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Theoretical Review on Safety Culture by Construction Companies

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Abstract: It is necessary for a construction company to ensure their good performance especially in safety and health in order to survive in the competitive construction industry. This is because the industry has a record in high rates of incidents, injuries and fatalities. The management team needs to begin by giving attention to health and safety management approach that can integrate between safety systems and people. However, to do this, an improvement to safety can be achieved if all project stakeholders change their belief, attitude, commitment and behaviour to create a good safety culture. This study aims to highlight the need for a positive safety culture towards better construction safety and health. Construction safety managers need to adapt more strategies which not only focus on improving physical working environment and employee's safety knowledge but also on employees beliefs and attitude which will lead to safe behaviour and safety culture.

Key words: Safety management, culture, construction, belief, attitude

INTRODUCTION

Construction industry is one of the major economic forces that has contributed in developing Malaysia to become a developed nation by the year 2020. It is also undeniable that the construction industry is a very active and booming industry worldwide and also consider as one of the highest contributing industries towards the country's economy. Unfortunately, it is also contributing to high rates of accidents and fatalities incidences. Statistics reported by the Department of Occupational Safety and Health Malaysia in 2012-014 shows that there are 513 accidents happen throughout the year with 208 (40.5%) cases of fatalities. Many approaches have been adopted by construction companies towards safety but most of them are focused on improving physical working conditions and safety management system and procedure which have led to some limited safety performance improvement. The construction companies nowadays are actively searching for the better approach to improve safety performance.

Teo and Fang (2006) emphasized that many construction companies heavily relying on lagging indicators such as accidents or historical statistics to evaluate safety performance. They also argue that integration between organisational system and human-value systems will facilitate the development of good safety culture. Safety improvement will only be achieved if all involved recognise the need to change their belief, attitude and behaviour to create a good safety culture. All construction safety management programs require compliance on safety standards, procedures, policies and training programs but focused attention on these success factors can significantly reduce the number of injuries and fatalities and increase the safety performance.

The next section will discuss on the concept, need of changes and safety culture practices by construction companies.

Concept of safety culture: Concept of safety culture (Choudhry *et al*., 2007) is highly valued within the construction companies. Management believes that a positive safety culture is required for improving safety performance in the construction project. Cooper and Phillips (2004) defined that safety culture as the set of beliefs, norms, attitudes, roles and social and technical practices that are concerned to minimizing the exposure of employees, managers, customers and members of the public to conditions considered dangerous, fatalities or injuries. Based on the definitions, safety culture can be includes the shared assumptions, attitudes, behavioural norms, beliefs and values regarding safety that top level management sets and expresses through policies and processes which is ingrained in perceptions, behaviour and practices at all levels and which develops and improves as an organisation learns.

Safety culture: Safety culture is concerned with the attitudes, behaviours, systems and environmental factors

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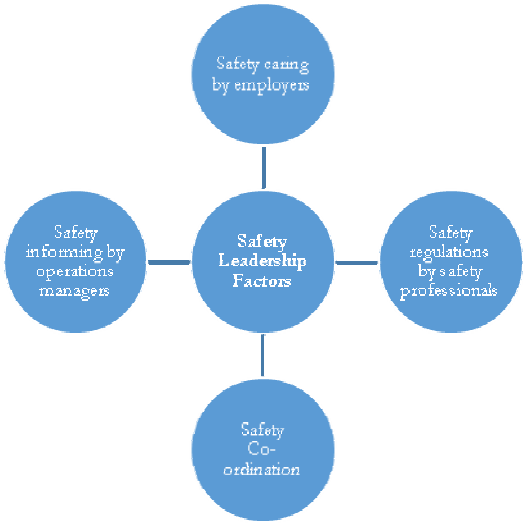

Fig. 1: Safety leadership factors (Wu *et al*., 2010)

that promote effective safety management. In relation to construction, the safety culture can be defined as an assembly of individual and group beliefs, norms, attitudes and technical practices that concerned with minimising the risks and exposure of employees and public to unsafe acts and conditions in a construction environment (Zhou *et al*., 2010).

Wu *et al*. (2010) using a stepwise regression model analyses the influence of higher level managers (employers), mid-level or operations managers and safety professionals on various factors that shape safety culture. They found that four safety leadership factors significantly affect safety culture. This is shown in Fig. 1.

Of these four predictive factors, safety informing had the most significant effect on safety culture. Safety caring refers to a paternalistic style or approach to safety management, achieving consensus in working practice, showing respect and trust for employees, showing care about employees needs and empathy with their problems. Safety informing includes three aspects: safety monitoring, safety dissemination and safety representing. Safety monitoring means collecting relevant safety information through a monitoring system. It is vital that this information is then continuously circulated so that employees receive important updates. Safety committees improve safety culture by enabling communication between management, safety representatives, safety professionals and employees. Safety co-ordination refers to safety policy development, safety information management and safety communication. Organisations with positive safety cultures are characterised by open channels of both formal and informal communication up and down the organisation structure. Safety regulation involves safety inspections, safety audits and safety incentive systems. Their research implies that certain role behaviours demonstrated by senior managers, operating managers and safety professional can significantly shape or change safety culture (Wu *et al*., 2010). Lingard and Rowlinson (2005) described that past experiences and anticipated obstacles contribute to a person's perception about whether certain behaviours are within their control.

MATERIALS AND METHODS

Needs to understand safety culture among employee and employer: The past decade has seen renewed interest in the role of safety culture in accident or injury prevention. The most recent definition defined safety culture as employee perception of the priority an organization or direct supervisor placed on safety (Zohar and Luria, 2005). Therefore, both parties need to to secure commitment and involvement to improve health and safety is recognised and encouraged.

Employee: The recent study shows a positive safety culture can improve employees' safety awareness and lessen Employees' unsafe behaviours. Having consistent key factors that comprise safety culture is vital in facilitating the measurement and comparison of safety culture over time which helps identify effective approaches to improve safety performance (Fang *et al*., 2006). In order to understand safety culture, attention needs to be directed to understanding the concept of attitudes and behaviour change. Lingard and Rowlinson (2005) show how Occupational Safety and Health (OSH) attitudes might shape OSH behaviour in construction and their model consists of four elements namely beliefs about jobs, job attitudes, behavioural intentions and the actual behaviour towards safety.

Belief represents the perspective an employee has relative to a subject. An example would be that an employee might believe that their job is inherently dangerous, exciting or probably dangerous. These descriptions represent beliefs the individual has about the job. These beliefs may or may not be factual and differ between individuals which then influence attitudes. For example, a person who believes his or her job to be inherently dangerous may develop a negative attitude towards OSH rules and regulations. This unfavourable attitude towards OSH may lead Employees to choose undesirable forms of behaviour. Lingard and Rowlinson (2005)'s model also explains that individuals with negative

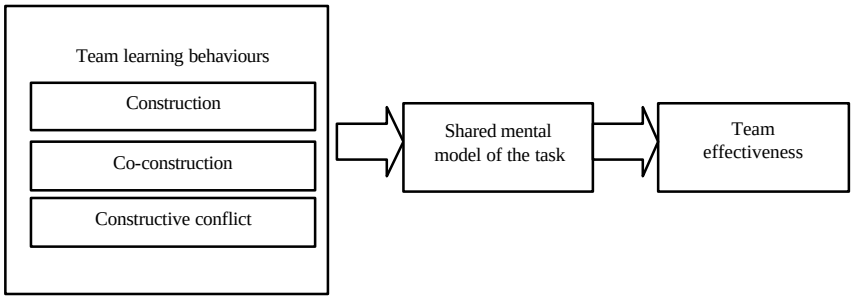

Fig. 2: Shared mental model (Bossche *et al*., 2011)

OSH attitudes will behave unsafely only if they make a decision to do so. Understanding the link between belief and attitudes to actual behaviour are crucial in the design of any attempts to improve OSH performance through attitudinal change.

Employer: Employers play an important role in promoting safety in the workplace. It is important that employees have the right belief, attitude and behaviour towards good safety performance. Lingard and Yesilyurt (2003) contend that the companies who manage OSH will typically have commonly held attitudes regarding the importance of OSH which are shared by employees at all levels and conveyed to sub-contractors. They added that the creation of a shared mental model of OSH is the key to ensuring consistently good OSH performance. The model is shown in Fig. 2.

Based on Fig. 2, shared mental models refer to shared representations of tasks, equipment, working relationships and situations (Bossche *et al*., 2011). It is stated that probably all of these types of knowledge need to be shared in effective teams. It is team members' overlapping mental representation of key elements of the team's task environment. To create a shared 'mental model' for OSH in construction, important to understand the factors that affect employee's attitudes towards safety and health. It is essential to achieve human potential in safety and health by shaping a culture in which safety permeates to all activities. An important element in shaping safety culture is to shape employees' perceptions and beliefs towards safety and health (Zhou *et al*., 2010). Employees need to have optimum beliefs and perceptions before attitudes and behaviour relative to safety can be changed. Safety culture highlights the perceptions held by employees regarding the significance of safety in their job site (Choudhry *et al*., 2007). In construction, safety culture can be defined as the assembly of perceptions held by construction Employees regarding construction safety policies, procedures and practices on construction sites (Zhou *et al*., 2010). Safety culture focusing on the Employee's perceptions of the role of safety plays in the workplace or called bottom-up approach. Mohamed (2003) suggested that safety culture is a product of safety culture. Furthermore, Choudhry *et al*. (2007) provided that the definition of safety culture is the reflection of Employees perceptions about the organization's safety management system including policies, practices and procedures that show how safety is implemented in construction site environments.

RESULTS AND DISCUSSION

Need of changes in construction safety practices by employee and employer: Many researchers have studied construction safety. Most construction players use traditional approaches to safety management which focused on the techniques and management tools. It is related on identification of work hazards, minimizing the risks associated with these hazards, developing safety management systems, safety procedures and standards, improving physical working conditions such as design of plant and machinery and site access, training site employees, developing better planning and work methods and providing personal protective equipment (Biggs *et al*., 2005). Furthermore, the construction industry also relies heavily on traditional measures such as an accident and Employees' compensation statistics (Mohamed, 2002).

Employees are the one or more service provider that operates in a workplace. The majority of workplace accidents and injuries have been attributed to the unsafe work practices of employees rather than unsafe working conditions (Mullen, 2004). Lack of awareness of hazards may employ dangerous working practices. Often, the employees believed that following all safety procedures including wearing safety equipment are not necessary for them. Review of the current practices of safety management reveals the major issue in safety is the lack of a safety culture with in the organisation. In

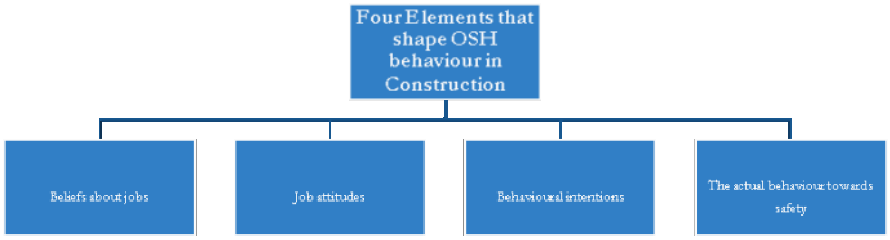

Fig. 3: Four elements that shape OSH behaviour in construction (Lingard and Rowlinson, 2005)

order to improve safety performance, one of the ways is to approach implement safety culture in organisation (Fung *et al*., 2005).

To promote safety in the workplace it is important that employees have the right belief, attitude and behaviour towards good safety performance. Lingard and Yesilyurt (2003) contend that the companies who manage OSH will typically have commonly held attitudes regarding the importance of OSH which are shared by employees at all levels and conveyed to sub-contractors. They further added that the creation of a shared mental model of OSH is the key to ensuring consistently good OSH performance. An important element in shaping safety culture is to shape employees' perceptions and beliefs towards safety. Employees need to have optimum beliefs and perceptions before attitudes and behaviour relative to safety can be changed.

In order to understand safety culture, attention needs to be directed to understanding the concept of attitudes and behaviour change. Lingard and Rowlinson (2005) show OSH attitudes might shape OSH behaviour in construction that consists of 4 elements (Fig. 3).

Belief represents the perspective an employer has relative to a subject. An example would be that a employer might believe that their job is inherently dangerous, exciting or probably dangerous. These beliefs may or may not be factual and differ between individuals which then influence attitudes. For example, a person who believes his/her job to be dangerous may develop a negative attitude towards OSH rules and regulations. This unfavourable attitude towards OSH may lead employers to choose undesirable forms of behaviour. This conscious decision to behave unsafely is the behavioural intention. Lingard and Rowlinson (2005)'s have developed a model to support the implementation of safety management in organisation. This model explains that individuals with negative OSH attitudes will behave unsafely only if they make a decision to do so. Understanding the link between belief and attitudes to actual behaviour are crucial in the design of any attempts to improve OSH performance through attitudinal change.

Table 1: Safety culture factors

Authors	Safety culture factors
Chan	Organizational commitment and communication
	Line management commitment
	The supervisor's role
	Personal role
	Workmate's influence
	Competence
	Risk taking behaviour and contributory influences
	Some obstacles to safe behaviour
	Permit to work
	Reporting of accidents and near misses
Choudhry *et al*. (2007)	Inappropriate safety procedure and work pressure
	Management commitment and employee involvement
	Satisfaction with resources and training
	Appraisal of hazard and reporting
	Personal risk appreciation
	Competence
	Co-employee's influence
Choudhry	Safety policy and standards
	Safety organization
	Safety raining
	Inspecting hazardous conditions
	Personal protection program
	Plant and equipment
	Safety promotion
	Management behaviours

Safety culture practices: Safety culture has been researched for many years, dominantly in several directions such as designing the psychometric measurement instruments, developing and testing theoretical safety culture model, examining the relationship between safety culture determinants and safety performance and exploring the relationship between safety culture and organizational culture (Cooper and Phillips, 2004). Reviews on safety culture factors are shown in Table 1.

Table 1 reviewed on safety culture factors in several industries together. The factors are then divided into 8 categories namely safety technology, safety management system, safety commitment, safety activities, safety training, safety communication, safety environment and safety-self related factors. Figure 4 shows the number of determinants that fall into each category.

Based on Fig. 4 shows that safety-self related have higher determinants that need to be more concern to the

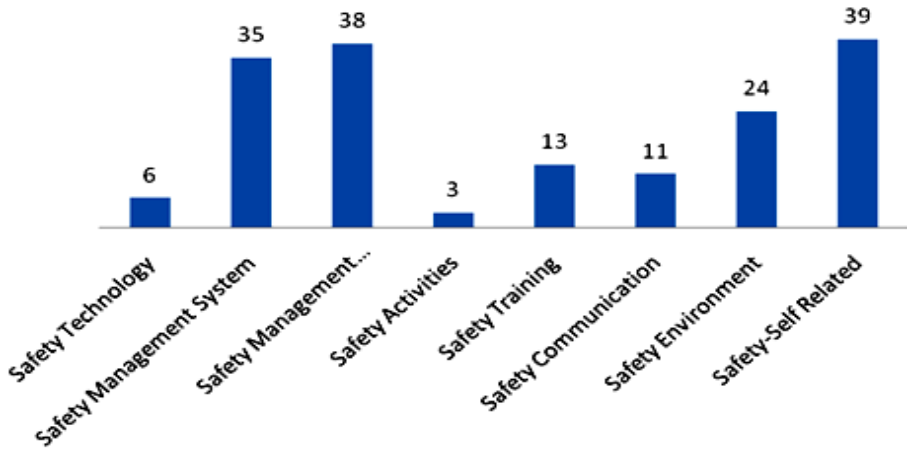

Fig. 4: Safety culture categories

construction companies. Its shows the impact of safety culture to employees to make sure work safely done. According to Kanten and Reis (2009), they found that safety culture influence the employees safety behavior. According to Zohar (2003), safety culture predicts employee's motivation to work safely which affects employee's safety behaviours and subsequent experiences of workplace injuries or incidents. The importance of safety culture rests on its ability to predict safety behaviour. Different implications for decision-making, morale and proactive safety behaviours such as stopping the job, seeking better ways of mitigating hazards Furthermore, safety culture showed its ability to predict important safety results such as perceived risk, accidents and injuries (Smith *et al*., 2006). Although safety culture can predict perceived risk, accidents and injuries the pattern of relationships identified around the prediction of the perceived risk is complex (Cooper and Phillips, 2004). According to Turnberg and Daniell (2008), they measured safety culture by using scales which covered various dimension such as personal protective equipment, policies and practices, safety related condition, risk justification, communication, management support, safety training, motivation and safety knowledge. There are three factors of safety culture which are appropriate safety procedures, management commitment and satisfaction with safety resources as the principle contributors to the safety performance (Choudhry *et al*., 2007).

The success of any system depends as much on people changing their attitude and behaviour as it does on a well-designed system and one must remember that while it is easy to bring about behavioural change, it is extremely difficult to keep it changed. Furthermore, developing a safety construction culture is something which cannot occur overnight. It is a journey rather than a destination which takes time and commitment over an extended period. To this end, it is essential that any organisation that has adopted a new approach to construction safety management continues to champion its new philosophy and monitor its performance on a continual basis, learning lessons, feeding them back into business processes and refining management practices. This must be supported by an effective training, motivation and performance appraisal system to reinforce appropriate behaviour (Loosemore and Zou, 2006).

Employee's awareness on construction safety culture plays an important role in making construction sites a safer and healthier place to work. Two principal components were established:

- Management dedication
- Employee's involvement

These two factors are regarded as the most embracing attributes for this research in construction site environments. Study by Masood and Choudry showed that management commitment and employee's involvement were the most significant factors relating to perceived safety performance because it contributed the most for establishing positive safety culture on construction sites.

CONCLUSION

It is concluded that besides implementation on the safety management system and new technologies to preventing fatalities, injuries and incident, project stakeholder also have to focus on the human factors. It is an important aspect that can be achievable when the management and employees have the right belief, attitudes and appropriate behaviour. The project

stakeholder can integrated safety management systems that focus on not only policies, regulations and site conditions but also the human factors.

In order to foster a safety culture at a construction site, top management support and commitment to safety programs is a must. The problem arises when the safety officer does not have power to enforce the regulation strictly. It is vital for the top management to support the safety and labor officer at all times. Top management's support of safety issues can not only be by means of better enforcement and stiffer punishment but also through frequent training for workers and management. This would prevent workers from repeating their offence. Serious enforcement and inspection need to be in place.

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