

# Performance Evaluation of Supervisory Consultants on Road Reconstruction Projects in East Kalimantan, Indonesia

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**Abstract**— Road constructions in East Kalimantan were conducted in 2022 and was expected to produce good infrastructure following the plan. This cannot be separated from the role and performance of the supervisory consultant who provides expertise services to the project owner. This research aims to evaluate the performance of the supervising consultants on road construction projects in East Kalimantan, to determine the most dominant factor influencing the performance. This is important to construct strategies for performance improvement of the supervising consultants and the project itself. The data analysis method is factor analysis and multiple linear regression. Data were obtained with questionnaire distributed to 55 respondents from the contractor and project owner to the construction workers. Based on the results, the performance of the supervising consultant significantly affects the success of the road reconstruction project, on the element of work attendance in the training and briefing. This is demonstrated by the result of regression analysis;  $t$ -statistics 3.380 ( $>$   $t$ -table 1.679). Furthermore, the most dominant factor affecting the performance of the supervising consultant is the control of occupational health and safety during project execution. This is demonstrated by the coefficient value of 0.744. Therefore, the supervising consultant must attend intensive training (workshop) and conduct a meeting prior to the project execution in order to set the evaluation standard and discuss the occupational health and safety control in the road construction project.

**Keywords**— Supervising consultant, performance, road development, construction project.

## I. INTRODUCTION

Infrastructure development in East Kalimantan, Indonesia is the lifeblood of the economy, which is another sector. In addition, infrastructure in the field of corporate governance has a very important role in connecting cities, production areas with marketing areas and other growth centers. Infrastructure in the field of corporate governance is a very important infrastructure to expedite economic activity. The increasing development effort also demands an increase in the development of its supporting infrastructure in order to facilitate the mobility of the population and expedite the flow of goods traffic from one region to another. Improvement of facilities and infrastructure for the community needs to be supported by the construction of a road network in order to spur economic growth and open land routes for isolated areas, it is necessary to allocate funds for road infrastructure development. For this reason, the Provincial Government of East Kalimantan through the Public Works Service in the Highways sector carries out activities to handle road construction, the allocation of which funds are provided every fiscal year.

Road construction activities in East Kalimantan were conducted in 2021 are expected to produce construction that is in accordance with what was planned on time, with the right quality and right on cost, and all of this cannot be separated from the role and performance of the owner, contractor and supervisory consultant. The owner, in this case, is the budget user authority (KPA) and appoints a technical implementation officer for physical work (PPTK) who is authorized to represent the KPA to control the contractor's work PPTK physical work is assisted by a technical team of supervisory consultants appointed by the directors of the supervision section who operationally carry out daily tasks in supervising the work of

contractors and their existence is regulated in the supervision contract itself. However, in practice, many supervisory consultants have not carried out their role and performance with good supervision.

The evaluation of professionalism of the supervisory consultant cannot be carried out partially, but this process requires overall improvement. These improvement efforts must be based on the right vision, mission and strategy. Therefore monitoring the performance of the supervisory consultant is very important. The performance of the supervising consultant on provincial road construction activities in East Kalimantan is the management capability of supervising the implementation of activities, controlling the quality of work in terms of quality and quantity, controlling volume and costs, controlling time, coordinating the preparation of materials for implementation meetings, mastery/understanding of duties and obligations listed in the KAK, accuracy, speed and completeness in submitting reports, work attendance. The performance of the oversight management capabilities above was obtained based on evaluation meetings monitored by the core team consultants for consultants within the Public Works Highways Office in East Kalimantan province. "There is work that until the end of the 2021 fiscal year has not been completed and continues to be completed beyond the fiscal year," said Hadi, Monday (13/6/2022). From the inspection report (LHP) of the East Kalimantan Financial Audit Agency (BPK), it was found that there were 9 work packages that were not completed in 2021. In the BPK LHP, the East Kalimantan Provincial Government was encouraged to follow up with an action plan, so that project delays would not be repeated.

Project management is a process, business or activity of utilizing and using all the resources involved in a construction project by managers in an appropriate, efficient and effective

manner. (Purwantara, 2010). The success of a project requires planning. Careful coordination and supervision, because the project contains various activities. The project itself is defined as a complex system, which involves the coordination of a number of separate parts of the organization, in which there are schedules and requirements that must be carried out, within a predetermined implementation time. Therefore, the success of a project is very dependent on the leader as the project manager and also the work of the project team members. Thus, project success requires project management. Project management here is the activity of planning and organizing a project, in which there is an organizational structure consisting of managers as project leaders who control resources and supervise the work of their members, and members who coordinate with each other, work together hard to achieve the desired goals, in the time allotted to work on the project.

Previous studies have shown the importance of construction project management, particularly regarding consultant performance. Yunianto (2015) studied the performance factors of the supervising consultants that affected the timing and quality of work on road improvement projects in Probolinggo district. In his research, it was reported that the most dominant factor affecting not achieving the target time was understanding the technical specifications. While the dominant factor influencing the failure to achieve the quality target is the method of carrying out the work. Meanwhile, Amir (2017) examined the performance evaluation of supervisory consultants on road construction projects in the province of East Kalimantan, and reported that the most dominant factors influencing the performance of supervisory consultants were the ability to supervise project management and work attendance factors. Finally, Lyanawati (2022) analyzes the effect of contractor performance on the quality of road improvement projects in Probolinggo Regency. In his research, it was reported that the most dominant factor affecting the performance of contractors on the quality of road improvement projects in Probolinggo Regency was motivation.

Based on the problems, this research was conducted to analyze the factors that influence the performance of supervisory consultants on road construction projects in the province of East Kalimantan. It is necessary to identify the most dominant factors influencing the performance of the project supervisory consultant. Furthermore, this study seeks to determine the strategy that must be carried out to improve the performance of supervisory consultants on road construction projects. The results of this study can be useful as important recommendations for project owners; Ministry/Department of Public Works and Public Housing, as well as supervisory consultants related to project supervision. This evaluation can also bridge the interests of contractors and project owners to improve the quality of supervision.

## II. METHOD

This research is included in the type of descriptive studies, which is related to the identification of factors that influence the performance of supervisory consultants on road construction projects in the province of East Kalimantan; Balikpapan boundary road - Samboja Intersection, Semoi Sepaku - Petung

1 road, Semoi Sepaku - Petung 2 road, Semoi Sepaku - Petung 3 road, and Samboja - Muara Jawa Intersection roads. The research method used was a survey, with data collection instruments in the form of a 1-5 Likert scale questionnaire. The questionnaire has been confirmed to have passed the Validity and Reliability instrument tests. Primary data obtained directly by written interviews conducted to research respondents. The population includes contractor and owner (PU) teams. Sampling was determined using a proportionate stratified random sampling technique (Ridwan, 2010), and a sample of 55 respondents was obtained. These respondents were taken from people from the contractor and owner with details of 37 people from the contractor which included 5 general superintendents, 23 technical people and 9 field implementers, then from the project owner as many as 18 people, which included technical implementing officials 5 people for PPTK activities, 5 supervisor coordinators and 8 field supervisors.

The data analysis method applied in this study is factor analysis and multiple linear regression. Data analysis was performed using the SPSS program. The performance of the supervisory consultant is expressed as the dependent variable (Y), while the independent variable (X) consists of:

1. Capability of management oversight of project implementation ( $X_1$ )
2. Quality control of work in terms of quality and quantity ( $X_2$ )
3. Volume and cost control ( $X_3$ )
4. Time control ( $X_4$ )
5. coordination of the preparation of materials for the implementation meeting ( $X_5$ )
6. Mastery/understanding of the duties and obligations listed in the KAK ( $X_6$ )
7. accuracy, speed and completeness in submitting reports ( $X_7$ )
8. Control of K3 construction ( $X_8$ )

## III. RESULT AND DISCUSSION

### A. Principal Component Analysis

In principal component analysis, a collection of variables meets the qualifications or deserves to be declared as a factor if it has a high level of dependency. An indication of the level of this relationship is determined by the value of KMO (Keiser Meyer Olkin) and MSA (Measures Sampling Adequacy) (Sharma, 1996). The results of variable extraction and interpretation of loading yield the following findings:

1. The project implementation supervisory management capability variable ( $X_1$ ), is formed with manifest variables consisting of: the supervisory consultant does not check contract documents ( $X_{1.1}$ ), the supervisory consultant does not check technical specifications ( $X_{1.2}$ ), the supervisory consultant does not check plan drawing ( $X_{1.3}$ ), the supervising consultant does not check the work safety program ( $X_{1.4}$ ).
2. Work quality control in terms of quality and quantity ( $X_2$ ), formed with manifest variables consisting of: the supervisory consultant does not check the use of equipment in terms of quality and quantity ( $X_{2.1}$ ), the supervisory consultant does not check the quality testing equipment

according to needs field (X2.2), the supervisory consultant does not check the use of construction materials and in terms of quality and quantity (X2.3), the supervisory consultant does not check material testing at each stage of construction (X2.4), the supervisory consultant does not check the construction in terms of quality and quantity (X2.5), the supervisory consultant does not check the realization of the implementation (no retesting occurs due to non-compliance with the specifications) (X2.6), the supervisory consultant does not check the repair work that does not meet specifications (X2.7).

3. Volume and cost control variables (X3), formed with manifest variables consisting of: the supervisory consultant does not check the measurement and calculation of work volume for each payment item (X3.1), the supervisory consultant does not check the volume and cost calculations and processes inspection/approval of monthly certificates (MC) (X3.2), the supervisory consultant does not check the use of the project budget during the construction period (X3.3), the supervisory consultant does not check the work added or lacking in relation to construction costs (X3.4), the supervisory consultant does not inventory changes in the field (X3.5).
4. Time control variable (X4), formed with manifest variables consisting of: the supervising consultant does not hold regular field meetings (X4.1), the supervising consultant does not check construction implementation schedules (X4.2), the supervising consultant does not check rate of achievement of work volume (X4.3).
5. The coordination variable for the preparation of implementation meeting materials (X5), was formed with manifest variables consisting of: the supervisory consultant did not check the preparation of the minutes of work progress approval (X5.1), the supervisory consultant did not check the preparation of work maintenance minutes (X5.2), the supervisory consultant did not check the preparation of the minutes of work handover (X5.3), the supervisory consultant did not coordinate during construction (X5.4).
6. The variables of mastery/understanding of the tasks and obligations listed in the KAK (X6), are formed with

manifest variables consisting of: the supervising consultant does not check work preparation/field administration in the form of reports, drawings, schedules and others (X6.1), the supervising consultant did not check the shop drawings (X6.2), the supervising consultant did not direct the determination of the location of handling points (X6.3), the supervising consultant did not direct the determination of the type of construction according to the damage conditions (X6.4), the supervising consultant does not check together (mutual check) (X6.5), the supervising consultant does not check work procedures/rules during construction (X6.6).

7. The variables of accuracy, speed and completeness in submitting reports (X7), are formed with manifest variables consisting of: the supervising consultant did not check work procedures/rules during construction (X7.1), the supervising consultant did not check the suitability of the drawings with what has been done in the field (as built drawing) (X7.2), the supervisory consultant does not inventory a list of damage during the implementation period to be repaired during the maintenance period (X7.3), the supervisory consultant does not make a written warning to the contractor (X7.4).
8. Construction K3 control (X8), formed with manifest variables consisting of: The supervising consultant does not participate in the K3 supervision of construction at each stage of the work (X8.1), The supervising consultant does not control the K3 supervision of Construction for each job (X8.2).

### B. Regression Analysis

First, it is necessary to confirm that the data used for the regression analysis has previously passed the prerequisite test (classical assumptions); normality, multicollinearity, heteroscedasticity, and autocorrelation. Furthermore, regression analysis was carried out to determine the significance of the influence of the determinant variables on the performance of road construction project supervisory consultants. A summary of the regression analysis results is shown in Table 1 for the partial test and Table 2 for the simultaneous test.

TABLE I. Summary of partial test of regression analysis

Variable	$\beta$ Coefficient	t-statistics	p-value	Interpretation
Constant	0,386	0,467	0,643	
X1	0,107	0,797	0,429	Not significant
X2	-0,190	-0,867	0,390	Not significant
X3	0,038	0,151	0,881	Not significant
X4	0,059	0,351	0,727	Not significant
X5	-0,009	-0,087	0,931	Not significant
X6	0,104	0,508	0,614	Not significant
X7	0,023	0,179	0,859	Not significant
X8	0,744	3,380	0,001	Significant
$\alpha$	= 0,050			
R <sup>2</sup>	= 0,392			
R	= 0,626			
F-Statistics	= 3,174			
F-Table (0.05,8,46)	= 2,150			
p-value	= 0,002			
t-table ( 0,05, 46 )	= 1,679			

Regression equation:

$$Y = 0,386 + 0,107X1 - 0,190X2 + 0,038X3 + 0,059X4 - 0,009X5 + 0,104X6 + 0,023X7 + 0,744X8 + \epsilon$$

TABLE II. Summary of simultaneous test of regression analysis

Hypothesis	Values	Interpretation
Ho : $\beta_i = 0$ (Insignificant association)	$F_{statistics} = 3,174$	Significant
Ha : $\beta_i \neq 0$ (Significant association)	$p = 0,002$	
$\alpha = 0,05$	$F_{table} = 2,150$	

Table 1 shows that the majority of the independent variables have a significant value  $> \alpha 0.05$ . In other words, the independent variables generally have no significant effect on the performance of the supervising consultant in road construction projects. The only variable that has a significant effect on the partial test is the control of K3 construction (X8), which is indicated by a significance value of 0.001 ( $< \alpha 0.05$ ). Meanwhile, the ability to manage project implementation supervision (X1), work quality control in terms of quality and quantity (X2), volume and cost control (X3), time control (X4), coordination of material preparation for implementation meetings (X5), task mastery or understanding -duties and obligations listed in the KAK (X6), accuracy, speed and completeness in submitting reports (X7) have no significant effect. Furthermore, Table 1 also shows the value of the coefficient of determination (R<sup>2</sup>) of 0.392. That is, the influence of all independent variables on the performance of the road construction project supervising consultant is 39.2%. The most dominant independent variable can be seen from the value of the  $\beta$  coefficient. Table 1 shows that the independent variable with the highest  $\beta$  coefficient value is construction K3 control (X8), namely with an acquisition value of 0.744.

Table 2 shows the results of the regression analysis based on the simultaneous test. Simultaneous testing was carried out to show whether all the variables used in the regression model had a significant effect on the performance of the supervising consultant on a road construction project. All of these variables were tested simultaneously using the F test. The F<sub>table</sub> value in this study was determined at 2.150. That is, the F<sub>count</sub> value is greater than the F<sub>table</sub> value ( $3.174 > 2.150$ ). In addition, the significance value is also greater than the significant level ( $0.002 < \alpha 0.05$ ). Thus, it can be confirmed that all independent variables have a significant effect on the performance of the road construction project supervising consultant in East Kalimantan.

### C. Discussion

In general, the factor analysis and regression in this study confirm that control of construction OSH is a variable that greatly determines the performance of road construction project supervising consultants in East Kalimantan. The Construction OHS Control Variable is the variable that has the second highest  $\beta$  coefficient value, which means that in this study the Construction OHS Control variable affects the performance of the supervising consultant on the performance of the supervising consultant on road construction projects. a positive  $\beta$  coefficient value indicates that the more often K3 Construction Control is carried out, it can be said that it is likely that the performance of the road construction project supervisory consultant will be better and the project can be

completed according to better results. In order to find out which indicators have the most influence on the performance of development project supervisory consultants, the communality value of the indicators can be explained as follows:

TABLE III. Communal values of OHS control sub-variables

Notation	Variable Name	Value
X8.1	The supervising consultant does not follow the K3 construction supervision at each stage	0,718
X8.2	The supervising consultant does not control the supervision of K3 Construction for each job	0,718

The table above shows that the most dominant indicator of the K3 construction control variable in influencing the performance of the road construction project supervisory consultant is that the supervisory consultant does not participate in the K3 supervision of construction at each stage and the supervisory consultant does not control the K3 supervision of the construction of each work. Thus, the strategy used to overcome this is to emphasize that the supervising consultant must attend intensive training (workshop) and hold a meeting at the beginning of the activity regarding the evaluation and discussion of K3 Construction Control and the supervising consultant in each work item makes a check list/standard format of K3 construction to control the stages work with the K3 construction system as well as a briefing on the methodology and supervisory work program on Construction K3 control in the field. Thus, the implications of research related to the necessity of road construction project supervisory consultants can be detailed as follows:

1. Employ workers in the field according to the proposed list
2. Understand work procedures properly and correctly
3. Have a good work result reporting system
4. Coordinate intensively with public works and contractors regarding field work
5. Understand and read and examine all documents related to supervision
6. Directing contractors regarding adjustments to field work with technical specifications
7. Control and understand K3 control of construction to avoid work accidents.

### IV. CONCLUSION

This study proves that control of construction OSH is a variable that greatly determines the performance of consultants supervising road construction projects in East Kalimantan. Meanwhile, the indicator that has the most potential to cause the low performance of the construction project supervisory consultant is the absence of construction K3 supervision at every stage of development, as well as the lack of control by the supervisory consultant regarding the implementation of construction OSH. Thus, the strategy used to overcome this is to emphasize that the supervising consultant must attend intensive training (workshop) and hold a meeting at the beginning of the activity regarding the evaluation and discussion of K3 Construction Control and the supervising consultant in each work item makes a check list/standard format of K3 construction to control the stages work with the K3

construction system as well as a briefing on the methodology and supervisory work program on Construction K3 control in the field.

An important implication that needs to be emphasized is that in order to improve the performance of road construction project supervisory consultants, the supervisory consultants themselves must have experts with high work professionalism. In addition, the project owner must give a warning to the supervising consultant who does not carry out his duties properly or is not in accordance with the provisions of the contract. For further research, it is suggested to analyze other variables that are closely related to the performance of construction project supervisor consultants.

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