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Study and overview of the occupational health and safety management in the construction industry

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Abstract. The Occupational Health and Safety Management System is a part of the company's risk management system for the creation of a safe, efficient and productive workplace. Construction Project in addition to paying attention to the timeliness, quality, and cost, also need to attention safety and health work. The regulation used as a reference for the implementation of OSH scope of the ministry of PUPR is No.05/ PRT/M/2014. This research aims to analyze the influence of the policy of PUPR Regulation No.05/ PRT/M/2014 on the improvement of OHS Management System performance in the construction project, and to formulate the improvement strategy that needs to be done in OHS Management System policy setting in the construction project. Data processing in this research is used smartPLS 2.0 program and Statistical Product and Service Solution version 22. Data analysis technique uses validity, reliability, normality, regression and descriptive analysis. The result of the regression analysis shows that every improvement of the policy variable will be followed by the improvement of OHS performance in the construction project. From the result of descriptive analysis, it is found that dominant elements have an effect and improvement strategy that can be done, that is the difference between OHS system and Safety Plan, the regulation concerning the potential of OHS hazard, and the importance of firmness to eliminate safety Plan document. The results of this study can be used by the government related to the policy improvement strategy so as to facilitate the related parties in implementing the OHS Management System in Construction Project.

1. Introduction

Indonesia is one of the developing countries where significant development occurred in the construction sector. The construction project in addition to paying attention to the timeliness, quality and cost, also needs to keep focusing on the safety and health of the project. Occupational Safety and Health (K3) is one of the basic rights of workers who are components of human rights. Occupational Safety and Health aim to protect workers for their safety in doing work. The Occupational Health and Safety Management System, hereinafter abbreviated as SMK3, is part of the company's management system to control risks related to working activities to create a safe, efficient and productive workplace.

The regulation used as a reference for the implementation of Occupational Health and Safety (K3) within the Ministry of PUPR is the Ministerial Regulation number 5 of 2014 concerning the Occupational Health and Safety Management System (SMK3). The Social Security Organizing Agency



(BPJS) Manpower records that the number of workplace accidents in Indonesia tends to increase every year. The phenomenon of high occupational accidents is a direct impact of poor work safety performance in the work environment. Work safety performance is strongly influenced by the implementation of workplace safety standards and procedures in the work environment.

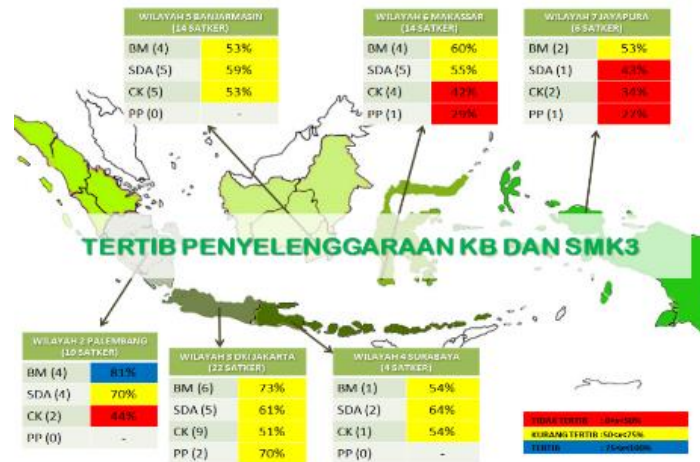


Figure 1. Monitoring and evaluation results of SMK3.

The results of the monitoring and evaluation of the implementation of SMK3 in 2016 in the work environment of the Ministry of Public Works and Public Housing shows that the application of OSH regulations and standards in construction projects is still very far from the ideal standard. Implementation of PU Ministerial Regulation No. 05 / PRT / M / 2014 is still very lacking in its application. It is still very necessary an effective strategy in encouraging the construction industry businessmen to improve the OHS aspect in the project environment, both from the Service Provider and from Service Users (2016 sustainable construction assistance). The purpose of this study is to analyze the level of influence of policy No. PU PU. 05 / PRT / M / 2014 on improving the performance of the OHS Management System in construction projects and formulating improvement strategies that need to be carried out in the K3 Management System policy settings in construction projects.

2. Methodology of research

The research method used in this research is survey research method. According to Kerlinger 1996 survey research is research conducted on large and small populations, but the data studied is data from samples taken from the population, so that related events, distribution, and relationships between sociological and psychological variables are found.

The total population in this study were 73 people, namely from the Nipah Mall construction project 12 people, the Makassar New Port development project (Phase 1) 14 people, the Tolo 16 people PLTB construction project, 20 Karalloe Dam construction projects, and the Mamminasata Bypass 11 Construction Project person. From the above population, samples were taken based on Slovin's opinion, namely:

$$\begin{aligned}
 n &= N / (1 + N.e^2) \\
 &= 73 / (1 + 73.(0,10^2)) \\
 &= 42.1 \text{ (rounded as 42)}
 \end{aligned}$$

The variable X in this study is sourced from the Minister of Public Works Regulation 05 / PRT / M / 2014 concerning SMK3 which consists of 4 stages namely Pre-Construction Stage, Selection Phase of Goods and Services Providers, Construction Implementation Phase, and Submission Phase of Final Work. Variable Indicator X Likert Scale Likert Scale is a type of scale used to measure research variables such as attitudes, opinions, and perceptions of a person or group of people (Drs. Riduwan, M.B.A,

Methods and Techniques for Composing Thesis). The level of influence of the policy based on the Likert scale consists of 5 levels, namely:

Table 1. Scale of policy influence on the implementation of SMK3.

1	2	3	4	5
Very Low	Low	Medium	High	Very high

While the dependent variable (Y) is given a scale of how much K3 is applied in accordance with Permen Number 5 of 2014 concerning SMK3.

Table 2. Variable score Y.

1	2	3	4
Very Low	Low	High	Very high
$Y \leq 5$	$5 < Y < 10$	$11 < Y < 20$	$Y \geq 21$

The instrument analysis used in this study was the validity, reliability, normality test using SPSS version 22 software, while the research variable was tested with regression analysis using Smart PLS 2.0, F test (simultaneous test) using SPSS version 22 and descriptive analysis of mean and ranking.

3. Analysis and discussion

3.1 Validity test results

In the validity test research is used to determine the validity of the data by comparing the calculated r -value with r table, with the provisions of $r_x > r$ table, the test results can be seen in the following table:

Table 3. Validity test.

Variable	Item	r_x	r_{table}	Remark
Pre-construction stage	X1.1	0.606	0.304	Valid
	X1.2	0.473	0.304	Valid
	X1.3	0.501	0.304	Valid
	X1.4	0.693	0.304	Valid
	X1.5	0.587	0.304	Valid
Selection of providers of goods and services stage	X2.1	0.654	0.304	Valid
	X2.2	0.662	0.304	Valid
	X2.3	0.623	0.304	Valid
	X2.4	0.533	0.304	Valid
	X2.5	0.505	0.304	Valid
	X2.6	0.482	0.304	Valid
	X2.7	0.591	0.304	Valid
	X2.8	0.444	0.304	Valid
	X2.9	0.355	0.304	Valid
	X2.10	0.146	0.304	Not valid
	X2.11	0.532	0.304	Valid
Construction implementation stage	X3.1	0.314	0.304	Valid
	X3.2	0.565	0.304	Valid
	X3.3	0.142	0.304	Not valid
	X3.4	0.508	0.304	Valid
	X3.5	0.304	0.304	Not valid
	X3.6	0.203	0.304	Not valid
	X3.7	0.340	0.304	Valid
Final submission stage of work	X4.1	0.407	0.304	Valid

From the test, it is known that 4 instruments are declared invalid. There is invalidity of the data above due to the different conditions of each project. The variety of respondents' answers from the 4 instruments above causes the four instruments to be statistically invalid. Instruments that are declared invalid can not be used for further analysis.

3.2 Reliability test results

Reliability Test is used to determine the nature of the measuring instrument used, in the sense of whether the measuring instrument is accurate, stable, and consistent. The instrument used in this study is said to be reliable if it has Cronbach's alpha of more than 0.6.

Tabel 4. Reliability statistics.

Reliability Statistics	
Cronbach's	N of items
Alpha	
0.737	25

Based on table 4. it is shown that the Alpha Cronbach value is more significant than 0.6 so that it can be said that the reliability of each instrument's questionnaire is reliable or reliable

3.3 Repair strategy analysis

The results of the mean and ranking analysis were obtained by the lowest instrument while the improvement strategy was obtained in accordance with the opinions of the project respondents from the 4 levels of the research object, the lowest instrument and the following improvement strategies:

1. Detailed Engineering Design (DED) is required to identify and analyze K3 Risk Levels from activities/projects that will be carried out, in accordance with the K3 Construction Risk Determination Procedure.
2. Detailed Engineering Design (DED) is required to identify hazards, assess K3 Risks and control them in determining the criteria for material design and selection, construction implementation, and Operation and Maintenance.

The Budget Plan (RAB) itself is a calculation of the overall price of the volume of each work unit. The RAB is made based on images which are then made a Bill of Quantity as well as specifications and prices. The RAB will be reviewed later, the calculation will be corrected, updated according to market prices so that it can be a Self Estimated Price (HPS) while the RKS includes requirements for quality and quantity of material, material dimensions, material installation procedures and other requirements that must be fulfilled by service providers. This RKS must be fulfilled by the service provider so that it can be included in the Procurement Document Standard (SDP).

Arrangement of instrument items 2 and 3, referring to the preparation of DED, is obliged to identify and analyze the K3 Risk Level of the activities / projects to be carried out, in accordance with the Procedures for Establishing K3 Risk Levels of Construction and identify hazards of assessing K3 Risk and its control in determining the criteria for designing and selecting materials. , construction, and operation and maintenance.

In essence, there is no explanation of the difference between the OHS control listed in the DED and the RK3K. Also, K3 identification has been applied in RK3K. If it is indeed regulated in the DED, the specifications in the settings are included, for example, related to the design criteria. The instrument also regulates the identification, analysis and control of OHS risks which should be included in RK3K or Pre-RK3K. Regarding the potential hazards of K3, if it is stated, the regulation regarding the potential hazard of K3 must be determined, and the cost of K3 in the Estimated Price is determined.

3. If based on the evaluation results it is known that the RK3K offer does not meet the K3 technical evaluation criteria, the bid can be declared invalid.

RK3K offer is a document that contains the Work Safety and Health Plan for Contracts that are made/compiled by the Service Provider as an attachment to the offer during the auction process. Seeing the conditions that occur in the Field, the auction process must pay attention to SMK3, but in fact, there is no firmness from the ULP Working Group in aborting. The decision to abort by only seeing K3 conditions is considered too rushed. Many parties become service providers who do not apply what is stated in the main contract related to K3. If indeed you have to do an abortion, you need a strict arrangement or firm attitude from the Procurement Service Unit and working group.

4. Conclusion

From the results of the analysis and discussion, the following conclusions can be drawn:

1. In accordance with the purpose of study 1, the results of regression analysis using SmartPLS 2.0 software shows that each increase of the occupational health and safety management system (SMK3) variable is: Pre-Construction Stage (X1), Selection Phase of Goods / Services Provider (X2), Stage Construction Implementation (X3), as well as the Submission Phase of the Final Work Results (X4) will be followed by the Improvement of the K3 Management System in the Construction Project.
2. The F Test Results of all valid instruments with 4 variables consisting of Pre-Construction Phase, Selection Phase of Goods / Services Providers, Construction Implementation Phase and Final Results Submission Phase sourced from Permen No. 5 of 2014 jointly influence the performance of K3 Management System in the Construction Project.
3. The results of Regression Analysis and F Tests prove that Permen 5 of 2014 greatly affects the increase of SMK3 in Construction projects. Every variable increase from candy number 5 in 2014 will be followed by an increase in the performance of SMK3 in the Construction Project.
4. For the purpose of research 2, based on the results of Descriptive Analysis used to find out one or more dominant instruments influencing, from 21 valid instruments, 3 dominant instruments had an effect on improving the performance of SMK3 in construction projects, namely:
 - a. For jobs with high hazard potential, it is mandatory to recruit a Construction K3 Expert and a company SMK3 certificate can be required.
 - b. The Service Provider that has been designated as a winner, must complete the RK3K with the planned implementation of K3 Construction for all stages of work
 - c. The Service Provider is obliged to carry out improvements and improve performance in accordance with the results of the quarterly RK3K performance evaluation, to ensure the suitability and effectiveness of the application of RK3K.
5. In accordance with the purpose of research 3, the strategy to improve policy settings is carried out on the lowest or not dominant instruments affecting the performance of SMK3 obtained from the descriptive analysis. The instrument is as follows:
 - a. Compilation of Detailed Engineering Design (DED) must identify and analyze K3 Risk Levels from activities/projects to be implemented. Improvement strategies that can be done:
 - There needs to be an arrangement that explains the different policies of SMK3 in DED with RK3K.
 - It is necessary to state the rules for the establishment of the K3 Construction Risk Level.
 - a. Compilation of Detailed Engineering Design (DED) is obligatory to identify hazards, assess K3 Risks and control them in determining criteria for material design and selection, construction implementation, and Operation and Maintenance.
 - It is necessary to include specifications in settings related to design such as design criteria.
 - Regulations concerning potential hazards of occupational safety and health and regulation of K3 costing in Self Estimated Prices.
 - b. If based on the evaluation results, it is known that the RK3K Offer does not meet the K3 technical evaluation criteria, then the bid can be declared null. The improvement strategy can be done:
 - Need regulation and firmness of the Procurement Service Unit and working group in aborting the RK3K Offer.

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