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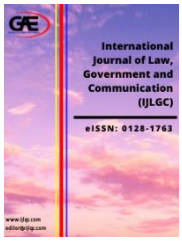

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THE RELATIONSHIP OF EFFECTIVE COMMUNICATION AND SAFETY CULTURE IN CONSTRUCTION INDUSTRY IN MALAYSIA

Ahmad Faisal Mohamed Fiah[1], Norhuda Salleh[2*], Romlah Ramli[3], Noor Syakirah Zakaria[4]

[1] Faculty of Communication and Medis Studies, Universiti Teknologi MARA, Malaysia
Email: afaisal@uitm.edu.my
[2] Faculty of Social Sciences and Humanities, Universiti Malaysia Sabah, Malaysia
Email: hannah@umk.edu.my
[3] Center of Multimedia Technology Studies and Communication, Universiti Utara Malaysia, Malaysia.
Email: aidilamzar@uum.edu.my
[4] Faculty of Social Sciences and Humanities, Universiti Malaysia Sabah, Malaysia
Email: hannah@umk.edu.my
[*] Corresponding Author

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Abstract:

This paper discusses on the relationship of effective communication and safety culture in construction industry. Generally, lack of communication at workplace and for this case, construction and project site is part of contributing factor in accident and some of the accidents involved fatalities. In any areas especially those involving human, communication is a key factor towards producing an optimum result. Lack of communication and understanding of safety culture if is not done effectively can lead to error and defect especially in construction industry since construction industry not only dealing with human but also other aspects such big machines and those machines operated by human. Safety culture among construction workers and project owners is also another crucial element in construction industry but safety culture can only be achieved if the message is communicated effectively. Therefore, this paper discusses on the relationship and importance of effective communication and safety culture and generally how it is implemented in construction industry in Malaysia.

Keywords:

Effective Communication, Construction Safety, Safety Culture

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Introduction

Construction sector is one of the key sectors that contributes to the country's economic growth. Based on sources from the National Bank of Malaysia, the GDP growth rate for the construction industry in 2013 was 10.6% and increased to 11.7% in 2014. While in 2015 the GDP growth rate of construction industry fell to 8.2% in 2015 and down again in 2016 by 7.4% and in 2017 again it decreased by 6.1%. Although it has dropped, this figure remains large and it is still an important industry in contributing to the country's GDP.

The federal government has allocated 15.8% of the 2015 Budget, 16.2% of the 2016 Budget, 17.1% of the Budget 2017 and 16.4% of the Budget 2018 from the full budget for development expenditure purposes. Refers to the above-mentioned figures, the number of projects awarded to contractors in 2013 was RM137 Billion and increased to RM185 Billion in 2014. The figure decreased to RM 142 Billion by 2015 and rebounded in 2016 as much as RM 229 Billion. This suggests that the construction industry is in full swing for a period of 5 years and the increase number of workforce involvement in the construction industry has set the rate of accident and fatality in the workplace.

Construction industry also often regarded as a hazardous work environment because of its unique structure compared to other sectors (Misnan et al). Most of the activities in the construction sector are outdoor activities and there is a dynamic change of work locations and a mix of workers comprising various countries and cultures (Misnan et al). The construction sector is also quite unique in terms of the composition of the parties involved which is conventionally comprised of the client who offers work, the main contractor who receives the job from the client and the subcontractor of various companies receiving work from the main contractor according to their respective specialties such as civil, mechanical, electrical etc. The phases or stages in construction sector also varies starting with the conceptual phase, tendering phase, construction phase and testing and commissioning phase.

The structure of construction setting is different from other sector where it is consisting of multi-cultural in a single workplace (D. Fang et al, 2013). The main difference between construction and other workplace setting is the nature of the organization where construction is a temporary setting and only exist for a period of time (upon completion of project) but other sector exist in a permanent form and conducive environment to implement the safety culture at the workplace.

Looking at this variety factors mentioned above, it was considered that this sector is hazardous and prone to occupational accident. Referring to statistics released by the Department of Occupational Safety and Health Malaysia (DOSH), occupational accident rates showed an upward trend every year. In 2013, the number of accidents investigated by DOSH was 2,830 cases and this figure did not show a positive sign of a decline in 2014 of 2,810 cases. However, this figure has seen a slight increase in 2015 of 3,345 cases and it continues to increase by 2016 of 3,750 cases and 3,246 cases in 2017 (data up to October 2017).

Of these, the construction industry is the third highest contributing figure to this statistic behind the manufacturing industry and the agriculture, forestry and fishery industries. However, the construction industry is the industry with the highest number of fatality in the workplace and the number of fatality has been increasing year by year. In 2013, the number of fatality in the construction industry was 69 cases and increased in the following year of 72 cases. This figure

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is increasing in 2015 by 88 cases and again in 2016, which is 106 cases. This figure shows a decrease in the number of 63 cases in 2017, however this figure is considered insignificant as it almost matches the figure in 2013 and data obtained updated until October 2017.

The other uniqueness of the construction industry in Malaysia is the composition of its workforce comprising foreigners and locals. According to statistics released by The Malaysian Administrative Modernization and Management Planning Unit (MAMPU), the number of foreign workers is very dominant and monopolizes almost 80% of the total workforce population in the construction industry. In 2017, a total of 889 residential construction projects were underway in Selangor and employed 222,250 workers and 80% were foreign workers of 177,800 workers while locals only contributed to 44,450 workers. Looking at this figure, foreign worker safety culture is significant to overall safety culture in construction industry in Malaysia and must be integrate with the safety culture model for construction industry.

According to DOSH, about 80% of fatalities in construction industry was contributed by the foreign workers. This scenario happened due to most of the foreign worker especially non-skilled worker did not familiar with working environment in construction industry which resulted to ignore the risk lingering around them and exposed to the risk without a proper control measure. The policy from the Immigration Department of Malaysia does not provisioned any specific training or competence pertaining to the construction sector. Emphasis is only given in terms of health aspects i.e. foreign workers should prepare health screening reports from source countries. This has resulted in the influx of foreign workers comprising a variety of cultures, levels of thinking, background, education level, skills and competency. Looking at this scenario, CIDB has obliging every worker involved in the construction industry to undergo a 1-day site induction for construction workers known as Green Card Program. But the extent of its effectiveness and the understanding of foreign workforce on this course is still a question mark because there is no mechanism to evaluate the understanding of this foreign workforce after they attended this 1-day program.

The lack of safety culture in the construction sector contributes to the number of accidents in the sector (Misnan et al). This is due to the employer fails to identify what is the level of safety culture at their workplace and what is the element in the safety culture need to be adopted in their work practice. Employer often adopt the safety culture element from the practices of other sectors such as manufacturing sector regardless to their suitability in the construction sector and practice the same element in every phase of construction which is not appropriate as each phase of construction has a different working environment and risk.

In order to identify what is the element that need to be develop in a construction safety culture and to determine the level of safety cultures in construction sector, there is a need to develop a tool to measure the safety culture index. The safety culture index need to be determine before proposing a suitable and specific health and safety programs that is suitable for every phase of construction. At the end of this research, the tools that has been developed to measure the safety culture index in construction can be used as a platform for continuous monitoring and improvement because it will tailor to the construction phase's environment and applicability. It also can be used as a basis for future research related to safety culture in construction sector.

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Literature Review

Characteristics of Construction Industry

"Construction Industry" means the industry related to construction works, including design, manufacturing, technology, material and workmanship and services for purposes of construction. "Construction Works" means the construction, extension, installation, repair, maintenance, renewal, removal, renovation, alteration, dismantling, or demolition (Act 520 Lembaga Pembangunan Industri Pembinaan Malaysia Act 1994) :

a) any building, erection, edifice, structure, wall, fence or chimney, whether constructed wholly or partly above or below ground level;
b) any road, harbour works, railway, cableway, canal or aerodrome;
c) any drainage, irrigation or river control works;
d) any electrical, mechanical, water, gas, petrochemical or telecommunication works; or
e) any bridge, viaduct, dam, reservoir, earthworks, pipeline, sewer, aqueduct, culvert, drive, shaft, tunnel or reclamation works, and includes :
i. any works which form an important and integral part of or are preparatory to or temporary for the works described in paragraphs (a) to (e), including site clearance, soil investigation and improvement, earth-moving, excavation, laying of foundation, site restoration and landscaping; or
ii. procurement of construction materials, equipment or workers, necessarily required for any work described in paragraphs (a) to (e);
(Act 520 Lembaga Pembangunan Industri Pembinaan Malaysia Act 1994)
"Contractor" means a person who carries out or completes or undertakes to carry out or complete any construction works. (Act 520 Lembaga Pembangunan Industri Pembinaan Malaysia Act 1994)

Unlike other sectors, the construction sector is a unique sector and has its own distinctive such as employee behavioral character, workplace environment, multi-phase construction process, management practices and organizational structure (D. Fang, H. Wu, 2013). The main distinctive between construction sector and other sector is in terms of its implementation during the construction process, its organizational structure and management practices (D. fang, H. Wu, 2013). A construction project is a process that has several phases divided into several stages and each stage involves different parties (Behm, 2005).

Organizational structure within the construction sector is also different from other sectors where it is temporary and is designed solely for the purpose of implementing a construction project and is known as the Project / Construction Team. The Project / Construction Team member consists of various background and will be abolished after a construction project completed. Construction project management is different from the usual management of the company as the nature of construction projects is temporary (D. Fang H. Wu, 2013). The construction sector is also a multi-organizational sector where the composition comprises the owner or client, main contractor and subcontractor (when the subcontracting process takes place) and is a common phenomenon in the construction sector (Chern and Bryant, 1984). In the construction project management, there are several different elements according to the construction phase starting with concept phase, feasibility phase, design and planning phase, and construction phase (Izatul Farrita M.K *et al*, 2016). The table below shows safety elements in detail according to construction phases (Izatul farrita, M.K *et al*, 2016).

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Table 1: Safety Elements In Detail According To Construction Phases

STAGES	SAFETY ELEMENT		
	(OGC Gateway Model)	**(OGC Gateway Model)**	**(OGC Gateway Model)**
Pre-Construction Stage	*Concept Phase* i. Possible need for project • Client's role in **H&S** throughout project; supply information, time allowed and **budget** required for project ii. Define user needs • Align **H&S policies** for project; how supply chain will be informed of H&S requirements, expertise required, criteria for evaluating competence, resources and commitment. • Identify **H&S hazards** (risk register).	*Strategic Definition Stage* • Identify client's **Business Case** and Strategic Brief and other core project requirements. • Review feedback from previous project.	*Inception Stage* • **OSH** in **project brief** & **objective**
	Feasibility Phase i. Options to meet user needs • Include **H&S performance**, materials and components specified by output performance can meet functional and H&S requirements. • Option evaluation chart to include H&S. • Input from end user's operation and maintenance at this stage; include format for **H&S file** and budget for maintenance strategy. • Initial **H&S box information** in during **concept designs**. ii. Prepare business case • H&S objectives, **H&S milestones** included. • Evaluate cost of specific **H&S items.** • Assess risks, decide management arrangements and control procedures, update **risk register.** iii. Project brief • H&S objectives included, decide project H&S Performance Indicators, agree format for **H&S File**. iv. Feasibility study option	*Preparation and Brief Stage* • Prepare Handover Strategy and Risk Assessments	*Feasibility Stage* • OSH in project brief & objective

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	• Consider **H&S risks** on each site via option evaluation chart. v. Procurement strategy • Agree **H&S criteria** for selection of supply chain. Seek advice on maintenance and access issues during operation and maintenance period to prevent H&S problems.		
Pre-Construction Stage	*Design & Planning Phase* i. Contract preparation • Develop **H&S milestones** for project program. Review specifications for prescriptive items that may generate H&S risks during construction, operation and maintenance. ii. Expression of interest/vetting • Use **H&S criteria** previously outlined to vet supply chain. iii. Partner/contractor selection • Include current **H&S file**. Cooperation between parties involved in negotiation/ tender process with regard to H&S issues. Ensure **H&S criteria** sufficiently weighted in decision. iv. Award contract • Confirm H&S duties. **H&S hazard workshop** and integrated responsibility chart with H&S included. v. Outline design • Identify **H&S hazards/risks** on **drawings**. Cross reference H&S plan to program. H&S milestones on program. vi. Detailed design • Site issues regarding residual risk have been addressed by the contractor ahead of completing the construction H&S plan. Identify **H&S hazards/risks** on **drawing**.	*Developed & Technical Design* • Review Construction Strategy, including sequencing, and update **Health and Safety Strategy**.	*Design Stage* i. Design • **Safety education** and **training** for designer • **Safety prevention** through design (PtD). ii.Tendering • Client is optimal responsibility in insisting on the safe performance of the contractors in making their selection. • **Selection of contractor** was based on the most cost-effective solution to control the **health, safety** and quality **risks**.

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Construction Stage	*Construction Phase* i. Site establishment • Display H&S Executive Officer notice, site inductions-confirm operatives have received and understood method statements, communicate site rules. Confirm contractor's supply chain input to construction **H&S plan** and **H&S file**. • Monitor **H&S performance** and **resources**. • Safety inspections continue to monitor **H&S performance** and resources, **report incidents/accidents.** • Identify potential **H&S risks** at commissioning during use. Ensure contractor's supply chain submit information for **H&S file**. ii. Handover • Final inclusions and completion of H&S file. Include **H&S issues** in testing of M&E equipment. • Communicate **H&S residual risks (H&S file).**	*Construction Stage* • Review and update Sustainability Strategy and implement Handover Strategy, including agreement of information required for commissioning, training, handover, asset management, future monitoring and maintenance. • Update construction and **Health and Safety Strategies**	

Source: (Izatul farrita, M.K et al, 2016)

Definition of Safety Culture

The recognised and respected definition or model of safety culture has not been clearly specified even though there is a plenty of reports, articles and information that has been made pertaining to safety culture (HSE, 2005). According to Pidgeon, past research was 'unsystematic, fragmented and in particular under-specified in theoretical terms' (Pidgeon, 1998). Cooper in his articles suggest that the creation of a standardised definition or safety culture mode is not clear cut (Cooper, 2000). The chronology of the definition of safety culture starts with Wert where he quoted that safety culture as "a work environment where a safety ethic permeates the organization and people's behaviour focuses on accident prevention through critical self-assessment, proactive identification of management and technical problems, and appropriate, timely, and effective resolution of the problems before they become crises" (Wert, 1986). To simplified the quotation, it is equivalent to safety ethic. Then, another definition of safety culture came in the picture defined that it is a constructed system of meaning through which the hazards of the world are understood (Pidgeon, 1998). Later on, Turner thinks that it is a set of attitudes, beliefs or norms (Turner, 1989) whereas in 1990, the Confederation of British Industry (CBI), defines safety culture as `The way we do things around here' (CBI, 1990). According to Correl and Andrewartha, safety culture is divided into two aspects that is something an organisation is i.e the beliefs, attitudes and values of its members regarding the pursuit of safety and something an organisation has i.e the structural,

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policies, practices controls and policies designed to enhance safety (Correl and Andrewartha, 2000).

Few years later, another definition get into the picture focusing on the organisational safety culture where it is the product of individual and group values, attitudes, perceptions, competencies and pattern of behaviour that determine the commitment to, and the style and proficiency of an organisation's health and safety management (Phil. Hughes et al, 2007). DuPont has translated the definition from Phil. Hughes in a layman's term that is safety culture defines what people do when no one is watching them.

Foreign Worker Involvement in Construction Industry

The number of foreign workers is very dominant and monopolizes almost 80% of the total workforce population in the construction industry. In 2017, a total of 889 residential construction projects were underway in Selangor and employed 222,250 workers and 80% were foreign workers of 177,800 workers while locals only contributed to 44,450 workers. Looking at this figure, foreign worker safety culture is significant to overall safety culture in construction industry in Malaysia and must be integrate with the safety culture model for construction industry. According to DOSH, about 80% of fatalities in construction industry was contributed by the foreign workers. This scenario happened due to most of the foreign worker especially non-skilled worker did not familiar with working environment in construction industry which resulted them to ignore the risk lingering around them and exposed to the risk without a proper control measure. The policy from the Immigration Department of Malaysia does not provisioned any specific training or competence pertaining to the construction sector. Emphasis is only given in terms of health aspects i.e. foreign workers should prepare health screening reports from source countries. This has resulted in the influx of foreign workers comprising a variety of cultures, levels of thinking, background, education level, skills and competency. Over-dependence on foreign workers has induced negative impacts and become a serious social problem (Abdul-Rahman, Wang, Wood, & Low, 2012). On the other hand, Smith & Dejoy (2012) reported there is a significant relationship between work and family interferences that contribute to safety climate, occupational injury and organizational effectiveness.In response to this problem, our study proposes the new safety subcultures, which integrate the elements of occupational and non-occupational factors. These subcultures refer to both foreign worker and family empowerment.

Relationship Between Work & Family Interference

Smith & Dejoy (2012) reported there is a significant relationship between work and family interferences that contribute to safety climate, occupational injury and organizational effectiveness. Jeffrey, Karen & Jason (2003) reported there are 3 element of work-family balance which are time balance, involvement balance and satisfaction balance. They suggested a better quality of life can be achieved if a person allocate more time with family than work compare to those persons spent more time with his work. Jeffrey & Romila (2003) suggested "work-to-family" conflict occurs when work demands interfere with the quality of family life. On the other hand, "family-to-work" conflict occurs when family demands and pressures interfere with the fulfilment of work responsibilities.

Integrated Safety Culture Model

Lei Wang & Ruishan (2009) has developed The Integrated Safety Culture Model and complete analysis on structure and components of safety culture from previous research. The safety culture has been looking from a different angle that is from the perspective of sub-culture.

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From this perspective, safety culture has been defined as the assembly of values, beliefs, attitudes, norms, organizational characteristic behaviours and environments which are concerned with safety, created and nourished in the long-term process of organizational producing practice and accepted by most of members in organization (Lei Wang and Ruishan Sun et al, 2009). It was then separated into seven types of sub-culture knows as :

i) Priority Culture
(both the organization and individuals can consider safety issues in priority when they make decisions and behave in working)

ii) Standardizing Culture
(organizational regulations, rules and standards are complete, applicable and updated individuals can comply with those regulations, rules and standards completely)

iii) Flexible Culture
(both the organization and individuals can discover and resolve safety issues well when they face risk and changes)

iv) Learning Culture
(both the organization and individuals show positive and supportive attitudes and behaviours to all kinds of learning ways including education, training and self-learning)

v) Teamwork Culture
(individuals behave with trust in team members, and they share knowledge and collaborate with each other actively)

vi) Reporting Culture
(organization will gather and analyse all kinds of safety information and individuals will present a positive attitude and behaviour on reporting and communicating safety information)

vii) Justice Culture
(both the rewarding system and monitoring system are complete and operate fairly to everyone. Most of individuals feel satisfied about them)

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Figure 1: Composing of Safety Culture

(Source: Lei Wang & Ruishan, 2009)

The Structure of Safety Culture dimensions were attributed into two levels which consists of :

i) Intrinsic Latency Level : Containing all dimensions of safety philosophy (safety values, safety consciousness and safety attitudes)
ii) Extrinsic Indication Level : Containing all dimensions of safety environment and safety behaviour (organizational safety commitment, safety organization, safety regulation and rule, safety operation behaviour, safety information exchange, safety education and training, safety management behaviour and safety rewards and punishment).

Relationship of Effective Communication and Safety Culture

Based on the above points, it is believed that that is (are) relationship between effective communication and safety culture as those are important factors in making sure the best outcome of any construction projects in this country. Although that are not many people could really relate effective communication, safety culture and construction but to achieve what considered as best practice and optimum safety culture, it must be from an implementation and practice of effective communication. Almost every aspects discussed before involve good communication process. Messages that are conveyed especially at workplace are vital in terms of safety and since that are many parties involved in the completion of any construction projects, those messages must be digested effectively by those parties especially foreign workers. Thus, the researchers believe further and thorough research can be done in near future. Given the factor of post-pandemics, the research would be more interesting as it may also include the other factors such as socio-economical of a society at large and also the effects of Covid19 towards the way people communicate.

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