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Implementation of Occupational Safety and Health Management System According to PP NO. 50 of 2012 on the Karanganyar Bridge

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Abstract

Given the elevated rate of workplace accidents within the construction sector, this study examines the extent to which an Occupational Safety and Health Management System (SMK3) has been put into practice, referring to Indonesian Government Regulation No. 50 of 2012. In particular, the study measures the degree of SMK3 adoption at the Karanganyar Bridge construction project during the 2024 fiscal year, drawing on a mixed-method design in which numerical data were obtained through a questionnaire while descriptive data came from interviews and a review of relevant literature. Findings indicate that SMK3 adoption on the Karanganyar Bridge project falls under the 'good' category, reflected in a score of 80.5%. Notwithstanding this favorable rating, the system still calls for continued evaluation of its adoption level and refinement, given that none of the sub-indicators has yet reached a full 100%. Consequently, an ongoing assessment of compliance with occupational safety and health regulations is warranted to sustain consistent, incremental progress.

Keywords: SMK3 Implementation, Occupational Safety and Health, PP No. 50 of 2024, SPSS, Indonesia

INTRODUCTION

Among the segments of Indonesia's construction sector, road and bridge development stands out as one of the fastest-growing (Mayank et al., 2023). Bridge construction, in particular, plays a pivotal role in strengthening transportation networks, a matter of considerable relevance to Karanganyar Regency in Central Java. Construction work, however, carries an inherently elevated exposure to occupational hazards. Left unmanaged, such hazards can translate into substantial financial burdens once compensation obligations toward affected workers are factored in (Choriyah et al., 2020).

For this reason, putting an Occupational Safety and Health Management System (SMK3) in place becomes a necessity. Within Indonesia, SMK3 implementation is regulated under Government Regulation No. 50 of 2012, which sets out the framework and guidance for managing occupational safety and health in the workplace. Accordingly, this study seeks to assess how thoroughly SMK3 has been carried out on the Karanganyar Bridge construction project during the 2024 fiscal year, measured against the provisions of Government Regulation No. 50 of 2012, particularly Article

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LITERATURE REVIEW

The Occupational Safety and Health Management System (SMK3) offers a structured approach for curbing occupational hazards while lifting overall workplace safety performance. Its relevance is especially pronounced in construction work, given the complexity of activities involved and the correspondingly high potential for accidents. In the Indonesian context, SMK3 deployment is anchored in Government Regulation No. 50 of 2012, which lays out the requirements and procedures for establishing occupational safety and health management systems across sectors, construction among them.

Earlier research has likewise looked into how SMK3 is carried out on construction sites. Mayank (2023), in a study entitled "Analysis of the Implementation of Standard Operating Procedures in the Occupational Safety and Health Management System (SMK3) in the Boulevard II Bridge and Approach Construction Project," relied on questionnaire data that had cleared validity and reliability screening, then employed frequency-based statistics to determine the extent of SMK3 rollout.

Building on that earlier body of work, the present study turns its focus to SMK3 practice on the Karanganyar Bridge construction project, with particular attention paid to gauging how successfully it has been carried out against the backdrop of the applicable regulatory framework.

RESEARCH METHODOLOGY

This study rests on a combined quantitative and qualitative design: numerical figures were collected through questionnaires, while interviews and a literature review supplied the descriptive dimension. Its central purpose is to assess how the Occupational Safety and Health Management System (SMK3) has been carried out relative to Article 6 of Government Regulation No. 50 of 2012.

1. Population and Sample

The population under study encompasses every worker and staff member involved in the Karanganyar Regency bridge construction project. Given that surveying the entire group was not practical, a sampling approach was adopted instead.

Respondents were chosen through purposive sampling, a non-probability method in which the researcher selects participants against predetermined criteria. The criteria applied were: (1) at least ten years of experience in construction work; (2) a minimum of junior-high-school education; (3) affiliation with the contractor team handling the Karanganyar bridge project; and (4) willingness to participate.

2. Research Variables

The variables examined in this study draw on Government Regulation No. 50 of

2012, which sets out the requirements for SMK3 implementation. The independent variables (X) are as follows:

- X1: Human Resources
- X2: Infrastructure and Facilities

The dependent variable (Y) is the degree to which the Occupational Safety and Health Management System (SMK3) has been carried out.

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3. Questionnaire Design

Qualitative responses were converted into numerical data using a Likert scale spanning 1 to 5, capturing implementation levels ranging from “never implemented” to “fully implemented.”

4. Instrument Testing

a. ValidityTest

The validity test gauges how precisely the questionnaire captures what it is intended to measure. An item passes when its correlation coefficient (r-count) surpasses the r-table value at a 0.05 significance level.

b. ReliabilityTest

Instrument reliability was assessed via Cronbach's Alpha; a variable is deemed reliable once its Cronbach's Alpha surpasses 0.60.

5. Data Analysis Techniques

Several statistical tests were conducted using SPSS software:

a. **NormalityTest**

This test examines whether the data conform to a normal distribution; a Shapiro-Wilk significance value exceeding 0.05 signals normally distributed data.

b. **HeteroscedasticityTest**

This test checks for irregular variance among the residuals; a significance value above 0.05 indicates the absence of heteroscedasticity.

c. **MulticollinearityTest**

This test identifies correlation among the independent variables; multicollinearity is flagged when the Variance Inflation Factor (VIF) exceeds 10 or the tolerance value drops below 0.10.

d. **PartialTest(t-test)**

The t-test assesses the individual (partial) contribution of each independent variable to the dependent variable, with significance confirmed when the p-value is below 0.05.

e. **SimultaneousTest(F-test)**

The F-test, meanwhile, assesses the joint (simultaneous) contribution of the independent variables to the dependent variable.

f. **MultipleLinearRegressionAnalysis**

This analysis serves to identify the direction and magnitude of influence that the independent variables exert on the dependent variable.

g. **SMK3AchievementLevelAnalysis**

SMK3 implementation levels were gauged via percentage analysis, sorted into three categories:

- 0–59%: Low
- 60–84%: Good
- 85–100%: Satisfactory

RESEARCH RESULTS

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1. Data Collection

SMK3 implementation is governed under Government Regulation No. 50 of 2012, legislation aimed at preventing work-related illness and injury, reinforcing workplace safety and health protections, and cultivating a productive, comfortable, and secure working environment. Questionnaires structured around the indicators listed in Article 6 of this regulation were distributed to workers on the Karanganyar Bridge construction project.

2. Respondent Characteristics

Thirty respondents took part in this study, representing a mix of occupations, age groups, genders, educational backgrounds, and years of work experience. Detailed respondent attributes are presented in Table 4.

3. (Table 4 is still in your paper.)

Instrument Test Results

a. Validity Test

All three variables (X1, X2, and Y) proved valid, with r-count values surpassing the r-table threshold at the 0.05 significance level, confirming that the questionnaire items adequately represent the intended constructs.

b. Reliability Test

Reliability testing produced a Cronbach's Alpha of 0.991, comfortably above the 0.60 threshold, confirming the instrument's high reliability.

c. Normality Test

The Shapiro-Wilk test yielded a significance value of 0.200 (> 0.05), confirming that the data are normally distributed.

d. Multicollinearity Test

A tolerance value of 0.220 together with a VIF of 4.544 for both independent variables confirms the absence of multicollinearity in the regression model.

e. Heteroscedasticity Test

Significance values of 0.176 for X1 and 0.661 for X2, both above 0.05, confirm that heteroscedasticity is not present.

4. Multiple Linear Regression Analysis

Results of the multiple linear regression analysis are presented in Table 10.

Based on these findings, the regression equation reads as follows:

$$Y = 0.853 + 0.113X1 - 0.015X2$$

This formula shows that:

1. With the independent variables held constant, the baseline level of SMK3 implementation corresponds to the constant term of 0.853.
2. X1 (Human Resources) shows a positive association with SMK3 implementation, with a coefficient of 0.113.
3. X2 (Infrastructure and Facilities), conversely, exhibits only a slight negative association with SMK3 implementation, indicated by its coefficient of -0.015.

5. T-Test Results

The t-test results show that X1 has a substantial effect on SMK3 implementation, supported by a t-value of 5.630 and significance of 0.001 (< 0.05), while X2 shows no significant effect, with a t-value of -1.062 and significance of 0.298 (> 0.05).

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6. F-Test Results

The F-test yields a significance value of 0.001 (< 0.05) alongside an F-value of 50.580 (> 3.34), indicating that X1 and X2 jointly produce a significant combined effect on SMK3 implementation.

7. SMK3 Achievement Level

SMK3 implementation was evaluated at a percentage score of 80.5%, placing it in the "Good" category. This reflects a reasonably solid level of SMK3 implementation on the Karanganyar Bridge construction project, although further effort is still needed to reach higher compliance levels.

DISCUSSION

The findings show that human resources (X1) exert the strongest influence on SMK3 implementation, suggesting that occupational safety at construction sites depends heavily on worker skill, awareness, and experience. This is consistent with Government Regulation No. 50 of 2012, which emphasizes the central role of human factors in occupational safety management.

Infrastructure and facilities (X2), by contrast, show no meaningful influence on SMK3 execution. This implies that the mere presence of safety facilities matters less than how consistently they are applied and integrated into daily work routines; without adequate human resource involvement, facilities alone are insufficient.

The simultaneous test results confirm that both factors together exert a substantial influence on SMK3 implementation, showing that infrastructure support and human resources jointly contribute to improved occupational safety outcomes.

Furthermore, the 80.5% SMK3 achievement score, while classified as "good," indicates that full compliance has not yet been reached. Achieving optimal, fully regulation-compliant implementation will require improvements across several sub-indicators.

Collectively, these findings highlight that human factors play a dominant role in shaping SMK3 implementation on construction projects, whereas infrastructure alone cannot ensure optimal safety outcomes. Ongoing improvement in training, supervision, and safety culture therefore remains vital to strengthening SMK3 effectiveness on construction projects.

CONCLUSION

SMK3 implementation on the Karanganyar Bridge construction project achieved a score of 80.5%, a result classified as strong. This shows that while SMK3 has not yet reached its ideal level, it has been reasonably well integrated into the project. Despite these relatively solid outcomes, continued evaluation and refinement remain necessary, as certain SMK3 sub-indicators have yet to achieve full compliance. Strengthening SMK3 implementation in accordance with applicable regulations, particularly Government Regulation No. 50 of 2012, is therefore essential to achieving better occupational safety and health outcomes on construction projects.

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