 100	1 0
29-38	7 13	1 - 2	1 2	1 - 5	3 7	100 - 999	4 13
39-48	4 1	2 - 4	3 13	6 - 10	4 10	More than 1000	10 13
49-58	2 8	4 - 6	5 3	11 - 15	2 3		
Over 58	1 1	6 -- 8	1 4	16 - 20	1 4		
		Over 8 years	1 1	21 - 25	1 1		
				26 or more	3 0		
Total	15 26		15 26		15 26		15 26

6.4.3 Involvement in developing leading indicators

Table 55 provides information about the mining industry research participants' involvement in developing their company's leading indicators.

Table: 55. Involvement in Developing the Company's Leading Indicators

Involvement in leading indicator development	Number	% of 41
Do not know what a leading indicator is and do not know who develops the leading indicators.	20	49
SHRs are not involved in developing company's leading indicators.	15	36.5
Sometimes SHRs are involved in developing company's leading indicators, but not always.	6	14.5
Total	41	100

The answers provided by the participants mirrored their answers to the questions on whether the company had leading indicators. With the same people stating that they did not know who developed leading indicators as they did not know if their company had leading indicators. This highlighted the communication gap between employees and management about leading indicators existence and performance.

Only six of the participants reported sometimes being involved in developing leading indicators. In some of the workplaces, the research participants reported that sometimes management consulted with safety and health representatives to assess the effectiveness of new leading indicators or to modify existing ones if they required improvement. A study conducted by Sinelnikov et al. (2015) concluded that occupational safety and health leading indicators were implemented to improve company occupational safety and health performance. A participant who was involved with developing leading indicators stated that:

We all participate in safety conversations, which are part of our Key Performance Indicators. These are recorded to a database and presented as monthly health, safety and environment committee meetings.

Similarly another participant said:

We do have lead indicators and myself is involved as I have to go through and enter our take 5 risk assessments and SOA's then report info to supervisor.

These two safety and health representatives reported positive involvement in relation to the development and use of leading indicators to measure safety performance. Other participants did not have as good an experience as evidenced by their following comments:

I involve developing the leading indicators. Company expects opinion from safety reps but company will try to implement company's views not the views of safety reps.

Yes, company had lead indicators, but I was never involved in their development. Never seen safety rep involvement with lead indicators in this company.

As a safety rep, I am not involved in developing these leading indicators. Safety Reps are sometime consulted to assess the effectiveness of leading Indicators or suggest new ways to improve the safety culture, but management takes final decision.

Other participants said that management only decided what was included and used as leading indicators and that the safety and health representatives were not consulted or involved. Examples of this are provided in the following comments from the mining industry research participants:

The company does have lead indicators in place. They are developed by people managers and executives.

Yes, I know that company's leading indicators developed by management and it's controlled by management.

Most changes and leading indicators are Determined, Delivered and Implemented by Management.

The exclusion of safety and health representatives in participating in the development of leading indicators was summarised by one of the participants; who explained that management decided on and developed the leading indicators without asking the safety and health representatives for any suggestions. Management then informed employees in safety meetings about the leading indicators they had developed or created and which employees were supposed to achieve as part of their performance management. Often new leading indicators were developed and implemented after

an unsafe incident occurred and then management informed the safety and health representatives and the workplace supervisors of this development.

In the pilot study only one of the healthcare participants reported that sometimes the safety and health representatives were involved in the development of the company's leading indicators. The remaining pilot study participants did not report any involvement, indicating that it was not just in the mining industry that there was a lack of involvement by safety and health representatives in the development of leading indicators to measure proactively safety performance.

Leading indicators are positive performance indicators that “measures the positive steps that organisations and individuals take that may prevent an OHS incident from occurring” (Cieri et al., 2015, p. 16). As safety and health representatives understand the work that is occurring in their area they would be useful employees to consult about the use of which type of leading indicators would have the greatest impact on improving workplace safety performance. Having their involvement would provide the safety and health representatives with greater commitment to implementing and encouraging other employees in their work area to use the leading indicators to improve workplace safety. More than 85% of the research participants reported that their managers did not use safety and health representatives as a valued resource, preferring instead to make their own decisions related to developing leading indicators. As 63.5% of the mining industry participants did not know what a leading indicator was, leading indicators were either not used in all mining workplaces, or not communicated to the safety and health representatives in the Western Australian mining industries.

Table: 56. Factors Affecting Involvement in Developing Leading Indicators

Age in years	YES	NO	Years worked as OSH Rep.	YES	NO	Years worked in mining	YES	NO	Company employee size	YES	NO
18-28.	0	4	Less than 1	1	6	Up to 9 months	1	1	Less than 100	1	0
29-38	2	18	1-2	1	2	1-5	1	9	100 - 999	4	13
39-48	1	4	2-4	1	15	6-10	1	13	More than 1000	1	22
49-58	2	8	4- 6	1	7	11-15	1	4			
Over 58	1	1	6--8	1	4	16-20	1	4			
			More than 8	1	1	21-25	1	1			
						More than 26	0	3			
Total	6	35		6	35		6	35		6	35

Very few of the mining industry participants (14%) were involved in developing their company's leading safety indicators. None of the participants under 28 years of age or employees who had worked for more than 26 years were involved in developing company leading indicators. The smaller the mining company the more likely the safety and health representative was to be involved in the development of leading indicators.

6.4.4 Types of leading indicators used

Leading indicators focus on having a proactive approach to occupational safety and health at the workplace and can be an indicator, or a predictor, of root causes of incidents as well as of occupational safety and health performance (Sinelnikov, Inouye, & Kerper, 2015). Leading indicators help the company to create, analysis and to implement proactive safety management (Sinelnikov, Inouye, & Kerper, 2015). Table 57 shows the leading indicators reported by research participants as being used in the Western Australian mining industries.

Table: 57. Leading Indicators Used in Western Australian Mining Companies

Leading indicators used at workplace/mining companies.	Number	% of 41
Do not know any company leading indicators.	20	49
Tool box meetings. <i>(Communication)</i>	6	15
TAKE 5's, hazard reporting, field interactions as key leading safety indicators. <i>(Communication)</i>	6	15
Safety conversations are recorded as TTT 'Take Time Talk', PTO 'Planned Task Observation', CCO 'Critical Control Observation'. <i>(Communication)</i>	6	15
Pre start meetings. <i>(Communication)</i>	5	13
Safety meetings. <i>(Communication)</i>	4	10
Safety interactions with other work groups. <i>(Communication)</i>	3	8
Advertising of safety all over the mine. <i>(Communication)</i>	3	8
Near miss reporting. <i>(Communication)</i>	3	8
Visual leadership where employees observe the person working and ask the safety related questions about the task at hand. <i>(Communication)</i>	2	5
The leading indicator that I'm aware of is Field leadership. <i>(Communication)</i>	2	5
Every crew is briefed on safety hazards at the start of each shift. Task observations. Five or two weekly safety meetings for crews (depending on crew). Monthly audits by crews. <i>(Communication)</i>	2	5
Job Safety Analysis. <i>(Proactive risk management)</i>	6	15
Safety Audits <i>(Proactive risk management)</i>	6	15
Safety observation. <i>(Proactive risk management)</i>	6	15
Hazard awareness training. <i>(Proactive risk management)</i>	5	13
Safety management plans. <i>(Proactive risk management)</i>	5	13
Workplace inspection. <i>(Proactive risk management)</i>	5	13
Monthly audits by crews. <i>(Proactive risk management)</i>	3	8
CONTAM monitoring completions. <i>(Proactive risk management)</i>	3	8
Visible Felt Leadership audits (similar to behavioural observation) and Safety and Environmental Inspections. <i>(Proactive risk management)</i>	3	8
TOPS = Task Observation Process for Supervisors. Take 5 and SWIC. Safe Workplace Inspection Checklist used for weekly, monthly, quarterly and yearly inspections. <i>(Proactive risk management)</i>	2	5
The company performs multiple types of safety observations, checks on peer behaviour observations, planned task observations, critical control observations and layered audits. <i>(Proactive risk management)</i>	1	3
Total.	107	

Forty nine percent of the participants did not know of any leading indicators. Of the 51% of participants who did know about the use of leading indicators in their

workplace, the leading indicators reported were of two main types; communication and proactive risk management.

Communication

There were 42 reports of leading indicators made by the participants related to communication used in the mining workplace. The findings of this research identified that the mining industry safety and health representatives counted as positive performance indicators their participation in tool box meetings, safety meetings, pre start meetings, safety interactions, safety conversation with employees, task observations and so on. Rashid et al. (2014) conducted research and discovered that there was a correlation between safety commitment, safety communication and the exchange of the leaders' safety communication and safety commitment. Rashid et al. (2014) identified that communication was an important medium for safety and health promotion at the workplace. In the pilot study only one participant reported communication as a positive performance indicator and this was the number of workplace safety meetings. The other type of leading indicators reported by the mining industry participants as used in their workplace was proactive risk management.

Proactive Risk Management

There were 45 reports of proactive risk management practices used as leading indicators by the mining industry participants. As an example one participant explained:

The leading indicator that I'm aware of is Field leadership. Quantity varies between teams and level of management. For example, I have to do 2 planned task observations and a critical control observation.

The most common risk management positive performance indicators were the number of: people provided with training on hazard awareness; safety and other observations of employees doing their work; safety workplace inspections and audits; job safety analysis conducted as well as the number of safety management plans. It was interesting to note that in the mining industry a positive performance indicator was how employees felt their managers were providing visible safety leadership in demonstrating and promoting safety at their workplace. This was not

evident in the pilot study with the healthcare participants who only looked at the number of safety workplace inspections, safety audit reports, safety management plans and job safety analysis.

The importance of safety leadership was identified by Muñiz, Peón, and Ordás (2017) when they conducted research in Spain with 103 process industry employees (a response rate of 15.08%) in which research participants completed a questionnaire that included questions on felt safety leadership. Data collected was analysed using a path analysis of the means. The findings of their research identified that safety leadership had a positive effect on improving workplace environmental conditions with more management investment in the availability of safer workplace equipment, in having a safety work environment, less employee over work and less occupational stress. Research results identified that if employees had too much work pressure there was an increase in unsafe employee acts and less compliance with safety policies and procedures (Muñiz, Peón, and Ordás, 2017).

Western Australian mining industry participant responses did show how the various mining companies were behaving proactively to maintain and to improve workplace safety through the use of positive performance indicators. A study by Pawłowska (2015) with 60 companies used a questionnaire to collect the data with the aim of identifying the nature of indicators used for safety performance measurement by the companies with various levels of safety performance. Their research findings concluded that the most commonly used leading indicators by the companies were those related to the statutory requirement and to confirm compliance (Pawłowska, 2015). This was different to the mining industry participants' experiences in this study that reported proactive risk management and communication were valued.

Mining industry research participants answers to the question on leading indicators were analysed using NVivo 11 software to create themes and sub nodes to identify the nature of leading indicators used at their workplace'. The word cloud identified the most frequent word was *safety* because, all of the leading indicators focused on safety. This provided validity for the research findings.

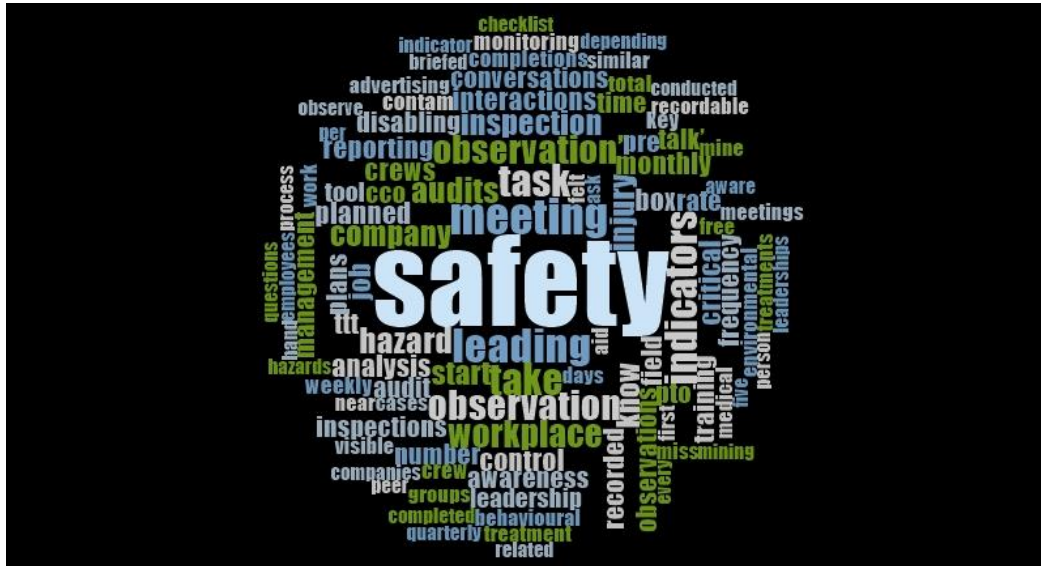


Figure: 20. Leading Indicators Used in Mining Workplaces

6.4.5 Communication of leading indicators

Table 58 reports the mining industry participants' perception of whether leading indicator objectives and targets are displayed and discussed with safety and health representatives.

Table: 58. Leading Indicator Communication

Sub Nodes: Leading indicator communication	Numbers	% of 41
YES, Leading indicator objectives and targets displayed and discussed with the SHRs	9	22
Sometimes displayed, but not discussed in safety meetings	7	17
Previously these were discussed but not now	3	7
NO. Leading indicator objectives and targets are not displayed and discussed with the SHRs	22	54
Total	41	100

In 61% of the participants' workplaces there was no communication about leading indicator results but in other mining industries workplaces there was. For example one participant reported:

Yes all leading indicators are shared with crews. Management insists we are trained to ensure quality safety conversations, our expectations are met, risks are targeted in the talks and employees are coached to verify quality. We display graphs of last month's field leadership without exact values in our meeting rooms used for pre-shift meetings that way it is discussed daily. Percentage compliance varies between teams and months. Majority of the time we are on target.

This safety participant added that their management was very supportive and proactive in implementing safety in the organisation. Management encouraged and provided time for the safety and health representatives to talk to other employees about any safety issues they were concerned about. In this workplace management were focused on the leading indicators metrics for safety compliance, improvement and continuous learning. Management, supervisors and employees took ownership to introduce leading indicators into the whole organisation. Management also promoted training of the safety and health representatives to teach them to communicate professionally with the employees about leading indicators, so that every employee understood what the leading indicators were and how to achieve them. In this participant's organisation leading indicators were used to proactively maintain workplace safety and employee health.

A second mining industry participant explained that, for leading indicators:

The main ones that all of the team participate in are usually discussed in either toolbox meetings, or on our teams visual scoreboard. Some leading indicators are highlighted more than others, or should I say are shown to be more important.

When talking about leading indicators used in his workplace a third participant said:

Monthly targets are issued and we are obliged to comply with meeting these requirements. This means we must fill out so many take 5's and task observations of all jobs, allowing us to identify what hazards and risks associated with all jobs carried out. Also there are Graphs on the Meeting Room walls and Power Point Boards the Crews can read.

Another participant reported good workplace use and communication of leading indicators as part of proactive safety management in the workplace. To promote compliance employees were financially rewarded for their proactive safety work:

Compliance with leading indicators is communicated via site newsletter, Site Safety Committee meeting minutes, Notice Boards, Safety Notices via email, toolbox meetings and prestart meetings. Leading indicators are part of the employees' bonus scheme and many are reported daily in the pre-shift safety and production presentation.

The above statements are examples of the effective use and communication to employees at the workplace of leading indicators and their outcomes. For the

majority of the mining industry participants leading indicators were not communicated, with only 22% reporting good workplace leading indicator communication. Many of the workplaces were focused on production. As an example one participant said:

Previously leading indicators were discussed with crews, but as the company has fallen into hard times over the last 6 years, these have fallen to the way side somewhere.

Another participant reported that:

Although the OHS Management Plan states that measurable indicators will be distributed to notice boards but this is not practised in my work area and they are not discussed with crews. I do not have access to compliance figures for the leading indicators.

In the pilot study 70% of the participants reported that there was no leading indicator objectives or targets displayed in their workplace or discussed with the safety and health representatives, while 30% stated that sometimes leading indicators were discussed in safety meetings, but were not displayed at their workplace. Communication of leading indicator results was reported by the safety and health representatives as being better in the mining industry than in the healthcare industry. The following table contains information about the factors that affect leading indicator communication.

Table: 59. Factors that Affect Leading Indicator Communication

Age in years	YES	NO	Years worked as an OSH Rep.	YES	NO	Years worked in mining	YES	NO	Company employee size	YES	NO
18-28.	0	4	Less than 1	3	4	Up to 9 months	1	1	Less than 100	0	1
29-38	10	10	1-2	1	2	1-5	4	6	100 - 999	10	7
39-48	2	3	2-4	5	11	6-10	5	9	More than 1000	6	17
49-58	2	8	4- 6	3	5	11-15	2	3			
Over 58.	2	0	6--8	3	2	16-20	2	3			
			More than 8	1	1	21-25	1	1			
						More than 26	1	2			
Total	16	25		16	25		16	25		16	25

No safety and health representative that was less than 28 years old was provided with

information about leading indicator results whereas all those that were 59 years and older were. This may have been because there was more respect for the older employees in the mining industry. Company size affected the communication of leading indicators with safety and health representatives in medium sized mining companies having the most knowledge of leading indicators used in their workplace.

According to the Mines Safety Inspection Act 1994 (s. 53), safety and health representatives in Western Australia should receive formal communication about safety and health matters at their workplace. This communication should include information about the leading indicators used and the outcomes. For example Randmaa et al. (2014) conducted research with 169 participants in two anaesthetic clinics at a hospital in Sweden. The aim of this study was to examine the current perception of staff communication and to implement a new communication tool namely Situation-Background-Assessment-Recommendation (SBAR). A questionnaire was used to collect data from the staff. This study concluded that staff perception of communication changed positively after the SBAR communication system was implemented, adverse incident rates decreased in the anaesthetic clinics and the workplace safety climate improved. Research conclusions were that better or improved communication in the workplace can improve workplace safety and employee health (Randmaa et al., 2014). Similarly, Kines et al. (2010) conducted a study with the aim of measuring the effects of onsite verbal communication at construction sites. The results of the study identified that daily verbal communication with employees had a significant impact on improving workers' safety at construction sites (Kines, 2010).

The following word cloud (Figure 24) displays the most frequent words, which were used by the mining industry participants when describing workplace leading indicator communication. This provides validity to the research findings as these words would have been used whether the leading indicators were, or were not, discussed and displayed.

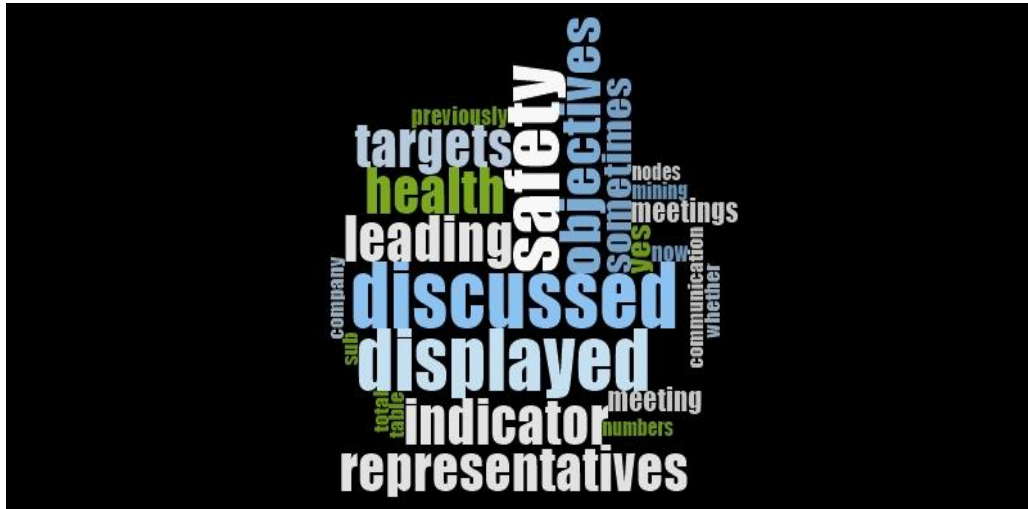


Figure 21 Leading Indicator Communication

As well as measuring a company's safety using leading indicators as a measure of proactive safety actions companies use lag indicators as a measure of what went wrong to cause an adverse safety event.

6.5 Lag Indicators

As well as identifying their knowledge of leading indicators the mining industry participants were also asked about the lag (after the event monitoring) indicators of their company's: Total Recordable Injury Frequency Rate (TRIFR) (combination of fatalities, lost time injuries, alternative duty injuries and medical treatment injuries x 1,000,000 / total number of hours worked); Lost Time Injury Rate (LTIR) (number of lost time injuries x 1,000,000 / total number of hours worked) and Medical Injury Frequency Rate (MIFR) (number of injuries requiring medical treatment x 1,000,000 / total number of hours worked). Lagging indicators are an output oriented measurement, which measures an organisation's past accidents and incidents. It is a measurement of a company's workplace safety and health failure statistics based performance, which focuses on how many people were injured at the workplace, how badly they were injured, how often they were injured and so on (Sinelnikov, et al., 2015).

Table: 60. Knowledge about Company's Total Recordable Injury Frequency Rate

Knowledge	Number	% of 41
Do not know	24	59
Not sure if I am able to release this info.	3	7
Knew company Total Recordable Injury Frequency Rate	13	32
Very low. No exact data available. Only know warehouse department TRIFR.	1	2
Total	41	100

The participant's communication about their company's TRIFR was better than their information about the company compliance rate with leading indicators, as 41% of the participants either knew their company's TRIFR, or had heard about them. However not all participants' knew as evidenced by the comments of one who said that:

I do not know about these indicators. Management do not share this information with Safety and Health Representatives.

Another participant reported:

I have requested this information from the Safety, Training and Compliance Manager, but have yet to receive any feedback on this.

The commitment of managers towards communicating this information to some of the participants was missing. When considering the importance of good communication about workplace safety and health outcomes Shea et al. (2015, p. 15) wrote:

Effective commitment is demonstrated in active engagement in areas such as information gathering about OHS, building trust so all employees view managers as committed to OHS, managers' behaviour demonstrating that they are OHS role models; and managers demonstrating that OHS is a high priority across the organization.

A study conducted by Randmaa et al. (2018) identified that good communication decreased adverse workplace incidents. This study was conducted with research participants from the USA, Canada, Australia, UK, Belgium, and Netherlands. The

aim of the study was to examine the perception of communication of staff members between the different professions, psychological empowerment and safety attitude, prior to and after implementation of communication tools at anaesthetic clinics. This study concluded that implementation of an effective communication tool improved the perception of communication of staff members between the different professions and decreased the rate of adverse incident reports (Randmaa, et al., 2018).

Table: 61. Factors Influencing Knowledge of Company's Total Recordable Injury Frequency Rate

Age in years	YES	NO	Years worked as an OSH Rep.	YES	NO	Years in mining	YES	NO	Company employee size	YES	NO
18-28.	1	3	Less than 1	4	3	Up to 9 months	1	1	Less than 100	1	0
29-38	6	14	1-2	1	2	1-5	3	7	100 - 999	4	13
39-48	4	1	2-4	3	13	6-10	4	10	More than 1000	9	14
49-58	2	8	4- 6	4	4	11-15	2	3			
59 and over.	1	1	6--8	1	4	16-20	1	4			
			More than 8	1	1	21-25	1	1			
						More than 26	2	1			
Total	14	27		14	27		14	27		14	27

The above table shows that working as a safety and health representative in a small organisation was the most significant factor in knowing the company TRIFR. This may be because communication is better in smaller organisations. None of the other above factors seemed to influence the communication by management to the safety and health representative of the company's TRIFR. Another lag indicator is the LTIR. Table 62 displays the knowledge of the mining industry participants about their company's LTIR.

Table: 62. Knowledge about Company's Lost Time Injury Rate

LTIR knowledge	Reference	%
NO, no one has communicated this to me.	30	73
I have requested this information but have not receive it. (85% of Representatives did not know)	5	12
No lost time injuries recorded in the last 10 years.	1	2.4
No LTIR's for 7 years.	1	2.4
Presently 0	1	2.4
0.3	1	2.4
Less than 8.5	1	2.4
A target of less than 130 per million worked hours' total. Currently we are sitting below. (15% did know)	1	2.4
Total	41	100

Not all participants were provided with information about the number of lost time injuries, despite asking for this information and searching for it. Fifteen percent of the participants did know this information and in general there was a low rate of reported lost time injuries. In this context, one of the participants said:

I heard that company forced to the workers to take the sick leave not lost time injury because they did not fix the hazard, so management thinks that, they will be in trouble if worker claim his absence period as lost time injury.

A study conducted by Azaroff et al. (2002) in United States of America showed there was a significant underestimation of occupational health problems. This study used a Filter model from Webb et al. (1989) to identify research participants. Azaroff et al. (2002) identified in their research that when workers reported their work related ill health problems to their supervisors at their workplace there was a risk to their employment and the way they were treated. These risks included harassment, disciplinary action, stigmatisation against the employee and not receiving an employment position promotion. Workers in this study who reported to their supervisors a work related injury were not paid workers' compensation until their claim was accepted and this caused financial hardship if they were unable to work. The study also found that some companies provided support and care for their employees if they developed a work related musculoskeletal disorders (MSDs). However, for other injuries employers only used their in house interventions, which were exercise, application of an ice pack and splints, medication and other first aid treatment (Azaroff et al., 2002).

Azaroff et al. (2002) noted that some employers were more concerned with having a high premium for worker's compensation than were about the injured or ill employees. The study reported that these employers were worried that filling out a workers' compensation form for an injured or ill employee would raise their insurance premium. According to Azaroff et al. in this context the employers warned their employees not to report to their doctors that their injuries occurred at work. To prevent employees reporting work related injuries or ill health some of the companies in this study had on site medical professionals or trained medical staff to treat the employees if they became injured or ill at work (Azaroff et al., 2002). It has been reported (US Congress, House of Representatives, 2008, p. 11) that:

some workers do not want to get caught up in the slow difficult workers' compensation process. Others are not aware that their injury or illness is work-related or reportable, or do not report because they are afraid of being stigmatized.

Therefore, it was not an exceptional case when similar findings were reported by this study's safety and health representatives in the Western Australian mining industry.

Table: 63. Factors that Affect Knowledge About Company's Lost Time Injury Rate

Age in years	YES NO	Years worked as an OSH Rep.	YES NO	Years in mining	YES NO	Company employee size	YES NO
18-28.	0 4	Less than 1	1 6	Up to 9 months	1 1	Less than 100	1 0
29-38	2 18	1-2	1 2	1-5	1 9	100 - 999	4 13
39-48	1 4	2-4	1 15	6-10	1 13	More than 1000	1 22
49-58	2 8	4- 6	1 7	11-15	1 4		
59 and over.	1 1	6--8	1 4	16-20	1 4		
		More than 8	1 1	21-25	1 1		
				More than 26	0 3		
Total	6 35		6 35		6 35		6 35

None of the participants who were under 28 years of age or who had worked for more than 26 years in the Western Australian mining industry had any knowledge of their company's LTIR and in general there was also very little knowledge about the LTIR. The safety and health representative who worked in a small organisation knew the company's LTIR. The last lag indicator asked about was the company

Medical Treatment Frequency Rate (MIFR). Table 64 provides information on the knowledge of the mining industry participants about their company's MIFR.

Table: 64. Knowledge of Company's Medical Injury Frequency Rate

MIFR knowledge	Numbers	% of 41
Do not know	30	73
I have requested this information from the safety, training and compliance manager, but have yet to receive any feedback on this.	1	2.5
Currently we are sitting well below average I heard from management but I do not know the figure.	2	5
We closely monitor recordable injuries for the month but I am not sure of the rate.	1	2.5
Knew MIFR	7	17
Total	41	100

Most of the participants did not know their company's MIFR. Knowledge of this was compared to the participants' age, size of the company worked for, years working as a safety and health representative and years working in the mining industry.

Table: 65. Factors that Affect Knowledge of a Company's Medical Injury Frequency Rate

Age in years	YES NO	Years worked as OSH Rep.	YES NO	Years in mining	YES NO	Company employee size	YES NO
18-28.	0 4	Less than 1	1 6	Up to 9 months	1 1	Less than 100	0 1
29-38	4 16	1-2	1 2	1-5	1 9	100 - 999	3 14
39-48	2 3	2-4	3 13	6-10	2 12	More than 1000	6 17
49-58	2 8	4- 6	2 6	11-15	1 4		
59 and over.	1 1	6--8	1 4	16-20	2 3		
		More than 8	1 1	21-25	1 1		
				More than 26	1 20		
Total	9 32		9 32		9 32		9 32

Apart from the fact that no one under 28 years of age knew their company's MIFR, there was no clear pattern of other factors that influenced the safety and health representatives' knowledge. Table 66 summarises the knowledge that the safety and health representatives had for each lag indicator for their work place.

Table: 66. Summary Safety and Health Representatives Knowledge of Lag Indicators

Lag indicators information	YES	% of 41	NO	% of 41
Total Recordable Injury Frequency Rate.	14	34	27	67
Lost Time Injury Rate..	6	15	35	86
Medical Injury Frequency Rate.	9	22	32	78

The lag indicator that was communicated by the company to most of the participants was the TRIFR. Therefore, this may be the most commonly used lag indicator in the Western Australian mining industry. For lag indicator communication there was a general trend to withholding this information from the majority of the safety and health representatives who were less than 28 years old. This correlates with reports of discrimination against the younger safety and health representatives. For company size the larger companies with more than 1,000 employees had the worst company communication of lag indicator results to safety and health representatives who worked there. There was no clear communication trend for years worked as a safety and health representative or years worked in the mining industry, although none of the participants who had worked in the mining industry for more than 26 years had any knowledge of their company's LTIR.

Table: 67. Knowledge of Indicators by Gender

Gender	Number	Lead YES NO	TRIFR YES NO	LTI YES NO	MIFR YES NO	No Knowledge
Male	25	9 16	6 19	3 22	4 21	16 (64%)
Female	16	5 11	3 13	4 12	4 12	11 (69%)
Total	41	14 27	9 32	7 34	8 33	27

Knowledge of indicators was not affected by gender as there were 64% of males and 69% of females who reported no knowledge of any leading or lag indicator being used for their workplace.

Table: 68. Knowledge of Indicators by Employment Position

Positions	Number	Lead		TRIFR		LTI		MIFR		No knowledge
		YES	NO	YES	NO	YES	NO	YES	NO	
Shift laboratory technician	5	1	4	1	4	1	4		5	4
Mine surveyor	4	2	2		4		4		4	2
Truck operator	3	0	3	3		3		3		
Electrician	3	1	2		3		3		3	2
Process operator	3	0	3	1	2	1	2	1	2	2
Haul truck, bulk water cart & 330 Cat Excavator rock breaker driver	2	2	0	0	2	0	2	2	0	
Maintenance	2	2	0	0	2	0	2	0	2	
Mechanical engineer	2	1	1	0	2	0	2	0	2	1
Mobile plant operator	2	1	1	0	2	0	2	0	2	1
Senior surveyor	1	1	0	1	0	1	0	1	0	
Relief production supervisor	1	0	1	1	0	0	1	0	1	1
Mine geologist	1	0	1	0	1	1	0	0	1	1
Project geologist	1	0	1	1	0	0	1	0	1	1
Process engineer	1	0	1	0	1	0	1	0	1	1
PO6 Process operator	1	1	0	0	1	0	1	0	1	
Plant operator	1	0	1	0	1	0	1	0	1	1
Production operator	1	0	1	0	1	0	1	0	1	1
Project officer	1	1	0	1	0	1	0	1	0	
Fixed plant fitter	1	1	0	0	1	0	1	0	1	
Underground shot firer	1	0	1	1	0	0	1	1	0	1
Warehousing and logistics	1	0	1	1	0	0	1	1	0	1
Contract and Permanent for another company	1	1	0	0	1	0	1	0	1	
Confidential	2	0	2	2	0	2	0	0	2	2
Total	41	15	26	13	28	10	31	10	31	22

Knowledge of indicators was not affected by employment position as there were both senior and production staff that had no knowledge of any indicator. In comparison to

the mining industry participants, none of the pilot study healthcare safety and health representatives knew their company's TRIFR, LTIR or MIFR. Thus, indicating that there was better company communication to the Western Australian mining industry research participants of these lag indicators. There was however insufficient knowledge of the leading and lag indicator results by mining industry safety and health representatives to use these indicators as a measure of their companies' safety and health management effectiveness. Leading and lagging indicators both show safety management performance.

6.6 Summary

This chapter provided information to answer the third research question which was *Which strategies are used in the workplace by Safety and Health Representatives to maintain the highest level of workplace safety and health according to leading and lag indicator?* Based on the answers of the research participants, the answers to this research question are as follows.

Twenty four percent of the mining industry safety and health representatives were involved in conducting workplace inspections on a regular basis (1-5 weekly), occasionally (34%), conducted walk around but not formal workplace inspection (22%) and 20% did not conduct any workplace inspections. For some mining industry of the safety and health representatives workplace inspections were a strategy used for workplace safety and health management and improvement. In the WA Mine Safety and Inspection Act (1994, s. 53, (1) (a) (d)) the safety and health representatives were to inspect their workplace at the mine to identify and report hazards. This legal requirement was not reported as being met in all workplaces.

Mining industry safety and health representatives (24%) reported that they were involved in accident and incident investigation on a regular basis, occasionally (39%), or not at all (37%). Following an accident investigation only 20% of these safety and health representatives said that corrective actions were discussed with, or communicated to, them. Some representatives did use their participation in accident and incident investigation as a strategy to improve workplace safety and employee health, but there was poor communication from management of the corrective actions to be implemented in their workplace to prevent the accident or incident from

occurring again due to the same or similar causes. In the Mine Safety and Inspection Act (s. 53, (1) (b)) safety and health representatives were to immediately carry out an investigation following a workplace accident or dangerous occurrence. According to the findings of this study these legal requirements are not being met. Some Safety and Health Representatives were either not given the time or permission to be involved in the investigation by their workplace management.

In the Mine Safety and Inspection Act (s. 53, (1) (c)) safety and health representatives are to be provided with health and safety information related to their work. This did not occur in all workplaces, particularly if the company had more than 1,000 employees. In smaller companies there was evidence of more effective communication. There was also discrimination against providing some of the younger safety and health representatives with health and safety information related to their area of work.

In Chapter 4 the safety and health representatives did report participating in workplace safety and health committee meetings and other meetings where they shared their knowledge. Safety and health representatives reported liaising with the employees in their work area and management staff as strategies used to promote a high standard of workplace safety and health. All of these strategies were meeting the safety and health legal requirements in the WA Mine Safety and Inspection Act 1994.

In summary the mining industry safety and health representatives used meeting the legal requirements of the WA Mine Safety and Inspection Act 1994 as their major strategy to maintain the highest level of workplace safety and employee health. Being able to meet the legal requirements of their role depended on management support and communication.

As 61% of the mining industry participants did not know their company's leading indicators, 68% were unable to provide their company's TRI FR, 85% did not know their company's LTIR and 83% did not know their company's MIFR, lead and lag indicators were unable to be used to determine the outcome of the strategies that

safety and health representatives used to maintain the highest level of workplace safety and health.

The final research report chapter summarises the research findings and includes the research conclusions and recommendations.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The aim of this research was *to identify what influence and support safety and health representatives had in the Western Australian mining industries to facilitate the achievement of a high standard of workplace safety*. To achieve this aim interviews were held with 41 mining industry safety and health representatives who worked for small, medium and large sized mining companies to obtain information about the influence they had, and the support they received to carry out their safety and health duties in the Western Australian mining industries.

7.2 Conclusions

7.2.1 Conclusions on support

Many of the conclusions on support come from answering the first research question which was: *what support does workplace management provide to safety and health representatives in the Western Australian mining industries to enable them to work effectively in promoting occupational safety and health?* The mining industries safety and health representatives received support from the following employment positions.

Top Management Support

Having a supportive Chief Executive Officer (CEO) (Top Manager) was reported as the most valuable support in enabling safety and health representatives to perform all their duties effectively and for the organisation to have a high standard of workplace safety and employee health, through the CEO promoting a strong positive safety culture throughout the organisation. In this research it was found that if the safety and health representative had top management support then they also had support from all levels of management. Top management support was only identified in one organisation with less than 100 employees.

Middle Management Support

More mining industry research participants reported receiving support from middle management than from top management. The highest level of support received from

middle managers was allowing safety and health representatives to attend the mandatory 5 day introductory course after they were first elected to their roles. Some middle managers provided safety and health representatives with other learning opportunities, information in meetings and providing guidance and training in how to share safety and health information in meetings with co-workers. Middle managers who provided effective support to safety and health representatives were the compliance manager, superintendent and their workplace manager. However, not all safety and health representatives felt supported with some reporting not being trusted or appreciated, mainly by middle management.

Supervisor Support

The highest level of support at any level of management reported by the mining industry safety and health representatives was from their workplace supervisor who controlled their daily work and allowed them work time for their representative duties (57% allowed; 42% did not allow work time); to prepare for and attend workplace safety meetings (24% allowed), to provide representatives with the required resources to be able to do their work and to present safety information to their co-workers (36% provided).

No Management Support

Having no management support was reported by 10% of the mining industry safety and health representatives. Not having management support meant that these representatives were not provided with safety and health information, not allowed work time to do their role related duties and were discouraged from attending safety meetings. Even if the safety consultant provided support for the representative this was not effective because there was no management support for the safety and health representative's work.

Safety and health representatives reported that when workplace hazards were identified and communicated to their supervisor, this communication was dismissed and the representative had to go to the safety and compliance manager for the required risk control measures to be implemented. There were supervisors who reported that the safety and health representatives' work was a waste of production time for both the supervisor and the representative involved. There were safety and

health representatives who stated that many employees would not volunteer to take on the role because of lack of supervisor support for this work.

Required management support

To make the work of Safety and Health Representatives effective requires management understanding of the role of safety and health representatives, listening to what the representatives have to say about workplace safety and health issues, consulting with representatives in relation to workplace safety and health, providing support, provision of the required resources, communicating with safety and health representatives, allowing the representatives to meet the legal requirements of their role and not being discriminatory towards them.

Other Support.

It was concluded that, after management support, the next highest level of support for mining industry safety and health representatives was from safety and health professionals (26%), co-workers (22%), warehouse team leaders (20%) and other safety and health representatives (5%). The safety and health professional's support was mainly given by providing education on matters related to the safety and health representatives' role.

No mining industry safety and health representatives reported support as coming from their workplace safety and health committee. Although 10% of them reported communicating with a mines' inspector this communication was described as answering the inspector's questions about their workplace rather than the inspector providing support for the representatives' work.

None of the safety and health representatives who worked in the Western Australian mining industry included having union support, but they did report harassment, bullying and sexual discrimination by certain members of the union.

Summary of Conclusions on Support

The most important support received by mining industry safety and health representatives that enabled them to full fill their duties was the support of management. Support from top management was the most valuable as this enabled

the safety and health representatives to have support for all of their representative work to ensure the workplace had a high standard of safety and health management and practices. The support of middle management and supervisors was equally as important as without this support the representatives reported not being able to do their work. Management support of the representatives' work was focussed on safety with very little mention of employee health.

7.2.2 Conclusions on influence

The conclusions on influence were related to answering the second research question which was: *what powers and methods do safety and health representatives in the Western Australian mining industries use to influence the achievement of a high standard of health and safety in their workplace?* The most common power used by the mining industry safety and health representatives to influence workplace safety and health was *consultation*, with other employees, management and people relevant to their work. Only 10% of the representatives used coercive power but none reported issuing a PIN Notice to improve workplace safety.

Methods used to influence mining industry workplace safety were: being a member of their workplace safety and health committee; using safety and health representatives' position power; having an expert knowledge of their workplace; work processes and co-workers; having good interpersonal and diplomacy skills and using their cooperation, networking and caring for people skills. Of the mining industry safety and health representatives involved in this study 27% reported influencing workplace safety by being involved in hazard identification, risk assessment and by suggesting risk control measures; with 10% reporting they were involved with developing site procedures and training packages to positively influence workplace safety for their co-workers.

Using their communication skills was another way the safety and health representatives positively influenced workplace safety. Safety and health representatives' communication skills were used in meetings that they attended which included workplace safety and health committee meetings, safety and health representatives meetings, site safety committee meetings and technical service safety meetings. As well as this, they also reported providing tool box talks to co-workers,

giving guidance to new, inexperienced and young workers and sharing safety information in weekly team and in daily prestart meetings. Some safety and health representatives worked very hard to build a positive safety culture at their workplace.

Although at an organisational level not all safety and health representatives were able to positively influence workplace safety and health; at a personal level all did. They reported promoting safety at their workplace through their motivation, initiative, time, hard work and effort used to promote workplace safety, through using workplace and work process knowledge, through friendships, safety discussions with co-workers and by being a role model for safe work behaviour.

7.2.3 *Conclusions on barriers*

There were 12% of safety and health representatives that reported having no power to influence workplace safety and no influence on promoting employees to work safely. In this study 24% of the representatives reported trying to influence having safe workplace equipment and products used in their workplace but were not able to do so due to their employer not being able to afford this. Of the representatives 5% said that management controlled workplace safety and decided if they would use the safety and health representatives' suggestions or not. For some management staff production was more important than safety, which minimised the safety and health representatives' ability to positively influence workplace safety.

The most responses to any of the questions asked to the safety and health representatives' was on the barriers (105 reports) that prevented them performing their representative work. The most common barrier reported was their managers. There were 79 (75% of barriers) that were reported by the representatives as being related to management. Being female (22%), followed by equal opportunity antidiscrimination policies not being enforced, age and gender discrimination, harassment, bullying and sexual discrimination were all reported as barriers to the safety and health representatives being able to do their representative work. Young female representatives did not seem to receive the respect that they required to be able to perform their role's duties.

There were also problems with lack of resources, lack of support, poor workplace communication, union conflict and employees' fear of losing their employment position which all created barriers. Being a safety and health representative was seen as a barrier to career development and progression.

Seventeen percent of the safety and health representatives said that they were not able to overcome the barriers to doing their official work, while the remaining representatives used their knowledge, interpersonal skills and used the least resources possible to solve safety issues. There was one workplace in which there were no barriers and this was the workplace with the supportive CEO.

7.2.4 Conclusions on strategies used

The third research question was: *which strategies are used in the workplace by safety and health representatives to maintain the highest level of workplace safety and health according to lead and lag indicators*. The strategies reported by the safety and health representatives in the Western Australian mining industries were all related to meeting the legal requirements of their official position and included workplace inspections and being involved in incident investigations (24%) on a regular basis. Not all safety and health representatives were able to perform their official duties described in the legislation, mainly due to their manager being a barrier.

7.2.5 Conclusions on leading indicators, lag indicators and effectiveness

The researcher anticipated that using lead and lag indicators would provide an objective measure of the workplace safety and health practices effectiveness. The barriers to using this as an outcome measurement was that there was poor company communication of leading and lag indicator measurements to the safety and health representatives with 63% not knowing the company leading indicators; 68% not knowing the company's TRIFR, 76% not knowing the company's MIFR and 76% not knowing their company's LTIR.

Figure 4 in this thesis was developed, based on a review of published literature, as a safety and health representatives' effectiveness model. Based on the findings of this research the conclusion is that adjustments are needed to this proposed model for the

Western Australian mining industries safety and health representatives' effectiveness model.

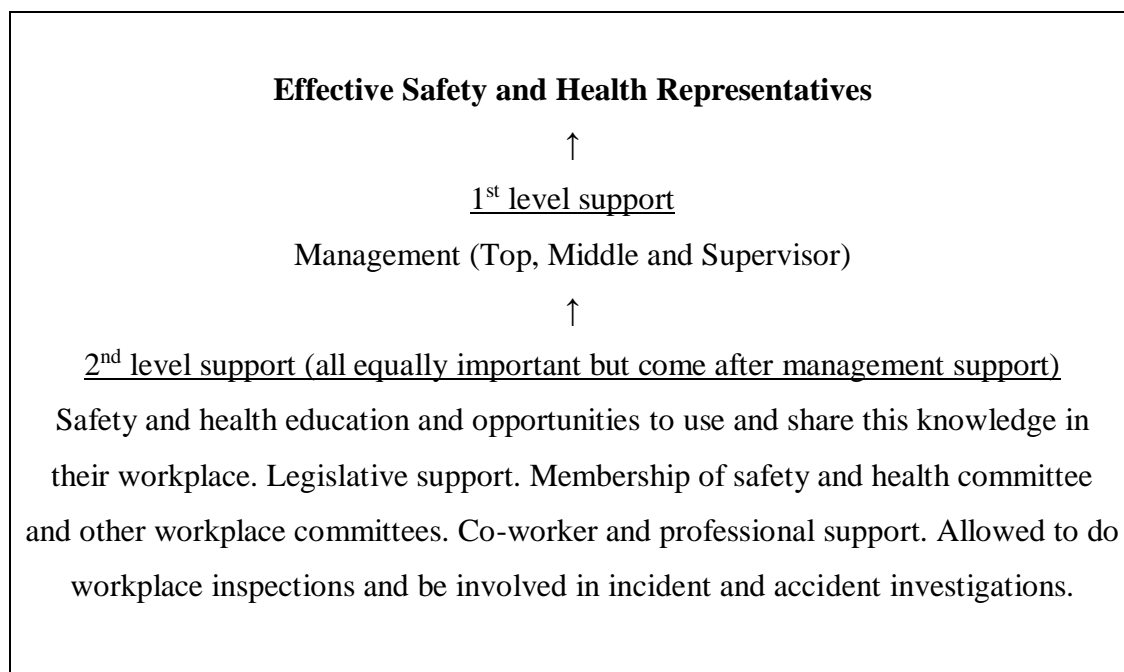


Figure 22. Effective Safety and Health Representatives

The figure 22 model shows that the most important factor that allows safety and health representatives to be effective in promoting a high standard of workplace safety and health is not the safety and health representative, but the support that the representative receives from management. This is the level one support in the above model.

Level two support does depend on the safety and health representatives' knowledge; skills; powers; legislative, co-workers, safety and health committee and professional support; being given the time to do their representative work and being allowed to do this work.

The use of this model is included in the following recommendations.

7.3 Recommendations

Without management support safety and health representatives are unable to work effectively. For this reason the first recommendation is for management to provide the following:

- Allocate sufficient work time for the safety and health representatives to be able to do their official work.
- Appropriate resources for workplace safety and employee health to be maintained at a high standard.
- Support the safety and health representatives in doing their official work as documented in legislation.
- Implemented and enforced workplace antidiscrimination policies.
- Support safety and health representatives in attending the legally required 5-day introductory safety and health representatives' course and in obtaining further safety and health education if the representative requests this obtain the necessary knowledge to perform their role effectively.
- Consult with safety and health representatives concerning safety and health issues, and for change management, in their area of work.
- Listen to, and act to resolve, safety and health concerns brought to management by safety and health representatives for their area of work.
- Communicate to the safety and health representatives information related to safety and health in their area of work; the results of incident and accident investigations in the representative's work area; risk control measures implemented; evaluation of the effectiveness of the risk control measures implemented; leading and lag indicator results for the representatives' area of work and all information about workplace safety and health matters for their area of responsibility.

It is recommended that managers, who have not previously worked as a safety and health representative, should undertake at least a one day in-house introductory course that explains the role of safety and health representatives and how managers can support representatives to be effective in their work. Included in this course should be information on how to use the safety and health representatives' effectiveness model.

It is also recommended that managers undertake a formal short course on workplace safety and health to be able to understand their legal responsibilities in relation to safety and health at their workplace.

In the publications review it was noted that in the Western Australian Mines Regulation Act 1906 the workmen's inspectors had many more workplace safety and health powers than today's safety and health representatives. It is recommended that the power of safety and health representatives be extended to include checking that all of the requirements of the Mine Safety and Inspection Act 1994 Western Australia are complied with in their workplace and that they be allowed to report to a mining industry inspector if they believe that these requirements are not being met.

Recommendations are also made to implement the effective safety and health representatives' model in the Western Australian mining industries to provide support for the work of Safety and Health Representatives. A map with positive performance guidance notes has been developed to assist with the use of this model in the Western Australian mining industries. See Appendix 7.

Further research is recommended to extend this exploratory study and to test the value of the effective safety and health representative's model after it has been implemented for at least 12 months in the mining workplaces. This follow up research can be quantitative as this study has identified the factors that assist, and those that hinder, the work of safety and health representatives in the Western Australian mining industries.

7.4 Summary

This research has reviewed 229 publications and has identified the influence and support safety and health representatives have in the Western Australian mining industries to facilitate the achievement of a high standard of workplace safety. It has made a substantial, original and significant contribution to knowledge about, and understanding in, this field of the work of safety and health representatives.

Previously, in respect to the Western Australian mining industries there were no publications on the level of management support and management communication provided for safety and health representatives and the effects of this support and communication on their work. There were also no publications identified on what made the work of safety and health representatives in the Western Australian mining industries effective. The findings of this research have filled these gaps in knowledge. It has also contributed to understanding the current roles, responsibilities and work tasks of safety and health representatives and methods used by them to positively influence workplace safety and health. This study has identified barriers that prevent representatives from meeting their legal role requirements and made recommendations to enable representatives to contribute effectively to safety and health management at their workplace.

A new model has been developed, based on the findings of this research, that has identified that support is the most important factor for safety and health representative effectiveness and for producing a positive safety culture workplace wide. This research has identified that there are two levels of support with the most important (level 1) being all levels of management support. There is also a need for level 2 support to be provided to the representatives. This includes having the education needed to gain the knowledge to do their official work, legislation support, safety and health committee membership and membership of other relevant committees, co-worker and professional support and being allowed to perform their duties that are documented in legislation. This original model can be used to enable safety and health representatives to work effectively, to achieve a high standard of workplace safety and prevent employee ill health due to work related causes not only in the Western Australian mining industries, but also world-wide.

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Every reasonable effort has been made to acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.

9. APPENDIX.

Appendix 1. Research Approval Letter



Government of **Western Australia**
Department of **Mines and Petroleum**
Resources Safety

Your ref: HSR 8 9 14
Our ref: A2071/201201
Enquiries: Su Ho - Ph 9358 8149
Email: su.ho@dmp.wa.gov.au

Dr Janis Jansz
Curtin University
GPO Box U1987
Perth WA 6845

Dear Janis

PHD PROPOSAL FOR SHIBANI CHAKRABORTI

As discussed, the Resources Safety Division will support Shibani's project by:

1. Inviting companies and elected safety and health representatives to participate in the research. This will be done by publicising the project's aims and providing Ms Chakraborti's contact details in an article in *Resources Safety Matters* magazine and emails to those representatives for whom an address is available, as well as weekly news alerts and other publicity as appropriate. Those interested in participating will be asked to correspond directly with Ms Chakraborti as Resources Safety will have no direct involvement in this independent study.
2. Keeping industry informed about the project's progress, including interim results and final outcomes. This will be done by inviting Curtin University to contribute articles to *Resources Safety Matters* magazine.

These actions will allow the learnings to be shared with industry and best practices to be promoted, particularly those workplace cultural practices that empower representatives to effectively perform their role and functions.

Yours sincerely

Dr Su Ho
Manager Safety Communications
Business Development

10 December 2014

002586.Su.HO

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www.wa.gov.au

Appendix 2. Participant Information Sheet



Participant Information Sheet

Research Title: The Influence of Safety and Health Representatives in the Western Australian Mining Industries.

Name of Investigator: Shibani Chakraborti.

I am currently completing this research as part of my Doctor of Philosophy at Curtin University of Technology.

Aim of Research

The aim of this research is to identify what influence and support health and safety representative have in the Western Australian mining industries to facilitate the achievement of a high standard of workplace safety.

Your role

Your expertise in providing information related to the research topic would be used to assist and to identify what influence and support health and safety representative have in the Western Australian mining industries to facilitate the achievement of a high standard of workplace safety. As part of this research, you will be interviewed by the researcher. This interview will be based on a list of written questions. This interview will take approximately 30 to 60 minutes. After completion of the interview a transcript with your questions' answers will be provided to you for you to check for accuracy, make any required corrections, and then give back to the researcher.

Resources

For this interview an audio tape and printed questions will be provided and used by the researcher.

Consent to Participate

Your involvement in this research is entirely voluntary. You have the right to withdraw at any stage without it affecting your rights or responsibilities. Participants in this research will be asked to complete a Consent Form confirming their consent to participate. At no time will any of the details obtained, be provided or disclosed to a third party to this research. Should a participant wish to inspect their own personal information that is collected as part of this research, the researcher, Shibani Chakraborti, can be contacted on phone number 0449771650 to provide you with access to the documentation. Any clarification regarding the privacy of information or further information related to this research can be obtained from Shibani Chakraborti. The data analysis will take place after receiving the final transcript from the participants. Interview and data analysis will be conducted by the same researcher.

Confidentiality

Names of research participants will not be recorded to maintain participants' confidentiality. Information obtained and collected from you in relation to this research will be stored and maintained confidentially, with the principal investigator and research supervisor only having access to the information. All electronic data will be stored on a computer and will be password protected with access by the principal investigator only. All hard copy data will be stored in the principal research supervisor's office in a locked filing cabinet for 7 years.

Further Information

This research is conducted as part of my doctoral study through Curtin University. It has been reviewed and given approval by Curtin University of Technology Human Research Ethics Committee (Approval number RDHS-94-15). If you would like further information about the study, please feel free to contact me on the phone number 0449771650 or by email shibani.chakraborti@postgrad.curtin.edu.au. Alternatively, you can contact my research supervisor, Dr Janis Jansz, on phone number (61 8) 9266 3006 or by email j.jansz@curtin.edu.au. Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number 5965). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Appendix 3. Consent Form

CONSENT FORM

I have read the information on the information sheet. Any questions I have asked have been answered to my satisfaction. I agree to participate in this research and understand that I can change my mind or stop at any time. I understand that all information provided by me is treated as confidential. I agree that the research information gathered for this study may be published provided names or any other information that may identify me is not used.

- I understand the purpose and procedures of this study.
- I have been provided with the participant information sheet.
- I understand that my involvement is voluntary and that I can withdraw at any time without any problem.
- I understand that answering the questions asked by the researcher may not benefit me.
- I understand that no personal identifying information, like my name and address, will be used in the research report and that all information will be securely stored for 7 years before being destroyed.
- I have been given the opportunity to ask questions and to make any comments which is relevant for this interview.
- I agree to participate in the study outlined to me.

I have read and agree to the terms above.

Signature:

Date:

Phone contact number:

Appendix 4. Interview questions for Safety and Health Representatives

Introductory positioning statement: Safety and Health Representatives have an important role in promoting workplace safety and in prevention work related employee ill health. There is a need to identify what assists safety and health representatives in the Western Australian mining industry to be effective in their role and which strategies used by safety and health representatives produce the highest level of workplace safety and health.

Demographic information.

Gender: Male ☐ Female ☐

Age: ☐ 18 – 28 ☐ 29 – 38 ☐ 39 – 48 ☐ 49 – 58 ☐ >58

How many years have you worked as a Safety and Health Representative in the Western Australian mining industry?

☐ <1 ☐ 2 – 4 ☐ 5 – 6 ☐ 7 – 8 ☐ > 8 years. Please specify

How many years have you worked in the Western Australian mining industry?

Your employment position is?

What size mining company do you work for? ☐ < 100 employees. ☐ 100-999
☐ > 1,000

(Broad 1st question)

In your role as a Safety and Health Representative what duties do you do?

(Follow up probing questions)

(To answer research questions 1+2)

What support does workplace management provide to you to enable you to work effectively in promoting occupational safety and health in your workplace? Does anyone else provide you with support?

What powers do you use to influence the achievement of a high standard of health and safety in your workplace? Examples: (Position power) (Information & expertise) (Coercive power) (Interpersonal power) (Safety & Health Committee) (Consultation & co-operation)

How do you influence employees to work safely?

Having a safe workplace, safe equipment and products to use, safe work processes and safe management practices are important. Do you have any influence over safety for these things? If so what enables you to promote safety for these things at your workplace?

What factors do you consider influence your effectiveness in promoting safety and preventing employee work related injury and ill- health in your workplace?

Are there any barriers that prevent you from performing your role effectively as a Safety and Health Representative? If so, how do you overcome these barriers?

Have you attended the 5 day Safety and Health Representatives' Introductory training course? Have you completed any other safety and health education? Has your health and safety education improved your ability and skills in performing your Representative's role? If yes, how?

Is there anything else that should be considered?

(To answer research question 3)

(Leading indicators)

Are you involved in workplace inspections? If yes, how often?

Are you involved in accident and incident investigation? If so are corrective actions discussed with, or communicated to you and closed out in a timely manner?

Does your company have Leading Indicators? If so are you involved in developing your company's leading indicators?

(Definition: Leading indicators are actions completed to promote occupational safety and health)

What leading indicators are used? Examples: (Hazard awareness training) (% Employee competencies) (Number of Job Safety Analysis completed) (Number of task observations completed) (Number of pre-start and workplace inspections conducted) (Number of audits conducted) (CONTAM monitoring completions) (Number of safety meetings) (Safety management plans)

Are leading indicator objectives and targets displayed and discussed with the crews?
What is the percentage of compliance with each leading indicator?

(Lag indicators)

What is your company's Total Recordable Injury Frequency Rate (TRIFR)?

(Definition: combination of fatalities, lost time injuries, alternative duty injuries & medical treatment injuries x 1,000,000 / total number of hours worked)

What is your company's Lost Time Injury Rate?

(Definition: number of lost time injuries x 1,000,000 / total number of hours worked)

What is your company's Medical Injury Frequency Rate?

(Definition: number of injuries requiring medical treatment x 1,000,000 / total number of hours worked)

Appendix 5. Ethics Approval Letter.

MEMORANDUM



Curtin University

To:	Dr Janis Jansz Western Australian School of Mines (WASM)
CC:	Shibani Chakraborti
From:	Dr Catherine Gangell, Manager Research Integrity
Subject	Ethics approval Approval number: RDHS-94-15
Date:	29-May-15

Office of Research and
Development
Human Research Ethics Office

TELEPHONE 9266 2784
FACSIMILE 9266 3793
EMAIL hrec@curtin.edu.au

Thank you for your application submitted to the Human Research Ethics Office for the project: 5965

The influence of safety and health representatives in the Western Australian mining industries

Your application has been approved through the low risk ethics approvals process at Curtin University.

Please note the following conditions of approval:

1. Approval is granted for a period of four years from 29-May-15 to 29-May-19
2. Research must be conducted as stated in the approved protocol.
3. Any amendments to the approved protocol must be approved by the Ethics Office.
4. An annual progress report must be submitted to the Ethics Office annually, on the anniversary of approval.
5. All adverse events must be reported to the Ethics Office.
6. A completion report must be submitted to the Ethics Office on completion of the project.
7. Data must be stored in accordance with WAUSDA and Curtin University policy.
8. The Ethics Office may conduct a randomly identified audit of a proportion of research projects approved by the HREC.

Should you have any queries about the consideration of your project please contact the Ethics Support Officer for your faculty, or the Ethics Office at hrec@curtin.edu.au or on 9266 2784. All human research ethics forms and guidelines are available on the ethics website.

Yours sincerely,

Dr Catherine Gangell
Manager, Research Integrity

Appendix 6. Mine Accident



Government of Western Australia
Department of Mines, Industry Regulation and Safety

Significant Incident Report No. 261

Subject: Face shovel operator crushed between ladder and handrail – fatal accident

Date: 07 May 2018

Summary of incident

Note: The Department of Mines, Industry Regulation and Safety's investigation is ongoing. The information contained in this significant incident report is based on materials received, knowledge and understanding at the time of writing.

On the night of 26 April 2018, a face shovel operator died after being crushed between a hydraulic access ladder and handrail of the face shovel.

The face shovel was loading a haul truck in an open pit when it suddenly lost power. The face shovel operator instructed the haul truck driver to move the truck to allow the bucket of the shovel to be lowered to the ground. The truck driver then went on a scheduled meal break while the shovel operator investigated the loss of engine power.

The pit face had collapsed, and overburden material had rilled against the side and rear of the shovel. This appears to have put tension on the pull-wire of the emergency shutdown switch, which is located next to the emergency access ladder pull-wire switch.

Note: The switches are only used by workers on the ground in emergency situations. They are activated by pulling on the wire, and reset by pushing the blue button above the wire. The switch cannot be reset if there is still tension on the wire.

The operator was found on the shovel platform, crushed between the handrail above the emergency switches and the hydraulic ladder, which had rotated down. This resulted in fatal injuries.



Circles indicate where the accident happened, showing the ladder in the final (left) and upright (middle) positions with the handrail, platform and emergency shutdown (A) and ladder (B) switches (close-up, right).

Postal address: Mineral House, 100 Plain Street, East Perth WA 6004
Telephone: (08) 9358 8002 Facsimile: (08) 9358 8000 Safetycomms@dmirs.wa.gov.au
www.dmirs.wa.gov.au
wa.gov.au

Direct causes

- The hydraulic ladder was activated and rotated anti-clockwise while the operator was in the line-of-fire.

Contributory causes

- The ladder was not isolated prior to the operator investigating the engine shutdown.

Note: The ladder switch is powered independent of the main power supply.

- The position of the emergency shutdown switch on the outside of the machine made it difficult to access from the platform without being in the line-of-fire of the ladder.
- There was inadequate lighting in the area where the operator was investigating.
- The emergency shutdown and ladder switches were located next to each other and were not labelled.
- The standard operating procedure for the shovel was inadequate and did not include the operation or reset of the two pull-wire switches.

Actions required

The following safe systems of work are recommended to mining operations to assist in the safe operation of shovels and excavators:

- Conduct an audit of shovels and excavators on site to identify all configurations of actuated access ladders and stairways that could present a crush hazard to workers accessing emergency switches.

Note: Pay particular attention to machines with rotating ladders and emergency pull-wire switches that could be activated inadvertently, either by personnel or by material falling against the machine.

- Conduct a risk assessment of these potential crush hazards and implement appropriate controls (e.g. safe positioning of switches, clearly labelling all switches and switch positions, providing adequate lighting for all tasks).
- Review standard operating procedures for the operation of shovels and excavators to confirm they include operation and reset of emergency switches.
- Train those using and accessing shovels and excavators in the reviewed standard operating procedures.

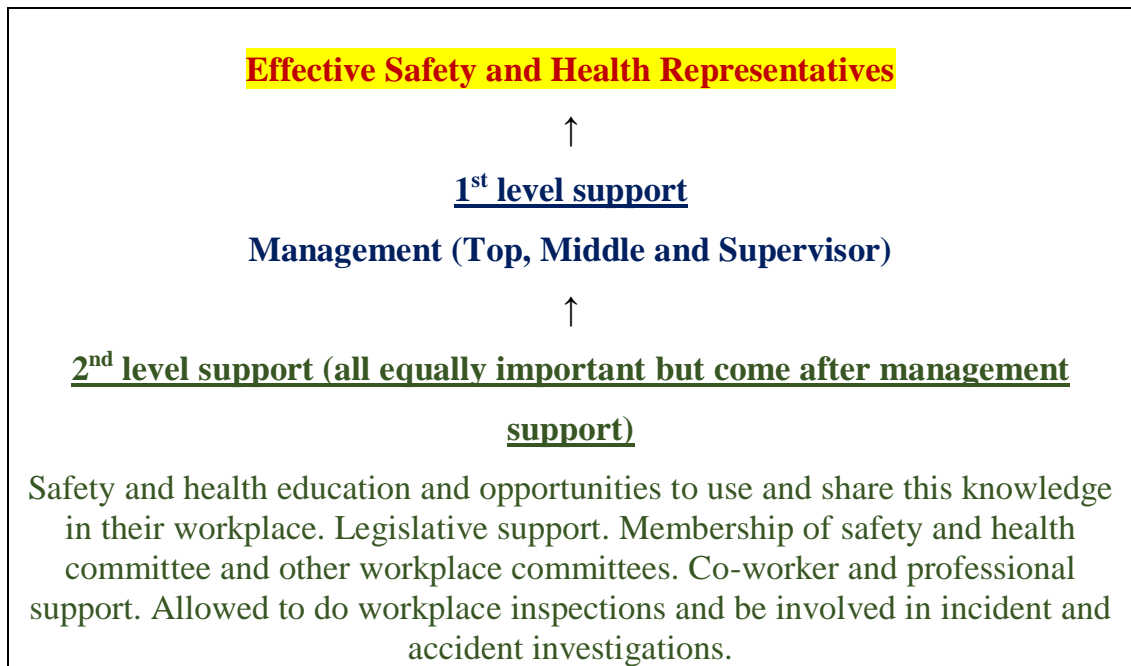
Further information

Visit www.dmirs.wa.gov.au/ResourcesSafety for information on occupational safety and health in the resources sector.

This Significant Incident Report was approved for release by the State Mining Engineer on 07 May 2018

Appendix 7.

Map of How to Enable Safety & Health Representatives to Facilitate the Achievement of a High Standard of Workplace Safety.



- **Most important is for Safety & Health Representatives to have support from Top Management in promoting a strong, positive safety climate throughout the organisation.** Top Management must implement and enforce workplace antidiscrimination policies, particularly in relation to young and female representatives.
- **Require support from Middle Management and workplace Supervisors in allowing Safety & Health Representatives to do their legally required work.** This includes providing representatives with enough time, enough resources & enough safety & health education to be able to do their representative work effectively. It includes allowing representatives to conduct a comprehensive monthly workplace inspection, & involving the representative in the investigation of accidents & incidents in their workplace as they know the work processes & people. Managers are to implement appropriate risk control measures for hazards identified & provide representatives with information related to the evaluation of the effectiveness of these risk control measures. Allow representatives time to prepare for & attend workplace safety meetings, including being members of the workplace safety & health committee, & time to prepare & present work related safety & health information to their co-workers. All levels of management need to provide effective communication of work related safety information to Representatives which includes information on positive performance indicators & lag indicator results. Need to give Safety higher importance than production because *if* the work & workplace are safe production is higher.
- **All Level 2 points on this Map are only effective if there is Management Support.**

Performance Indicators with Guidance Notes for Managers (Top, Middle + Supervisors) for Effective Safety & Health Representatives' work.

	Activity	Safety & Health Representatives participation	Management Support	% Yes	% No
1	Safety & Health work. (Legislation)	Duties included in safety and health legislation.	Managers will, if necessary, roster another person to work all, or part, of a Safety & Health Representative's work shift so that the Representative can perform their safety and health duties in work time & attend safety & health educational activities in work time.		
2	Identify workplace hazards and inform management. (Risk management + communication)	Ask for and listen to the workers concerns about workplace safety and health on a regular basis.	Managers provide 10 minutes each day for Safety and Health Representatives to have a pre start meeting with workers. Act to resolve safety and health concerns.		
3	Coworker feedback (Communication)	Provide coworkers with feedback on workplace safety and health improvements.	Managers provide time and opportunity.		
4	Workplace Inspections. (Risk management + communication)	Opportunity to conduct monthly workplace inspections. Inspection results reported to management.	Managers provide time and opportunity. Post inspection managers discuss with the safety & health representatives the outcomes of the workplace inspection and when any required risk control measures will be implemented. Managers report to Representatives on the effectiveness of risk control measures implemented. Allow Representatives to conduct more frequent inspections for identified problems.		

	Activity	Safety & Health Representatives participation	Management Support	% Yes	% No
3	Control of Workplace Hazards. (Risk management + communication)	Opportunity for workers and Representatives to identify & discuss work related hazards and risk control measures on a weekly basis.	Managers provide time and opportunity. Provide Representatives with feedback about risk control measures implemented.		
4	Job safety analysis. (Risk management + consultation)	Contribute to designing safe work procedures in consultation with coworkers and other relevant people.	Provide time and opportunity. Provide Representatives with feedback on work procedures.		
5	Workplace equipment safety. (Risk management + consultation)	In consultation with coworkers and experts provide input into the purchasing of workplace equipment in relation to safety.	Provide time, opportunity and relevant resources. Implement recommendations.		
6	Safety Audit involvement. (Risk management + communication)	Opportunity to participate in workplace safety and health audits.	Managers provide time and opportunity for Representatives to take part in their workplace safety audit with the lead auditor. Provide Representatives with the audit results.		
7	Development of company's leading indicators. (Consultation + communication)	In consultation with managers and coworkers contribute to the development of the company's leading indicators.	Provide time and opportunity. Communicate leading and lag indicator results annually, or more frequently, to Representatives.		
8	Attend introductory Safety and Health Reps. course. (Education)	Opportunity to learn about the role of the Safety and Health Representative and how to meet the legal requirements related to this role.	Provide time, opportunity and required resources.		
9	Workplace incident investigation involvement. (Education + risk management + communication)	Education provided to Representatives to learn to effectively use incident investigation tools, such as ICAM. Representatives participate in workplace incident investigations.	Managers provide time, opportunity and resources for this education and participation in workplace incident investigations. Provide Representatives with the incident investigation report.		

	Activity	Safety & Health Representatives participation	Management Support	% Yes	% No
10	Opportunity to learn about, & keep up to date with, workplace safety issues. (Education + communication)	Present at and/or listen to Safety Tool Box Meetings.	Managers provide time for Safety and Health Representatives to attend Tool Box meetings at least monthly.		
11	Attend in house and outside safety and health workshops. (Education)	Attend in house and outside workshops and educational sessions to increase work related safety & health knowledge and share their knowledge with other Representatives and / or workers.	Managers provide time, opportunity and resources.		
12	Obtain further safety and health education. (Education)	Opportunity to obtain tertiary education qualifications in occupational safety and health (e.g. Certificate IV, Diploma).	Managers provide time, opportunity and resources.		
13	Networking Opportunity. (Communication + education)	Opportunity to share safety & health information with coworkers, new, inexperienced & young workers & with other Representatives.	Managers provide time and opportunity.		
14	Attend safety and health committee meetings, and other workplace safety meetings. (Communication + risk management)	Opportunity to share workplace safety and health information and to contribute to improving organizational safety and health.	Provide time and opportunity to attend.		
15	Information provision. (Communication)	Communication with and from management.	Managers communicate regularly, and whenever necessary, to provide information to Representatives about safety & health matters related to their workplace & work processes.		

	Activity	Safety & Health Representatives participation	Management Support	% Yes	% No
16	Change management. (Communication + consultation)	Representatives consulted about, and involved in, workplace change management.	Managers consult with Representatives and take their advice into account. Feedback given to Representatives on the effectiveness of the education for and implementation of change management.		
17	Develop and review Safety and Health Policies. (Consultation)	Opportunity to participate in developing and updating workplace Safety and Health Policies.	Managers to provide time and opportunity.		
18	Contribute to workplace safety and health projects. (Risk management + communication)	Opportunity to participate in and to contribute to safety projects including collecting data and other information.	Managers provide time, opportunity and resources.		

	Management Education	%Yes	%No
1	All managers, who have not previously worked as a Safety & Health Representative, have undertaken at least a one day in-house introductory course that explains the role of Safety & Health Representatives and how managers can support Representatives to be effective in their work. Included in this course is information on how to use the Safety and Health Representatives' Effectiveness Model.		
2	All managers have undertaken a formal short course on workplace safety and health to be able to understand their legal responsibilities in relation to safety and health at their workplace.		

Assessment summary

What has been done well.

Opportunities for improvements are:

Action Plan for Improvements

	Current situation	Improvement to be made	Person responsible	Date action completed
1				