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Evaluation of the Implementation of the Construction Safety Management System (SMKK) in the Novotel Batam Hotel Development Project

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Abstract

This study aims to evaluate the implementation of the Construction Safety Management System (SMKK) and to analyze the factors hindering its implementation in the Novotel Hotel construction project in Batam. A quantitative research method was used, with data collected through questionnaires distributed to 55 respondents consisting of project managers, supervisors, and construction workers. Data analysis was conducted using validity and reliability tests with SPSS, as well as the Relative Importance Index (RII) method. The results indicate that all variables are valid and reliable, with Cronbach's Alpha values greater than 0.60. The implementation of SMKK is categorized as good, with a success rate of 79.22%, which falls into the "fairly good" category (silver flag certification). However, several obstacles were identified, including insufficient safety training, limited work facilities, low worker awareness, and unsafe environmental conditions. This study concludes that improvements in training, supervision, and safety facilities are necessary to enhance SMKK implementation and reduce the risk of construction accidents.

Keywords: SMKK, construction safety, RII, SPSS, Evaluation, Project

1. Introduction

A construction project is defined as a logical relationship between work items from start to finish, carried out with a number of resources and limited by implementation time [1]. Construction projects have 2 (two) types of projects, namely building construction projects and civil construction projects. Commonly constructed projects are building projects, both multi-storey and ordinary buildings [2]. Each project implementation involves workers who are generally not certified except for heavy equipment operators, heavy equipment that is at risk of work accidents, limited time and requires a lot of energy [3]. According to data from the Ministry of Manpower (Kemnaker) and BPJS Ketenagakerjaan, work accidents in Indonesia increased from 2023 to 2024,

with the number of cases in 2023 reaching 370,747 cases, then soaring to 462,241 cases in 2024. Due to the high number of work accident cases, it is necessary to implement occupational safety and health comprehensively from top management to the lowest level of workers as a guide for project implementation [4]. The construction process of the Novotel Batam hotel and the implementation of SMKK have been carried out, but work accidents still occur in several work areas, such as casting and welding areas. As construction work progresses, the weather in the area often experiences extreme weather and some workers experience illness due to bad weather. Based on this, this study aims to examine and analyze what factors are obstacles to the implementation of the construction safety management system (SMKK) in the Novotel Batam hotel construction project.

2. Research methodology

This study uses a quantitative approach to evaluate the implementation of the Construction Safety Management System (SMKK) and identify factors that hinder its implementation in construction projects. The quantitative approach was chosen because it can objectively measure the level of SMKK implementation based on numerical data obtained from respondents.

2.1. Construction Safety Management

Management is the process of collaboration between individuals and groups, as well as other resources, to achieve organizational goals. This process is defined as the functions and activities carried out by leaders and members or subordinates in working together within an organization. These functions and activities encourage human resources to work by utilizing other resources so that organizational goals are achieved. [5]

2.2. Work Accidents

A work accident is an incident that occurs in the workplace or is work-related. This accident can result in Occupational Diseases (PAK), injury, and even death. Meanwhile, [6] a work accident is defined as an accident that occurs in an employment relationship,

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including accidents that occur on the way from home to work or vice versa, as well as diseases caused by the work environment [7].

2.3. Factors Influencing the Implementation of the Construction Safety Management System (SMKK)

Several factors that influence the implementation of the Construction Safety Management System (SMKK), as follows:

a. Human factors, such as lack of training on K3, indifference to safety, and motivation of both internal and external workers can affect their compliance with safety procedures [8].
b. Environmental factors, such as uneven ground conditions, bad weather, such as prolonged rain and strong wind conditions [9].
c. Technological factors, such as limited provision of PPE that meets standards, hamper worker protection, and the use of heavy equipment and work tools that are not operationally suitable or not certified increases the risk of accidents [10].
d. Organizational factors, such as strong support and commitment from construction company leaders, are key pillars; without this commitment, safety initiatives tend to be ineffective [11].
e. Legal and regulatory factors, such as compliance with applicable occupational safety regulations and standards, as well as supervision by authorized parties in ensuring compliance with these regulations [12].

2.4. Data Types and Sources

The data used in this study consists of:

a. Primary Data
   Primary data was obtained directly through questionnaires distributed to parties involved in construction projects. The questionnaires were systematically compiled to gauge respondents' perceptions of SMKK implementation in the field [13].
b. Secondary Data
   Secondary data was obtained from various sources such as reference books, government regulations, and literature relevant to research on construction safety [14].

2. 5. Data Collection Techniques

Data collection is done through:

1. Questionnaire, to obtain quantitative data related to the implementation of SMKK
2. Field observation, to determine the actual conditions at the project location
3. Documentation, as supporting data for research

2. 6. Research Instruments

The research instrument is a questionnaire compiled based on several main variables, namely:

a Performance
b Occupational health
c Work safety
d Work facilities
e Work environment

Each variable is described in several indicators which are measured using a Likert scale.

2.7. Data Analysis Techniques

Data analysis was carried out with the help of SPSS software and other statistical methods with the following stages:

a Validity Test
  Validity testing is used to determine the extent to which a research instrument is able to measure the variables being studied. An instrument is considered valid if the correlation coefficient is greater than the table's r value [15].
b Reliability Test
  Reliability testing was conducted to determine the consistency of the research instrument. An instrument is considered reliable if *the Cronbach's Alpha value* is greater than 0.60 [16].
c *Relative Importance Index* (RII) Analysis
  The Relative Importance Index (RII) method is used to determine the level of importance of each factor influencing SMKK implementation. The RII value is obtained by weighting respondents' answers and then used to determine the ranking of the most dominant factors [17].
  Mathematically, the RII value is formulated as follows:
  $$RII = \sum W / (A \times N) \quad (1)$$
  Information:
  W = weight of respondent's answer
  A = maximum weight
  N = number of respondents

The results of the RII calculations are then used to identify the factors that have the most influence on the implementation of SMKK in construction projects [18].

3. Results and Discussion

3.1 Validity Test

The results of the validity test show that all statement items in the questionnaire have a correlation coefficient value (r count) greater than r table, so that all instruments are declared valid and suitable for use in research [19].

Table 1. Validity and Correction Test Results

No	Faktor	Variabel	r Tabel	r Hitung	Interpretasi
1	Performance	X1	0.266	0.667	VALID
		X2	0.266	0.619	VALID
		X3	0,266	0,627	VALID
		X4	0.266	0.531	VALID
		X5	0.266	0.627	VALID
		X6	0,266	0,428	VALID
2	Kesehatan Kerja	X7	0.266	0.607	VALID
		X8	0.266	0.615	VALID
		X9	0,266	0,639	VALID
		X10	0.266	0.626	VALID
		X11	0,266	0,674	VALID
3	Keselamatan Kerja	X12	0,266	0,44	VALID
		X13	0.266	0.733	VALID
		X14	0.266	0.614	VALID
		X15	0.266	0.607	VALID
		X16	0.266	0.604	VALID
		X17	0.266	0.71	VALID
4	Pekerjaan dan Vasilitas	X18	0.266	0.666	VALID
		X19	0.266	0.652	VALID
		X20	0.266	0.512	VALID
		X21	0.266	0.651	VALID
		X22	0.266	0.511	VALID
		X23	0,266	0,61	VALID
5	Lingkungan	X24	0.266	0.772	VALID
		X25	0.266	0.761	VALID
		X26	0.266	0.768	VALID
		X27	0.266	0.814	VALID

3.2 . Reliability Test

Reliability test results showed that the Cronbach's Alpha value for all variables was above 0.60, thus declaring the research instrument reliable. This indicates that the questionnaire has a good level of consistency in measuring the research variables [20].

Table 2. Reliability Test Results

No	Faktor	Cronbach's Alpha	Keterangan
1	Performance	0,614	Reliable
2	Kesehatan Kerja	0,611	Reliable
3	Keselamatan Kerja	0,662	Reliable
4	Pekerjaan dan Vasilitas	0,644	Reliable
5	Lingkungan	0,780	Reliable

3.3 . *Relative Importance Index* (RII) Analysis

Based on the results of questionnaire data processing using *the Relative Importance Index* (RII) method, the importance level of each factor influencing the implementation of the Construction Safety Management System (SMKK) was obtained. The RII value was used to determine the ranking of the dominant factors that hinder the implementation of the SMKK in the Novotel Batam Hotel construction project. The calculation results show that the factors with the highest RII values are as follows:

Table 3. Results of Implementation Improvement

No	Variable	Pernyataan	(RII)%)
1	X10	Saya sangat merasa lelah fisik setelah bekerja	$\frac{0+10+18+124+275}{5x55} x100\% = 78,909$
2	X16	Saya tidak sering diperintahkan untuk melakukan pekerjaan yang tidak aman	$\frac{0+6+6+140+75}{5x55} x100\% = 82,545$
3	X23	Peralatan kerja yang ada dilapangan masih banyak digunakan	$\frac{0+0+6+156+70}{5x55} x100\% = 84,364$
4	X3	Saya mampu memenuhi target pekerjaan saya	$\frac{0+0+9+144+80}{5x55} x100\% = 84,727$
5	X8	Disediakan pertolongan pertama pada kecelakaan (P3K) apabila terjadi kecelakaan kecil	$\frac{1++8+9+76+140}{5x55} x100\% = 85,091$
6	X11	Bahan pekerja layak dan seimbang dengan kemampuan	$\frac{0++4+9+116+105}{5x55} x100\% = 85,091$
7	X1	Saya mengetahui karakteristik peralatan yang digunakan dalam proyek	$\frac{0++0+15+120+100}{5x55} x100\% = 85,455$
8	X9	Saya mengetahui karakteristik peralatan yang digunakan dalam proyek	$\frac{0++0+15+120+100}{5x55} x100\% = 85,455$
9	X18	Bahan material disusun rapi	$\frac{0++0+3+128+110}{5x55} x100\% = 87,636$
10	X20	Adanya pengatur lalu lintas disekitar proyek	$\frac{0++0+6+120+115}{5x55} x100\% = 87,636$

3.4. Discussion

The research results indicate that the implementation of the Construction Safety Management System (SMKK) in the Novotel Batam Hotel construction project has been quite successful. This is demonstrated by the implementation rate of 79.22%, indicating that most occupational safety elements have been implemented in accordance with the standards stipulated in Minister of Public Works and Public Housing Regulation Number 10 of 2021.

Conclusion

It can be concluded that the results of the evaluation of the success of the implementation of the Construction Safety Management System (SMKK) on the Novotel Batam hotel development project reached a value of 79.22%. This is in accordance with category number 2 of the Minister of Manpower Regulation Number: 05/MEN/1996, namely where the achievement level of 60-84% is given a certificate and a silver flag. The factors causing the implementation of the Construction Safety Management System (SMKK) on the Novotel Batam hotel development project not to reach the level of perfection or 100% are due to several factors according to each variable, namely:

a. In terms of *performance,* there is a lack of ability to meet work targets.
b. Viewed from an occupational health perspective, there is a lack of energy so that after work the body becomes very tired and weak.
c. From an occupational safety perspective, workers are often ordered to do unsafe work.
d. In terms of work and facilities, there is some equipment in the field that is no longer used.
e. From an environmental perspective, sometimes we still find workplaces that are slippery, uneven, and oily.

Reference List

[1] Yuliana, D., Prasetyo, B., & Hidayat, R. (2023). Analysis of construction project management in Indonesia. *Infrastructure Journal* , 13(1), 15–24. https://scholar.google.com/scholar?q=Yuliana+2023+manajemen+proyek .

[2] Supriyatna, Y. (2011). *Building construction project management* . Alfabeta. https://scholar.google.com/scholar?q=Supriyatna+2011 .

[3] Habir, A., Purwanto, P., & Mardianti, N. (2022). Analysis of occupational accident risks in construction projects. *Civil Engineering Journal* , 11(2), 67–75. https://scholar.google.com/scholar?q=Habir+Purwanto+Mardianti+2022

[4] Mustafa, MZ, & Putra, ADM (2022). Implementation of occupational safety and health (K3) in construction projects in Indonesia. *Jurnal Teknik* , 14(1), 55–63. https://scholar.google.com/scholar?q=Mustafa+Putra+2022

[5] Hersey, P., & Blanchard, K. H. (2013). *Management of organizational behavior: Utilizing human resources* (10th ed.). PearsonEducation. https://scholar.google.com/scholar?q=Hersey+Blanchard+2013

[6] Government Regulation of the Republic of Indonesia Number 14 of 2021 concerning Amendments to Government Regulation Number 22 of 2020 concerning Implementing Regulations of the Construction Services Law. (2021). https://peraturan.bpk.go.id/Home/Details/161846

[7] Ervianto, W. I. (2005). *Construction project management* (Revised ed.). Andi Offset. https://scholar.google.com/scholar?q=Ervianto+2005+manajemen+proyek

[8] Soeharto, I. (1999). *Project management: From conceptual to operational*. Erlangga. https://scholar.google.com/scholar?q=Soeharto+1999+manajemen+proyek

[9] Project Management Institute. (2021). *A guide to the project management body of knowledge (PMBOK guide)* (7th ed.). Project Management Institute. https://scholar.google.com/scholar?q=PMBOK+Guide+7th+edition+2021

[10] Robbins, S. P., & Judge, T. A. (2017). *Organizational behavior* (17th ed.). Pearson Education. https://scholar.google.com/scholar?q=Robbins+Judge+2017+organizational+behavior

[11] Endroyo, B., & Surahman, A. (2020). The role of occupational safety and health (K3) management in preventing construction accidents. *Journal of Civil Engineering*, 15(2), 101–110. https://scholar.google.com/scholar?q=Endroyo+Surahman+2020+K3

[12] Law of the Republic of Indonesia Number 2 of 2017 concerning Construction Services. (2017). https://peraturan.bpk.go.id/Home/Details/37626

[13] Regulation of the Minister of Public Works and Public Housing Number 10 of 2021 concerning Guidelines for Construction Safety Management Systems (SMKK). (2021). https://peraturan.bpk.go.id/Home/Details/163071

[14] Husen, A. (2011). *Project management: Planning, scheduling, and control*. Andi Offset. https://scholar.google.com/scholar?q=Husen+2011+manajemen+proyek

[15] Pratama, A., & Wibowo, M. A. (2022). Analysis of factors affecting the implementation of the construction safety management system. *Infrastructure and Built Environment*, 9(1), 34–42. https://scholar.google.com/scholar?q=Pratama+Wibowo+2022

[16] Mangkunegara, A. P. (2017). *Corporate human resource management*. Remaja Rosdakarya. https://scholar.google.com/scholar?q=Mangkunegara+2017+SDM

[17] Proboyo, B. (1999). Causes of delays in building construction projects. *Civil Engineering Dimension*, 1(1), 1–10. https://scholar.google.com/scholar?q=Proboyo+1999+delay

[18] Ramadhan, R. (2021). Risk analysis in high-rise building construction projects in Jakarta. *Indonesian Journal of Construction Management*, 10(3), 45–55. https://scholar.google.com/scholar?q=Ramadhan+2021+risk+analysis

[19] Tarore, H., & Mandagi, R. J. (2006). *Project cost and time control system*. Jurnal Tekno Sipil. https://scholar.google.com/scholar?q=Tarore+Mandagi+2006

[20] Widyastuti, R., & Saputra, A. D. (2023). Implementation of K3 regulations on worker productivity in government construction projects. *Journal of Infrastructure Planning*, 12(1), 50–58. https://scholar.google.com/scholar?q=Widyastuti+Saputra+2023+K3