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Paper's Authors:	Biggs, H. C., Dingsdag, D. P., Sheahan, V.L, Cipolla, D., and Sokolich, L.
Main Contact's Details: Institution Email Phone Fax	Dr Herbert Biggs Queensland University of Technology. School of Psychology & Counselling h.biggs@qut.edu.au 07 3864 4722 07 3864 4999 (fax)
Presenter's Name:	Dr Herbert Biggs
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Presenter's Bio:	<p>Dr Herbert Biggs is a Senior Lecturer at QUT School of Psychology and Counselling; and is also a Senior Research Consultant with CARRS-Q.</p> <p>He has an extensive background in Organisational Psychology and Rehabilitation Counselling.</p> <p>Dr Biggs is currently undertaking research in OH&S with the CRC for Construction Innovation and with the State Transit Authority of NSW.</p>
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Utilising a Safety Culture Management Approach in the Australian Construction Industry

New innovations in health and safety management are required to further reduce injuries and fatalities in the Australian construction industry. Current approaches to safety management emphasise hazard identification and reduction, but fail to fully account for a worker's motivation to behave safely. In order to understand and improve safety motivation, many researchers and practitioners are utilising the construct of *safety culture*. Unfortunately, the transitory nature of work within the industry frequently hinders an organisation's attempts to develop and maintain a good safety culture. Hence, a framework is needed to facilitate the formation of a good safety culture across the construction industry as a whole. A methodology is advanced as to how culture change can be facilitated by using a system of competencies developed and applied to the key safety roles within the industry. This set of nationally standardised and accepted competencies would specifically state what is required by those who have safety critical roles, to positively influence construction site safety culture. By encouraging organisations to integrate these competencies into their existing HRM processes such as selection, training and performance management, it should be possible to (1) educate the industry as to best practice in safety culture management, (2) provide a safety culture management system that allows a good safety culture to be built quickly on new projects, (3) ensure a standard level of competency within the workforce to allow for ease of movement of workers between sites and contractors, and (4) improve safety culture and in turn potentially improve safety on-site.

Key words: Construction safety management, Safety Competencies, Safety Culture, Safety Training.

Authors: Biggs, H. C¹, Dingsdag, D. P², Sheahan, V.L¹, Cipolla, D³, and Sokolich, L⁴

1. Queensland University of Technology. Beams Rd Carseldine Brisbane, Queensland, Australia 4034
2. University of Western Sydney. Locked Bag 1797 South Penrith Distribution Centre, Sydney, New South Wales, Australia 1797
3. John Holland Group. 70 Trenerry Crescent Melbourne, Victoria, Australia 3001
4. Bovis Lend Lease. 30 Hickson Rd, Sydney, New South Wales, Australia

Introduction

Injury rates within the Australian construction industry remain a matter of concern (Cole Royal Commission, 2003; Mohammed, 2002; Trethewy, Atkinson, & Falls, 2003). Rates have reached a plateau and continue to resist the push for safer work sites; and as a consequence, new innovations in construction site safety management are required (Lingard & Yesilyurt, 2003). Traditional approaches to safety management relate to the identification of work hazards and the minimization of risks associated with these hazards (Trethewy et al., 2003; Holmes, Gifford & Triggs, 1998). Typically, this approach focuses on: improving the design of plant and machinery, training those on the site to identify potential hazards and to work safely, developing better planning and work methods, and providing personal protective equipment (Holmes, Gifford & Triggs, 1998; Reese, 2003). The hazard identification and reduction approach has been effective in improving the work environment and reducing the risks a worker faces (Holmes, Gifford & Triggs, 1998; Reese, 2003). Even so, the Australian construction industry in all of the jurisdictions continues to report higher injury rates and fatalities than most other industries (WorkSafe Victoria, 2004).

In order for further improvements in safety to be made, construction firms and safety regulators need new approaches that can affect a worker's motivation to use hazard identification / reduction systems and to comply with the methods the systems dictate (Lee & Harrison, 2000; Reese, 2003). It is a key proposition of this article that an improvement in industry safety culture can be achieved through the development and application of a system of specific competencies linked to safety critical roles.

Safety Culture; a Means to Influence Motivation and Behaviour

A useful construct for understanding safety behaviour within a workplace is safety culture. Safety culture has been used to explain why organisations differ in safety performance, even though they have the same risk exposure, technology and laws (Lingard & Yesilyurt, 2003; Trethewy, 2003). The construct is used to describe the values, norms, attitudes and beliefs that are held collectively towards safety within an organisation (Cox, Tomas, Cheyne, & Oliver, 1998; Glendon & Stanton, 2000; Williamson, Feyer, Cairns & Biancotti, 1997). It is thought that these values, attitudes, norms and beliefs guide behaviour by indicating to employees and management what will be rewarded or punished by the organisation. As safety culture is a source of influence in determining safety outcomes, the construct can be a useful tool to manage and further improve safety outcomes in the construction industry.

To understand how a safety culture management approach may be used in the construction industry it is first important to outline the key research findings, the problems associated with the construct's use in industry and how these barriers may be overcome. (For a recent, full review of the safety climate and culture literature, see Neil and Griffin (2004) and Guldenmund, 2000)

Safety Culture & Safety Climate: an Inclusive Model

When perusing the safety literature, it becomes apparent that two different terms, culture and climate, describe a very similar concept. After many years of debate, the difference has yet to be clearly articulated. However, more recent research has begun to integrate the two concepts into one synonymous construct (Guldenmund, 2000). An integration of these two concepts is vital to reduce confusion over how to approach research in the area; as well as how to improve safety using the constructs.

Guldenmund, (2000) proposes that culture and climate can be understood as a sphere with three layers. At the centre are the factors normally associated with culture; the basic assumptions held by the organisation. These assumptions relate to the understanding of human behaviour and relationships and the nature of work. The middle layer of this model relates to what is commonly referred to as safety climate. This layer highlights the explicit values and attitudes expressed regarding safety. These attitudes and values can be seen in policies, training approaches, procedures and formal communications. The final, outer layer holds what is referred to as *artefacts*. These artefacts are the outcomes of safety climate (level 2), and include things such as “accidents” and incidents, the use of personal protective equipment (PPE), the presence of posters and bulletins, and other safety related behaviour and objects. An example of how the three layers are interlinked is that an organisation has an underlying assumption that injuries and deaths are the result of bad luck. This assumption results in an attitude of “it won’t happen to me” or “safety training won’t stop accidents”. This attitude then manifests itself in risky behaviour such as not following safe work procedures or not using the appropriate PPE.

The holistic view of culture has yet to be fully applied in the research field, with recent work continuing to focus only on climate. The continued focus on safety climate is most likely due to the utility of the construct for use in quantitative research methodologies. Regardless of this development, the safety climate literature still provides useful guidance on how safety culture within the Australian construction industry can be improved.

Another consideration for research is as to the applicability of safety culture at the workplace. Generically for organisations in all sectors, the incorporation of safety culture addresses a fundamental requirement of occupational health and safety (OHS) practice embodied in the Robens model, ie, that OHS is everybody’s business and that better outcomes are achieved based on co-operation between management and employees. Further to the Robens philosophy, NOHSC (now known as the Office of the Australian Safety and Compensation Council) has commissioned research that examines the significance of worker participation in achieving superior OHS performance. Worker participation is a recognised principle in the industrialised world in obtaining better informed OHS results and performance and in New South Wales for example it is also embodied in the OHS Act. The practical consideration is as to which approach is capable of delivering the best safety performance. Safety culture is often promoted in the OHS literature as the best strategy. In that regard as a departure from the Robens model in some state jurisdictions in the USA its efficacy is accepted and it’s mandatorily required.

Even though safety culture has become more accepted globally in the last decade or so, its uptake has been slow because the implementation of some safety cultural

strategies is extremely resource intensive, in human and capital terms. Some types of safety culture interventions may require, for example, the temporary shutdown of the organisation involved or can only be effectively implemented in greenfield worksites. Clearly, these types of safety cultural strategies are highly impractical and they are not promoted as the research objectives of this paper nor for the project on which it is founded.

Safety Climate's Influence on Safety

Little research has specifically tested for the mechanisms by which safety climate influences safety outcomes (Neil, Griffin, & Hart, 2000; Guldenmund, 2000). To meet this need Neil et al., (2000) used structural equation modelling to investigate the pathways through which safety climate influences certain outcomes in a large Australian hospital. The study revealed that safety climate influenced knowledge about safety and motivation to behave safely. These two factors in turn influenced safety compliance and participation. Neil et al., (2000) proposed that safety climate influences compliance with safety procedures and rules, such as using personal protective equipment, by influencing whether the employees have the required knowledge about safety and by providing sufficient motivation to follow the rules. A perception of a good safety climate is also thought to encourage participation in activities that may not directly impact the person's own safety, but positively impact the safety of the organisation as a whole. These activities may include for example, participation in safety planning, safety monitoring, and tool box talks.

Greater research attention has been given to the various factors that comprise and contribute to safety climate. Typically, most research has found that safety culture is determined by the commitment, ability, leadership and communication styles of management; and the participation, competency, training, behaviour and attitudes of individual workers (Farrinton-Darby, Pickup, & Wilson, 2005; Guldenmund, 2000; Neil & Griffin, 2004; Glendon & Stanton, 2000). For instance, a recent study by DeJoy, Schaffer, Wilson, Vanderberg, and Butts, (2004) found that 55% of perceived safety climate in a retail organisation was explained by environmental conditions, safety-related policies and programmes, and general organisational climate. Environmental conditions referred to workplace conditions such as noise, heat, chemicals and hazardous tools and equipment. Safety related policies programmes referred to the existence of directives indicating the value an organisation's management placed on safety. General climate included an individual's perception of various aspects of their organisation, including areas such as leadership, communication, organisational support, participation and innovation. The study found that safety policies and programmes held the highest correlation with safety climate, with communication and organisational support being the second highest factor. This finding indicates that safety policies, communication and organisational support may play the strongest role in determining safety climate.

With specific reference to the Australian construction industry, Mohammed, (2002) used structural equation modelling to investigate the independent factors that accounted for safety climate. He found four independent constructs determined safety climate: management, safety, risk and competence. The management construct incorporated the following aspects: communication, commitment, supervisory environment, supportive environment. The safety construct referred to the safety rules

and procedures of the organisation. Risk referred to the workers' appraisal of the work hazards they faced and their personal risk appreciation. Finally, competence referred to the level of skills, knowledge and ability of workers. With the exception of risk, higher values on these constructs were associated with a better safety climate. For risk, greater work hazards were associated with a poorer safety climate.

Dedobbeleer and Beland, (1991) examined safety climate in the American construction industry and found that two factors represented the construct: management commitment to safety, and workers' involvement in safety. Management commitment to safety included aspects such as management's attitudes towards safety, as evidenced by their safety related policies, practices and actions. Workers' involvement with safety encompassed their perception and control of risk at work. Despite finding a different number of factors than the Mohammed (2002) study, it is apparent that both studies established similar constructs. That is, both found that management's actions and workers' perceptions were important in determining safety climate.

In summary, safety climate and culture is a topic that is receiving continued research attention. Safety climate has been linked to safety outcomes such as compliance and participation in safety activities and appears to impact these variables through its influence on safety knowledge and motivation. A climate is thought to develop as a result of the actions of management and the perception of safety conditions in the workplace. By utilising this influence and focusing on creating a pro-active, positive safety climate, it should be possible for organisations to improve workers' motivation to behave safely and to acquire and use safety knowledge. Creating an appropriate safety culture and climate however, presents a difficult challenge; particularly in the construction industry. The following section discusses the problems associated with adapting a safety climate management approach in the Australian construction sector.

Safety Culture Management and a Transitory Workforce

A significant barrier to the effective implementation of the safety climate management approach is the transitory nature of work within the building and construction industry. A large proportion of the work is completed by subcontractors, the majority of whom will shift regularly between projects and primary contractors (Trethewy, 2003). Additionally, the work is project based, with definite start and end points. Hence, a positive safety culture is difficult to establish and maintain, as people and jobs are regularly changing. Furthermore, even when a proficient safety culture is present, the knowledge about how to develop and maintain this culture is often lost when the project ends and the workers disband. Hence, a new system is required that facilitates the rapid development of a positive safety culture when a project begins and helps to maintain this culture even when the workforce is changing.

In addition to a changing workforce on site, there is also a high degree of movement of sub-contractors between primary contractors. This inherent transience implies that there is little incentive or value for individual construction organisations to invest large sums of money and time training workers to build a positive safety culture on site, if the sub-contracting workers are moving on to work for a competitor. With a transitory workforce, it is also difficult to change worker attitudes if the safety messages being propagated by those who hold management and supervisory positions

are inconsistent between employers. Consequently, a safety culture management approach in this particular industry requires some degree of standardisation of competencies as well as uniform training packages to reduce the need for construction organisations to be constantly retraining new workers.

In summary, to utilise a safety culture approach to safety management, the construction industry needs to adopt a system that can overcome the transitory nature of the work and the workforce. The following section proposes this new system.

Developing and Maintaining a Good Construction Site Safety Culture

The safety culture / climate literature provides a reasonable basis for safety professionals seeking to affect change at the enterprise level. Unfortunately, the research findings are harder to apply at the industry level as most research has used data from single organisations in a wide range of industries. Hence, the research body requires a contribution that will promote discussion on how culture change can be implemented across an industry as a whole. It is argued that the industry would benefit from the application of a system of safety competencies linked to safety critical roles.

Safety Critical Roles

Key to this proposal is the establishment of a compendium that lists all roles within a construction site that are in a position to drive the site's safety culture. By identifying the people who have a primary role in the development and maintenance of the safety culture it should be possible to target training interventions to these people. Toole, (2002) has provided a useful guide to identifying safety critical positions within the construction industry. The author has proposed that "accidents" are a result of eight factors: lack of proper training; deficient enforcement of safety rules; lack of safety equipment; unsafe work methods; unsafe site conditions; failure to use proper safety equipment; poor attitudes held towards safety; and isolated unavoidable causes. Therefore, it should be possible to identify safety critical positions by identifying all people who have an influence over those preventable factors. The benefits of this approach include being able to collect information about safety critical roles that are not traditionally seen as primary "safety roles". For example, through focus group consultations using the Toole (2002) model as a guide, it may become apparent that a key person influencing site safety culture is the person who "mans" / controls access to the site – a role that may not be recognised for its importance. After identifying safety critical roles it will be vital to detail the competencies that make a person skilful in that role.

Safety Competencies

The introduction of a system of competencies to manage safety culture first requires the industry to identify the specific attributes required by those people who hold safety critical roles. A "competency" has been defined in several different ways; in the present case, a competency includes the knowledge, skills and attitudes required to successfully perform a role. For example, in a safety competency may be: "identify

the risks associated with working at height and proactively implement strategies to control the risks". The inclusion of "attitude" as a central element to a competency differs from other traditional definitions that define a competency as knowledge and skills required for a particular task (Dubois, Rothwell, Stern, Kemp, 2004). However, its inclusion within this conceptualisation has been deemed essential due to the importance of attitudes in determining the valence of a safety culture.

The use of safety competencies to manage site safety is not a new concept. For example, the former Australian National Occupational Health and Safety Commission (NOHSC) has published a list of generic safety competencies that contain the knowledge and skills required by managers, supervisors and workers. Within this document, four types of skills are listed: task skills, task management skills, contingency management skills, & job / role environment skills. This competency framework is an excellent guide to managing safety by listing broadly, the knowledge and skills required to follow principles of hazard identification and risk control. As they were proposed to serve as generic competencies to fit in with a hazard identification and reduction approach, they are not suited for clearly establishing the attitudes and behaviours required to successfully develop and maintain a good safety culture.

A similar attempt to improve safety through the enforcement of competencies has been made in the United Kingdom. The Construction Skills Certification Scheme (CSCS) lists the tasks a person would be required to perform to be deemed competent in a role, with all position descriptions including a safety element. The scheme covers workers at all levels, from labourers to senior management staff. The CSCS is similar to current Australian construction safety induction programmes, in that workers are required to possess certification that they have met a suitable standard of safety knowledge before they are permitted to work on site. To obtain certification, a person is required to sit for a safety exam relevant to their intended position and to prove work competency via the possession of certain qualifications or verified industry experience. A photo identification card, valid for 3-5 years is then issued to the successful applicants. The principle behind the CSCS is that through proper competency assessment and enforcement within the industry, it should be possible to improve general work and safety competency. Though the scheme has evolved over approximately 10 years, only at the conclusion of 2003 did the major contractors take possession of a certification card a minimum employment requirement. Unfortunately, little published evidence exists directly linking the CSCS to site safety performance. Further, in the disparate Australian jurisdictions there is the concern that construction induction training requires less than a day and that the training is largely predicated on the knowledge/observance of legal requirements and little attention is given to competencies or their examination. A related concern is that trainers could have as little as one day of training although they do have to provide proof of competence to be eligible for training. To the authors' knowledge there is no known reliable, published evidence of the correlation between construction induction training and improved safety performance.

The CSCS and the NOHSC frameworks provide a solid base from which to develop a new Australian safety culture competency programme for the construction industry. The proposed new system would build on existing competencies and shift the focus to

include safety culture management aspects along with the hazard identification / reduction based competencies.

Integrating Safety Competencies into Existing HRM Strategies

Having developed a competency framework that lists safety critical roles and the competencies required to be skillful in the roles, it is important to establish how the framework can be applied within organisations for maximum effect. It is proposed that this objective can be achieved through the use of existing human resource management strategies (HRM). That is, the safety culture competencies can be utilised in current employee selection, training and performance management processes.

Selecting new employees that have the competencies required to successfully maintain and develop an appropriate safety culture is one method an organisation can use to improve safety. For example, a construction firm seeking a safety manager may assess a candidate for communication and leadership styles; and attitudes and beliefs about safety and human behaviour. By structuring the assessment process around key competencies it should be possible for organisations to select people who are most likely to have a positive impact on culture. However, the current shortage of skilled workers in Australia may make it difficult for organisations to discriminate between employees based on the possession of certain safety competencies. Furthermore, the competency level of existing employees is an issue. Hence, a robust training system also needs to be in place.

A set of safety competencies should make it clear to the organisation the difference between an employee's current behaviour and the behaviour that is required. After conducting a traditional training needs analysis, the organisation can develop a training plan to develop and engender within the employees the skills and abilities required to positively affect safety culture. Additionally, by standardising core safety culture competency training, it should be possible to mitigate the skills' loss when projects finish.

After ensuring that the employees hold the required competencies, it is then important to promote the requisite behaviour. This could be done by linking the behaviour to existing performance management and reward systems. For instance, an employee may be motivated to increase his/her safety communication by requiring that they show evidence of this behaviour in order to receive public recognition or even a satisfactory performance review.

To further increase the success of training, research should pay particular attention to eliciting the factors that drive safety competencies, such as, for instance, the factors which are responsible for the development of good safety leadership skills. By identifying these drivers, it should be possible include these into the staff training / development process.

In summary, by utilising the HRM and safety management strategies and processes that are already in place, it should be possible to apply safety culture competencies to educate staff as to best practice in safety culture management, and in the long term, help improve an organisation's safety culture. When viewing safety culture of the

industry as a whole, it becomes apparent that any improvements require that organisations include safety competencies as part of their current core, strategic competencies. Furthermore, in the application of this proposed strategy, researchers must ensure that they gain the support of management and workers at all levels within the industry as they are interacting with industry to discern the best way to develop appropriate and attainable safety cultural competencies.

Conclusion

To further reduce incidents of fatalities and injuries, the Australian construction industry requires innovative safety management solutions. It has been proposed, in this paper, that a management system of safety-culture linked competencies tied to culture-driving roles has the potential to help the industry to develop and enhance safety culture. These competencies have the advantage of being able to be used in parallel with traditional HRM processes such as selection, training and performance management, thus ensuring that they can be easily adopted by industry organisations.

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