

STUDY OF THE IMPLEMENTATION OF SAFETY MANAGEMENT SYSTEM IN THE CONSTRUCTION OF HIGH-RISE BUILDINGS IN KARANGANYAR REGENCY

(Case Study : PP Miftahul Ulum flats)

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Abstract

This research focused on SMKK for the construction of high-rise buildings in Karanganyar Regency. Although the government has established regulations through Law No. 10 of 2021, concerning the Construction Safety Management System (SMKK), its implementation in the field is still faced with a number of challenges. Safety is not only emphasized to protect the workers, but also to ensure the smooth running of construction projects on schedule with minimal risk. Therefore, the purpose of this study is to determine the implementation of SMKK control, SMKK supervision and identify the most influential factors in the implementation of SMKK in high-rise building projects in Karanganyar Regency, especially in the Construction of PP Flats. Miftahul Ulum.

This research involved respondents who were contractors, supervisory consultants, and project owners from the Housing Provision Task Force of the Ministry of PUPR Central Java. Analysis of questionnaire data was carried out with statistical tests, including data validity tests using *spearman rank* correlation and reliability tests using *Alpha Cronbach*. Then tabulated the questionnaire data using the Relative Importance Index (RII) to determine the factors that most influence the implementation of the Construction Safety Management System in the development of the apartment project. The results of this study show that the implementation and supervision of SMKK on the project is satisfactory. And there are factors that have an interpretation of the RII value that has an effect to be very influential in the potential causes of work accidents of 0.92, factors in the implementation of work accident control of 0.90 and factors in the supervision of work accident control which have an influential value of 0.89. One of the strategies provided is to increase documentation of the implementation of SMKK and the implementation of education and training programs related to SMKK to improve the implementation of occupational safety and health management systems in housing development projects in Central Java Province.

Keywords : RII, SMKK, and SMKK control improvement strategy

1. INTRODUCTION

The construction of PP Miftahul Ulum Flats in Karanganyar Regency marked a significant increase in the construction of high-rise buildings, however, new challenges emerged related to work accident risk management and safety for workers and building occupants. Awareness of the

importance of occupational safety and health not only provides a sense of security, but also improves worker morale and performance [1,2]. Various types of construction work involving high risks, such as structural work and electrical wiring, became an integral part of the building construction process[1,3], which became increasingly dynamic with increasing safety risks and high accident rates[4,5]. Failure to understand potential risks can result in non-achievement of project implementation targets, including time, quality, and costs [6,7,8]. For example, difficulties in the availability of materials and transportation to the site can hinder the process of project implementation, as well as cause delays in work. In addition, late delivery of materials from suppliers can also be a significant risk factor. Damage to the project's machinery and equipment parts can also slow down the overall progress of the project[7]. Therefore, the implementation of SMK (Construction Safety Management System) becomes very important as an integral part of the management system to ensure safety in the construction process [9,10,11]. Although the government has issued regulations and guidelines related to SMK[12] such as Regulation Number 10 of 2021, challenges in the effectiveness of implementation in the field still exist, including low awareness, lack of training, and non-compliance with regulations[13].

Flats are multi-storey building structures consisting of various compartments designed for specific functions, both horizontally and vertically[14]. Case study PP Miftahul Ulum flats are 3-storey barrack-rembunai type flats that adopt the *E-Purchasing* procurement system, showing that the procurement process is carried out online by utilizing *E-catalogs*. There are two relevant procurement systems for the construction of flats, namely the tender system and the *E-Purchasing system*. Electronic procurement of government goods/services is carried out through *E-Tendering* or *E-Purchasing*[15]. This study aims to investigate the implementation of SMK, supervision, and factors that influence its implementation, especially in the aspect of K3 (Occupational Safety and Health), in the hope of understanding the role of SMK in construction projects and providing guidance for contractors in identifying, analyzing, and controlling risks in subsequent construction projects.

2. METHOD

Figure 1. Shows a research flow chart / Flowchart where this study illustrates a flow consisting of five sequential stages. Starting with the implementation of preliminary studies, the research

continued with primary data collection through the distribution of questionnaires as a tool to collect responses and written statements from participants. In addition, the study also includes direct observation of the project under study, as well as secondary data collection from related literature. After that, the collected data is analyzed using quantitative methods, including tests of validity, reliability of variables, and calculation of the weight of the Relative Importance Index (IKR) on each variable. The results of this analysis are then discussed further to develop a strategy in the form of recommendations for research findings. Finally, the study is concluded and given suggestions for further research.

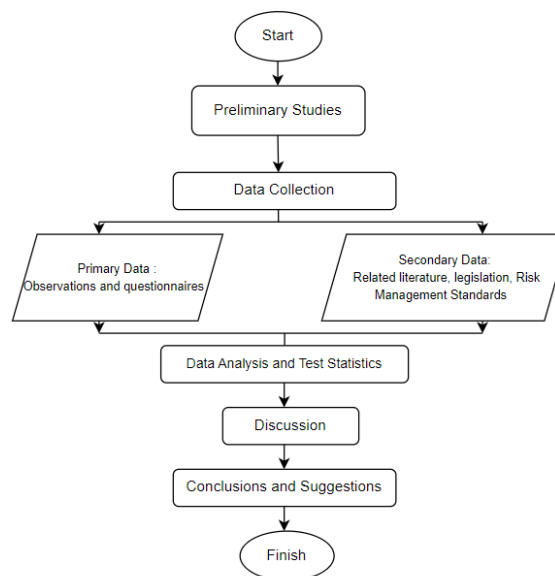


Figure 1. Research Flowchart / Flowchart

3. RESULTS AND DISCUSSION

3.1 Observations of SMKK Implementation

In Table 1, it is clear how the plan and efforts to implement the entire K3 program have been prepared and implemented by the service provider. The compilation table provides knowledge about the extent of the contractor's commitment and concern in realizing construction safety based on the K3 program plan.

Table 1. Compilation of K3 Program Targets and Implementation in the Field

No.	K3 Goals & Programs	Implementation in the Field	
		Contractor Commitment	Contractor Concern
1	Wearing PPE (helmet, safety shoes, gloves, mask, and work	Meet PPE requirements according to K3 standards and ensure workers use it	PPE Procurement

	goggles)		
2	Understand traffic rules and install safety signs at the project site and around the project	- All employees get instructions on safety and worn commemorative rambu. - Warning signs are installed in the project area and surrounding areas according to potential hazards that may arise.	- Socialization and promotion of construction safety - Procurement of infrastructure and safety signs
3	Follow machine operation SOPs and ensure operator competence Follow machine operation SOPs and ensure operator competence	- Implement SOPs for every construction activity - Using a certified and competent operator workforce - Provide welfare facilities, security, and provide first aid - Using equipment and technology in accordance with safety standards, and using quality materials according to quality standards.	- Socialization and promotion of construction safety - Employment insurance fulfilled - Socialization and promotion of construction safety - Employment insurance fulfilled
4			Conduct regular K3 evaluations and consultations

The implementation of SMKK in the construction project of PP Miftahul Ulum Flats has proven to be good and appropriate, with a number of advantages such as reducing the incidence of work accidents, reducing accident-related expenses, and improving worker safety perceptions. In addition, the implementation of SMKK supervision on the PP Miftahul Ulum Flats construction project went well and effectively, successfully minimizing the potential for work accidents and achieving the expected level of efficiency.

3.2 Identification of Dominant Factors

3.2.1 Respondent Profile

Figure 2 displays the profiles of respondents involved in the study. Out of a total of 40 respondents, 4 of them did not qualify based on education level and length of time worked. Thus, only 36 respondents were eligible for further analysis.

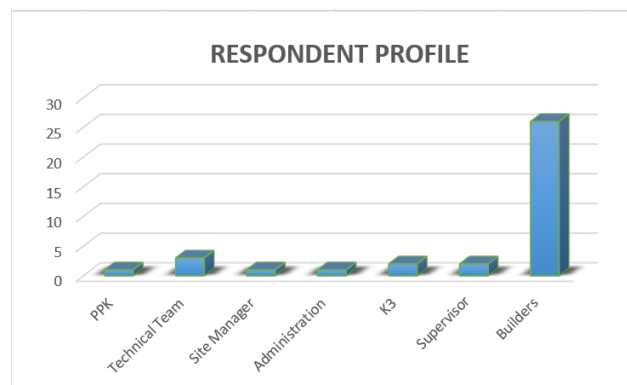


Figure 2. Respondent Profile

3.2.2 Data Reliability and Validity Test

The results of the recapitulation of data reliability tests on questionnaires on each research variable showed that the variables were categorized as reliable because they showed *Cronbach's*

Alpha gave a value greater than 0.6. Meanwhile, based on the results of processing validity test data, the questionnaire showed that the Sig (2-Tailed) value for all research variables was less than the specified Sig (2-Tailed) value, which was 5% (0.05). Thus, it can be concluded that the questionnaire data are valid.

3.2.3 RII Analysis

Through analysis and follow-up of these three tables, safety and prevention of accidents in the workplace can be significantly improved due to the identification of the implementation of existing risk control strategies at the construction project site. The elements examined help in finding the factors that trigger accidents in the work area, providing a concrete picture of the measures that have been taken to reduce the risk of accidents in the work environment. In addition, it can also provide perspective on the monitoring system used to ensure that risk control strategies have been implemented effectively and safety standards are maintained.

The potential causes of work accidents in the PP Miftahul Ulum Flats Construction Project can be seen in Table 2. The level of implementation of work accident control that occurred in the PP Miftahul Ulum Flats Construction Project can be seen in Table 3. Table 4 which explains the analysis of the level of supervision of work accident control that occurred in the PP Miftahul Ulum Flats Construction Project.

Table 2. Potential Causes of Work Accidents

No.	Questionnaire Questions	$\bar{x}$	RII	Rank	Information
1	Knowledge of employees in the conduct of work equipment.	4,14	0,83	4	Influential
2	Not wearing PPE.	4,58	0,92	2	Very Influential
3	Unsanitary and dangerous workplace conditions.	4,03	0,81	8	Influential
4	The employee does not comply with the specified rules.	4,61	0,92	1	Very Influential
5	Unfit or under-maintenance condition of work equipment	4,19	0,84	3	Influential
6	Construction materials that do not meet quality standards.	4,06	0,81	7	Influential
7	Inadequate methods of carrying out work.	4,11	0,82	6	Influential
8	Lack of K3 rule signs at the project site.	4,14	0,83	5	Influential

Table 3. Implementation of Work Accident Control

No.	Questionnaire Questions	$\bar{x}$	RII	Rank	Information
1	Regular inspection of the use of PPE on workers.	4,19	0,84	6	Influential
2	Installation of safety and safety lines.	4,42	0,88	2	Influential
3	Tool inspection and regular maintenance.	4,25	0,85	5	Influential

4	Availability of working methods and operational programs.	4,25	0,85	4	Influential
5	Provide fire extinguishers.	3,97	0,79	8	Influential
6	Evacuation routes available for emergencies	4,50	0,90	1	Influential
7	Training/socialization on Occupational Safety and Health (K3).	4,11	0,82	7	Influential
8	Worker health check.	4,42	0,88	3	Influential

Table 4. Supervision of Work Accident Control

No.	Questionnaire Questions	$\bar{x}$	RII	Rank	Information
1	Storage, use and maintenance of work tools.	4,14	0,83	6	Influential
2	Personal protective equipment used by workers.	4,39	0,88	2	Influential
3	The state of health of the workers.	4,47	0,89	1	Influential
4	Supervision of occupational accident risks.	4,36	0,87	3	Influential
5	K3 signs in places that are categorized as dangerous.	4,31	0,86	4	Influential
6	Check the workplace and K3 completeness regularly.	4,28	0,86	5	Influential
7	Measurement of the accessibility of the implementation of the K3 program.	4,06	0,81	8	Influential
8	Evaluation of K3 program objectives.	4,11	0,82	7	Influential

3.3 Recommendations on Research Results

After observation of the implementation of SMKK by contractors and consultants, as well as analysis of the results of the questionnaire, recommendations can be prepared for more effective implementation of SMKK. The recommendations that can be given are as follows:

1. Improving documentation of SMKK implementation activities, considering the lack of documentation evidence can show weaknesses in indicators, especially those categorized as minor. This is in line with the provisions of the Regulation of the Minister of Public Works and Public Housing (PUPR) Number 10 of 2021 concerning the Implementation of Construction Safety Management Systems which manages recorded documentation.
2. Organizing education, training, and/or counseling programs related to the Construction Safety Management System (SMKK) to overcome negligence or lack of internal supervision.
3. Strengthening the SMKK inspection program and active safety patrols with the active involvement of Occupational Safety and Health (K3) experts in the field.
4. Routinely organizes activities such as *Safety Morning Talk* and *Toolbox Meeting* to increase awareness of workers, as well as providing K3 information facilities such as information boards,

installation of hazard signs, warning signs, as well as storage and handling of materials and machinery.

5. Hold regular safety meetings to evaluate the K3 program and explain construction safety policies to all project stakeholders.
6. Imposing sanctions in the form of fines for workers who violate the regulations on the use of Personal Protective Equipment (PPE). And apply awards or incentives as a form of appreciation if construction safety targets are achieved.

4. CONCLUSION

Research related to the SMK Implementation Study has been carried out, with several important points of research results that need to be emphasized, namely:

1. The implementation of SMK in the construction project of PP Miftahul Ulum Flats has been proven to be good with the potential for work accidents that can be minimized so as to reduce the incidence of work accidents, reduce expenses related to work accidents, and improve the perception of worker safety during the implementation of duties. Important steps in the implementation of SMK by contractors, such as socialization of construction safety, procurement of PPE, and evaluation of K3, have had a positive impact. CV. Multi Karya, as a service provider, shows commitment to Occupational Safety and Health by integrating SMK principles in all aspects of project implementation.
2. The implementation of SMK supervision in the construction project of PP Miftahul Ulum Flats has been good and effective with minimal potential for work accidents and completion of work ahead of contract schedule. Team of PT. Tri Patra Konsultan as a supervisor has conducted routine supervision, including a Safety Talk program every two weeks and PPE checks to ensure compliance with safety standards. Supervision also includes monitoring worker health and evaluation with service providers, demonstrating commitment to worker safety and health and improving the smooth running of construction projects.
3. In the construction of PP Miftahul Ulum Flats, the factor of workers who do not comply with regulations shows a significant impact on the potential for work accidents with a RII value of 0.92, which is included in the very influential category. In addition, the availability of

emergency evacuation routes and workers' health conditions also have a significant influence on the implementation of work accident control, with RII values reaching 0.90 and 0.89 respectively. Although some factors get a lower rating, as seen from the smaller RII value, all these aspects are still important to consider in an effort to prevent workplace accidents because occupational safety is holistic.

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