STRUCTURAL EQUATION MODEL STAKEHOLDERS IN DEVELOPING SAFETY CULTURE TO INCREASE SAFETY PERFORMANCE IN CONSTRUCTION SECTOR

Yusuf Latief

Department Civil Engineering, Universitas Indonesia

Akhmad Suraji

Department Civil Engineering, University of Andalas

Leni Sagita

Department Civil Engineering, Universitas Indonesia

Rossy Armyn Machfudiyanto

Department Civil Engineering, Universitas Indonesia

ABSTRACT

Construction sector is one of the top labor absorber in Indonesia. The high level of work accidents become an issue in construction sector. 80% of work accident caused by unsafe behavior. The construction sector is one of the most absorbing labor in Indonesia. The high number of accidents at issue in employment. 80% of workplace accidents caused by unsafe behavior. Safety due to unsafe behavior is not a requirement, and the lack of effective role of stakeholders in building safety culture. the purpose of this research is to know the relationships among stakeholders in building a safety culture in the construction sector in Indonesia. This study used structural equation modeling to examine the influence of the role of stakeholders that have a significant impact in building a safety culture and influence between these stakeholders. The result of this research is that there are 10 dominant stakeholder role in influencing physical culture, behavior culture, norm culture and management, ideology culture

Key words: Stakeholder, Safety Culture, Structural Equation Modelling, Construction Sector.

1. INTRODUCTION

Indonesia as a developing country, develops in various sectors. One of them in the construction sector, meaning that in the construction sector is the use of labor intensive enough. Based on data from BPS in 2015, the construction sector is included in the top 5 sectors that absorb the largest workforce in Indonesia. According to Dessler (1997), workplace accidents are based on 3 reasons, namely, accidental events, unsafe conditions, and unsafe behavior. The number of accidents that occur is based on the 3 reasons above. For accidental events are beyond human reach, while unsafe conditions and unsafe behavior are the result of a well-established safety and health culture. To establish a good safety and health culture, it is necessary to involve stakeholders in the construction sector. Ministry of Manpower and the Ministry of Public Works and People's Housing as the representative of the central government has done its function regulator by issuing laws and regulations as a reference. But this is still not enough considering the construction sector is very complex with the number of parties who have interests (stakeholders) in it. Thus, the roles of these stakeholders are needed in building a culture of occupational safety and health. According to Freeman (1984), stakeholders are groups or individuals who can influence and or be influenced by a particular goal achievement. Clarkson (1995) defines stakeholders as persons or groups who bear the risk of either investing in the enterprise, or because of the risk of the company's activities.

Research related to stakeholder relations to occupational safety and health already exists, such as the relationship between individuals and organizations that affect workers' safety behavior (Hee-chang Seo, 2015), then the relationship between safety culture and occupational health driving factors in construction (Thanwadee Chinda, 2007).

2. THEORITICAL STUDY

The occupational safety and health culture shows the relationship between management and the organizational climate in this case is the occupational safety and health condition (Thompson et al, 1998). Kennedy and Kirwan (1998) in his research say that the culture of occupational safety and health is an abstract concept, supported by the incorporation of group perceptions and individual perceptions through processes, feelings and attitudes that evolve into how to work in an organization.

According to some pre-existing research:

Biset (1998), a stakeholder is a person with an interest or concern for the company.

Gray et al (2001), stakeholders are parties with an interest in the company that may affect or may be affected by company activity. The stakeholders include the community, employees, government, suppliers, capital markets and others.

Freeman (1984), stakeholders are groups or individuals who can influence or be influenced by a particular goal achievement.

Clarkson (1995), a stakeholder is a person or group that owns or asserts ownership or interest in the company or its activities, in the past, present and future. Clarkson further narrows the notion of stakeholders as individuals or groups who bear a kind of risk either because they have invested in the company (voluntary stakeholders), or because they are at risk because of the activities of the company (non-voluntary stakeholders)

3. METHODOLOGY

Stages of the research process to be performed are as follows:

1. The initial step to answer the research question is by using survey method. Survey research consists of two stages, namely theorization process and empirization process. The theoretical stage requires a good knowledge of the various elements of the study through a study conducted sourced from the literature that addresses the topics of safety culture, stakeholder and structural equation modeling. The related literature review aims to collect concepts, research theories to formulate existing theoretical relationships well. Then, the empirical stage aims to conduct further studies on the variables to be tested, the hypotheses to be proved, and the operational definition for the picture to be used clearly. The empirical stage identifies the safety culture factors that affect the performance of occupational safety and health.

2. The next stage is the collection of primary data through the aid of research instruments in the form of questionnaires distributed to respondents.

3. After the primary data collected, the next to perform the existing data processing using statistical techniques, namely structural equation modeling (structural equation modeling) through software assistance. Structural equation modeling has the advantage to estimate the relationship between multiple relationship variables. It also has the ability to describe the pattern of relationships between latent constructs and indicator variables

4. After the process of analysis of the variables, then do the validation to the experts to get accurate results. The results of this validation process form the basis for compiling questionnaires for single case data collection.

5. A case study method to find out the actions needed to shape a safety and health culture.
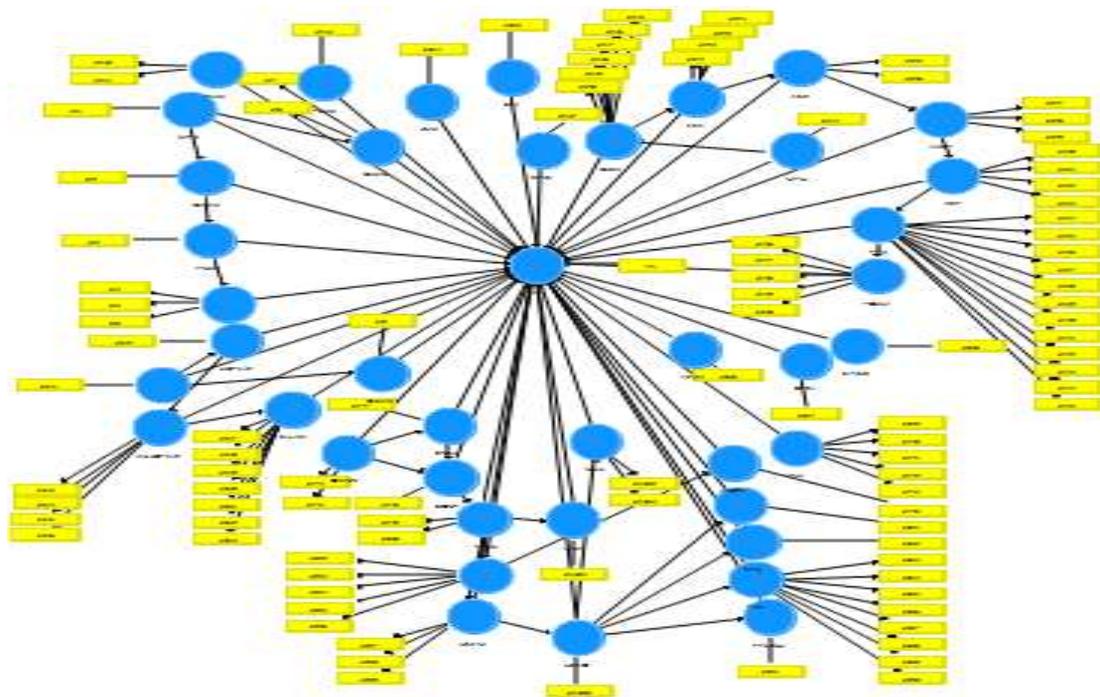
4. RESULT AND DISCUSSION

Figure 1 Research of Stakeholders Model

Based on the results of data processing using SMARTPLS 2.0, the authors obtain the value of the influence of stakeholder roles on OSH culture. Then from the results of data

processing, taken 10 roles that have the most significant influence on occupational safety and health culture, then combined with data stakeholder mapping, it will get stakeholders with the most significant role to influence the culture K3. The following are presented by stakeholders and their roles which have the most significant influence in 4 cultures. The following stakeholder management is based on PMBOK 5th edition

4.1. Action Plan and Stakeholders Relationship Pattern

The purpose of this study is to create a work plan in the relationship between stakeholders in building a culture of occupational safety and health. PMBOK 5th, 2013 states that:

- Stakeholder Management includes the processes necessary to identify the people, groups, or organizations that can influence or be affected by the project, analyze stakeholder expectations and impact them on the project, and to develop appropriate management strategies for stakeholders effectively involved in decisions and project implementation.

- Stakeholder Management also focuses on ongoing communication with stakeholders to understand their needs and expectations, issues that occur, manage conflict of interest and encourage appropriate stakeholder engagement in project decisions and activities. The satisfaction of the stakeholders should be managed as the main objective of the project.

- The stakeholder planning cycle starts from creating a list of stakeholders involved and then categorized and interviewed the wishes and expectations of the project. After analyzing the effects and impacts from the interest of the stakeholders, then the results of the analysis are made a work plan to facilitate and establish a pattern of relationship with or between the stakeholders

Table 1 Roles and Responsibilities of Stakeholders in Developing Physical Culture

No	Stakeholder	Roles and Responsibilities
1	Director General of Construction	Prepare Implementation Guidelines for Monitoring and Evaluation of SMK3 Implementation Implementation of Construction of Public Works;
2	Echelon I Structural Official Technical Work Unit	Responsible for the implementation of SMK3 Construction of Public Works for construction work within the Echelon I Working Unit concerned
		Coordinate the results of the implementation of SMK3 Construction of Public Works within the work unit with the Construction Construction Agency to be forwarded to the Minister
3	Committing Officer	Prepare and establish a Contract Document within which contains provisions on the application of SMK3 for Construction of Public Works
4	Working Group of Procurement Services Unit (Pokja ULP)	Check the completeness of Self Estimate Price (HPS) and ensure that the cost of SMK3 has been allocated in general cost
		If HPS has not allocated the cost of SMK3 for PU Construction, the Working Group of ULP shall propose changes to KDP to be completed
5	Head of Health and Safety Section of Disnaker Dati I / II	Preparation of materials preparation of planning and implementation of programs in the field of supervision and supervision of Health and Safety (K3)
6	Owner	Include OH & S requirements in the project tender or contract
7	Manpower	Wearing PPE in carrying out its work
		Refuse to work if conditions are unsafe.

In the physical culture, there are 7 stakeholders with 10 dominant roles that have a significant influence in building the culture. 4 stakeholders came from the PUPR ministries, 1 stakeholder came from the Local Government, and 2 stakeholders came from internal projects.

Table 2 Roles and Responsibilities of Stakeholders in Developing Behavioral Culture

No	Stakeholder	Roles and Responsibilities
1	Echelon I Structural Official Technical Work Unit	Responsible in the implementation of SMK3 Construction of Public Works for construction work within the Echelon I Working Area concerned
2	Echelon II Structural Officials Technical Work Unit	Responsible in the implementation of SMK3 Construction of Public Works for construction work within the Echelon II Working Unit concerned
		Evaluate the implementation of SMK3 Construction of Public Works and report it to the Echelon I Work Unit and make continuous improvement in environment of the Echelon II Working Unit concerned
3	Working Group of Procurement Services Unit (Pokja ULP)	Provide an explanation during aanwijzing and pour it in the aanwijzing news report about the potential and identification of the hazards of the construction work to be auctioned
4	Head of Disnaker Dati I / II	Formulation and implementation of technical policy of OHS Supervision Sector
		Supervision of work norms, health and safety norms (K3) and Social Security (Manslaughter) norms (BPJS)
5	Head of Health and Safety Section of Disnaker Dati I / II	Preparation of materials and work plan of labor inspectors in the field of Health and Safety (K3)
6	Occupational Health Services (PKK)	Periodical reports on the PKK
7	Safety Manager	Ensure SMK3 is effectively implemented throughout the organization
		Implement monitoring the implementation of SMK3 Construction in the field of Public Works PU work

In the culture of behavior, there are 7 stakeholders with 10 dominant roles that have a significant influence in building the culture. 3 stakeholders came from the PUPR ministries, 2 stakeholders came from the Local Government, and 2 stakeholders came from internal projects.

Table 3 Roles and Responsibilities of Stakeholders in Developing Norm and Management Culture

No	Stakeholders	Roles and Responsibility
1	National OSH Council (DK3N)	As a national auxiliary body to provide national advice and considerations whether requested or not, to the Government on the national OSH policy and to assist the development of K3 into OSH culture
2	Director General of Construction	Prepare Implementation Guidelines for Monitoring and Evaluation of SMK3 Implementation Implementation of Construction of Public Works
3	Echelon I Structural Official Technical Work Unit	Establish norms, standards, procedures and criteria according to the needs of SMK3 Construction of PU in the work unit environment, referring to the applicable technical provisions

4	Echelon II Structural Officials Technical Work Unit	Responsible in the implementation of SMK3 Construction of Public Works for construction work within the Echelon II Working Unit concerned
		Evaluate the implementation of SMK3 Construction of Public Works and report it to the Echelon I Work Unit and make continuous improvement in environment of the Echelon II Working Unit concerned
5	Head of Work Unit	Implement monitoring and evaluation on controlling the implementation of SMK3 Construction of PU in the package of construction work carried out by PPK
6	Committing Officer	Prepare and establish a Contract Document within which contains provisions on the application of SMK3 for Construction of Public Works
7	Working Group of Procurement Services Unit (Pokja ULP)	If HPS has not allocated the cost of SMK3 for PU Construction, the Working Group of ULP shall propose changes to KDP to be completed
8	Owner	Include OH & S requirements in the project tender or contract
9	Manpower	Wearing PPE in carrying out its work

In Norm and Management culture, there are 9 stakeholders with 10 dominant roles that have significant influence in building the culture. 1 stakeholder came from the Ministry of Manpower, 6 stakeholders came from the Ministry of PUPR, and 2 stakeholders came from internal projects.

Table 4 Roles and Responsibilities of Stakeholders in Developing Ideology Culture

No	Stakeholder	Roles and Responsibility
1	Safety Supervisor	Provide guidance and information to employers, managers and workers on all OHS requirements
2	Echelon I Structural Official Technical Work Unit	Responsible in the implementation of SMK3 Construction of Public Works for construction work within the Echelon I Working Area concerned
3	Echelon II Structural Official Technical Work Unit	Responsible in the implementation of SMK3 Construction of Public Works for construction work within the Echelon II Working Unit concerned
4	Direct Head of the Working Unit	Coordinate the implementation of SMK3 Construction of Public Works to the Head of Work Unit below
		Implement monitoring the implementation of SMK3 Construction of Public Works at work environment
5	Head of Work Unit	Allocate the cost of SMK3 Implementation of Construction of Public Works for Service User organizations in the Work Unit, among others to: 1. Provision of K3 facilities and infrastructure; 2. Development Program of SMK3 Construction of Public Works
6	Head of Labor Supervisory Division of Dati I / II	Supervision on work norms, Occupational Health and Safety (K3) norms and norms BPJS Employment
7	Construction Services Development Agency (LPJK)	Encourage and enhance the role of arbitration, mediation, and expert appraisers in the field of construction services
8	*Owner*	Include OH & S requirements in the project tender or contract
9	Safety Development Committee (P2K3)	As an institution established in the company to assist in carrying out and handling work safety and health efforts whose membership consists of employers and workers

In Ideology culture, there are 9 stakeholders with 10 dominant roles that have significant influence in building the culture. 1 stakeholder came from the Ministry of Manpower, 4 stakeholders came from the Ministry of Public Works, 1 stakeholder came from Local Government, 1 stakeholder came from industry association and 2 stakeholders came from internal project

5. CONCLUSIONS

1. DK3N has good mission vision to build K3 culture, because of limited power, vision of this mission can not be realized. DK3N is also a tripartite institution whose members consist of elements of government, employers and workers. With this membership formation, DK3N can serve as an interface institution in accommodating all relevant stakeholders. Increasing power DK3N will be a major influence in building a culture of safety

2. The Ministry of Manpower, the Ministry of PUPR, and the Regional Government as the representatives of the government must harmonize the integrated regulations so that there is no overlap of policies

3. Coordination and collaboration is required between the Ministry of Manpower, the Ministry of PUPR, Local Government in running the safety program together

4. Socialization of OSH program needs to be continuously improved to build safety culture, which means necessary coordination with the Ministry of Education

ACKNOLEDGEMENT

REFERENCES

[1]   Zhang, L., & Gao,Y. (2012). Safety Culture Model and Influencing Factors Analysis in Construction Enterprises of China. Research Journal of Applied Sciences, Engineering and Technology 4(18):3297-3312,2012.

[2]   Cooper, M.D.(2000). Towards a Model of Safety Culture. Safety Science (2000), Vol.36, pp.111-136.

[3]   Chinda, T. (2015). Examination of Thai Construction Safety Factors using the Analytic Hierarchy Process. International Journal of Smart Home, Vol.9, No.7 (2015), pp.285-292.

[4]   Lopaticka, V. (2013). Occupational Health and Safety Initiatives: An Exploration of the National OHS Strategy in New South Wales'Manufacturing Industry.

[5]   Buranatrevedh, S. (2015). Occupational Safety and Health Management among Five ASEAN Countries; Thailand, Indonesia, Malaysia, Philippines, and Singapore. J Med Assoc Thai 2015;98 (Suppl.1):S64-S69.

[6]   Taderera, H. (2012). Occupational Health and Safety Management Systems: Institutional and Regulatory Frameworks in Zimbabwe. International Journal of Human Resource Studies, Vol.2, No.4.

[7]   Kheni, N.A. & Braimah, C. (2014). Institutional and Regulatory Frameworks for Health and Safety Administration: Study of the Construction Industry of Ghana. International Refereed Journal of Engineering and Science (IRJES), Volume 3, Issue 2 (January 2014), PP.24-34.

[8] Chan, E. (2012). A Safety Culture in Construction Business. Journal of Research in International Business and Management, Vol.2(13) pp.335-350, December 2012.

[9] Kozuch, B.,Sienkiewicz, K. & Jurek, M. (2016). Factors of Effective Inter-Organizational Collaboration: A Framework for Public Management. Transylvanian Review of Administrative sciences, No.47 E/2016 pp.97-115.

[10] Umeokafor, N.,Umeadi, B.& Jones, K. (2014). Compliance with Occupational Safety and Health Regulations: A Review of Nigeria's Construction Industry. Proceedings of the 3rd International Conference on Infrastructure Development in Africa – Abeokuta, Nigeria, 17th-19th March, 2014.

[11] Kamar, I.F.M & Ahmad, A.C.(2016). Aconceptual Framework of Safety and Health in Construction Management. MATEC Web of Conferences 66, 00107(2016).

[12] Frazier, C.B. (2011). A Hierarchical Factor Analysis of a Safety Culture Survey.

[13] Nielsen, K.J. (2014). Improving Safety Culture through the Health and Safety Organization: A Case Study. Journal of Safety research 48 (2014) 7-17.

[14] Biggs, Herbert C., Dingsdag, Donald P., Sheahan, Vaughn L. and Stenson,Nicholas J. (2005). The Role of Collaboration in Defining and Maintaining a Safety Culture:Australian Perspectives in the Construction Sector. Association of Researchers in Construction Management 21st Annual Conference, September 2005, London.

[15] Ismail, F.,Hashim, A.E., Ismail, R., Madjid, M.Z.A. (2009). The Operationalisation of Safety Culture for the Malaysian Construction Organization. International Journal of Business and Management, Vol.4, No.9, September 2009.

[16] Freeman, R. (1984). Strategic management: A stakeholder approach, Boston MA: Pitman

[17] Yang, J.,Shen, Q.S., Ho, M., Drew, D.S., & Xue, X. (2011) Stakeholder management in construction: A empirical study to address research gaps in previous studies, International Journal of Project Management, 29, 900-910.

[18] Project Management Institute. (2013). A Guide to The Project Management Body of Knowledge Fifth Edition, Project Management Institute.

[19] Biswaj it Das, Surya Narayan Mishra and Bhubaneswari Bisoyi, Green Technology for Attaining Environmental Safety and Sustainable Development, International Journal of Mechanical Engineering and Technology 9(3), 2018, pp. 1087 – 1094.

[20] Aishwarya Jaju, Jikku Susan Kurian and P. Ravikanth, Health, Safety & Welfare Measures for Employees at Hindustan Coca - Cola Pvt. Ltd: An Empirical Study, International Journal of Mechanical Engineering and Technology 9(2), 2018. pp. 698 – 6709.

[21] Asha Raymond and Alappat Ramachandran, Food Safety Management Systems In Indian Seafood Export Industry- The Case of Kerala, International Journal of Management, 8(2), 2017, pp. 199–208.

[22] Mr.S. Pradeep Saravanan, Improving Safety Performance in Construction Industry, International Journal of Civil Engineering and Technology, 8(8), 2017, pp. 1515–1520.