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The Effectiveness of Implementing the Quality Management System ISO 9001; 2015 in Supervising Road and Bridge Projects in South Sulawesi Province

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ABSTRACT
ISO 9001;2015 Quality Management System is a quality assurance document for the stages of the process of implementing construction work activities in accordance with management rules. There are 7 ISO 9001;2015 principles, namely: 1. Customer focus, 2. Leadership, 3. Engagement and competence of people, 4. Process approach, 5. Improvement, 6. Informed decision making, 7. Relationship management. This study aims to examine the effectiveness of implementing the ISO 9001;2015 Quality Management System in fulfilling quality management requirements in the implementation of supervision on road and bridge projects in South Sulawesi province based on the seven principles of ISO 9001;2015. Data collection was carried out by interviewing, observing and distributing questionnaires to Supervision Consultant personnel in all road and bridge monitoring packages in the province of South Sulawei for the 2022 fiscal year. To analyze the effectiveness of implementing the Quality Management System ISO 9001; 2015 a quantitative descriptive approach was used and analysis used a Likert scale, the type of data used is primary data (results of interviews, questionnaires, observations) and secondary data. Based on the research results, the effectiveness of implementing ISO 9001; 2015 in project implementation is in the good category.

Keywords: Effectiveness; ISO 9001;2015; Construction Project

INTRODUCTION

The development of the world of Construction Services in Indonesia is currently very rapid along with the rampant development, companies engaged in construction services, especially in the project supervision section (supervision consultants) in Indonesia are required to improve the quality of implementation in project work, with the hope of meeting the expectations of the owner project. In every implementation of construction project activities, project management is required, as a reference used in starting each construction activity, the project implementation process starts from planning, implementation, implementation and supervision, carried out systematically by using existing resources effectively and efficiently in order to achieve goals projects are on time, on cost, and on quality.

One of the reference standards used as a guarantee that a company has the ability or capacity to work on a construction project is the ISO 9001; 2015 Quality Management System where it is hoped that the implementation of the ISO 9001; 2015 quality management system in the implementation of construction projects will produce physical products that meet the standards. technical requirements so that they are in accordance with what the project owner wants. Many companies that are active in the field of construction supervision services in Indonesia have received ISO 9001:2015 certificates and are expected to be able to apply them in the implementation of supervision services for construction projects, especially in road and bridge supervision projects in South Sulawesi Province. In an effort to find out the quality of the implementation of project supervision activities standardized with the ISO 9001: 2015 quality management system for road and bridge projects in South Sulawesi Province.

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METHODS

The research was conducted in the province of South Sulawesi for 3 months starting from October to December 2022.

The data collection techniques to be carried out are as follows:

1. Primary Data. Primary data collection is done by Interview, Questionnaire, Observation
2. Secondary Data, To obtain more complete data, descriptions and explanations, a literature study was carried out in the form of ISO 9001; 2015, reports, relevant documents as well as research and literature related to research.

The population in this study were the supervision consultant personnel involved in the supervision of road and bridge projects in South Sulawesi, the total population in this study were 137 supervision consultant personnel divided into 9 road and bridge project work packages. This study uses the Slovin formula because in sampling, the number must be representative so that the research results can be generalized and the calculation does not require a table of the number of samples, but can be done using simple formulas and calculations.

The methodology section typically has the following sub-sections: sampling (description of the target population, research context, and units of analysis; sampling; and respondent profile), data collection, measures (alternatively: measurement). The Slovin formula for determining the sample is as follows:

$$\boldsymbol{n = \frac{N}{1+N\,(e)^2}}$$

Information:

n = *Sample size/number of respondents*
N = *Population size*
e = *Percentage of inaccuracy due to sampling errors that can still be tolerated (margin of error); in the Slovin formula there is a provision for the sample error range that can be taken, namely between 10-20% of 100%.*

By using Equation (1) above, the number of samples is obtained as follows:

$$\boldsymbol{n = \frac{137}{1+137\,(0.1)^2} = 57{,}805}$$ ***; rounded up to 58 people***

The analysis technique used in this study is a quantitative descriptive analysis technique such as the Likert scale analysis and class intervals.

1. Likert scale

   The Likert scale is a scale used to measure attitudes, opinions, and perceptions of a person or group regarding an event or social phenomenon, based on the operational definition set by the researcher. This scale is a psychometric scale that is usually applied in questionnaires and is most often used for research in the form of surveys, including descriptive survey research. The steps in the Likert scale are as follows:

   a. Collect a number of questions related to the problem to be studied
   b. Make a total score for each respondent by adding up the scores for all answers

   The Likert scale formula is as follows:

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$$\mathbf{N = T \times Pn}$$

Information :

T = *Total number of respondents who voted*
Pn = *Likert score number choice, then adding up all of each N*

2. Class Intervals

To determine the level of effectiveness of implementing ISO 9001; 2015 in project implementation. can be done by calculating the minimum score and maximum score. With levels divided into 5 (five) classes, namely very good, good, enough, less, very less. Making class level interval values aims to distinguish class level implementation of ISO 9001; 2015 in project implementation.

The formula used to create an interval class is:

$$\boldsymbol{Ki = \frac{Xt - Xr}{k}}$$

Description:

Ki = *Interval Class*
Xt = *Highest data*
Xr = *lowest data*
k = *Number of levels*

In order to obtain a class level of application of ISO 9001; 2015 in the implementation of project supervision, as follows:

Table 1. Class Interval Calculation

Number of Respondents	= 58 People
Maximum Score	= 58x5x 24 Questions = 6960
Minimum Score	= 58x1x 24 Question = 1392
Interval	= (6960 – 1392) / 5 = 1113
Performance Level :	
Very Good,if the score	= 5845 - 6960
Good, if the score	= 4732 - 5844
Enough, if the score	= 3619 - 4731
Less, if the score	= 2505 - 3618
Very Poor, if the score	= 1392 - 2505
Grade Level Criteria :	
Very Good: Construction projects are implemented according to predetermined standards and targets	
Good: the implementation of construction projects is running according to predetermined standards	
Adequate: Implementation of construction projects is running according to predetermined standards with some deficiencies	
Less: Implementation of ongoing construction projects is not in accordance with established standards	

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Very Inadequate: Implementation of construction projects is not in accordance with the standards and targets that have been set

RESULTS AND DISCUSSION

To find out the level of effectiveness of implementing ISO 9001; 2015 in implementing project supervision, it can be done using a Likert scale analysis based on the results of the questionnaire. Quantitative descriptive description is divided based on 7 ISO principles to determine the level of effectiveness of each ISO principle.

Customer Focus

Table 2. Calculation of the ISO principle effectiveness score (Focus on Customers) with a Likert Scale

No	Indikator	skala	frekuensi	skor
1	In your opinion, how is communication built between contractors, consultants and the PU Directors?	5	0	0
		4	48	192
		3	10	30
		2	0	0
		1	0	0
	Jumlah Skor			222
2	The contractor always follows the direction of the PU Directors	5	0	0
		4	37	148
		3	19	57
		2	2	4
		1	0	0
	Jumlah Skor			209
3	The contractor pays attention to the quality of work desired by the Board of Directors	5	0	0
		4	41	164
		3	16	48
		2	1	2
		1	0	0
	accumulated			214
	Total Score			**645**

Table 3. Calculation of effectiveness using interval classes

Number of Respondents	=	58		
Maximum Score	=	58 x 5 x 3	=	870
Minimum Score	=	58 x 1 x 3	=	174
Interval	=	(870 - 174) / 5	=	139
Total Score	=	**645**		
Performance Level :				
Very Good,if the score	:	730 - 870		
Good,if the score	:	**591 - 730**		
Enough,if the score	:	452 - 591		
Less,if the score	:	313 - 452		

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Very Poor, if the score	:	174 - 313

From Table 2 and Table 3 above it is known that the effectiveness of the Principles of ISO 9001; 2015 Customer Focus has a score of 645 and is at the interval level 556 – 695. After knowing the level of effectiveness of each ISO principle, the next step is to calculate the overall ISO implementation effectiveness score. Details can be seen in the following table :

Table 4. Scores of 7 principles of ISO 9001; 2015

No	principles of ISO 9001; 2015	Score
1	Customer Focus	645
2	Leadership	748
3	Involvement and competence of a person	595
4	Process Approach	733
5	Repair	809
6	Informed decision making	786
7	Relationship management	738
	Total Score	**5054**

After obtaining the cumulative score of the 7 principles of ISO 9001; 2015, the next step is to calculate the score level criteria.

Table 5. Criteria for Levels of Value

Number of Respondents	=	58		
Maximum Score	=	58 x 5 x 24	=	6960
Minimum Score	=	58 x 1 x 24	=	1392
Interval	=	(6960 - 1392) / 5	=	1113
Total Score	=	**5054**		
Performance Level :				
Very Good,if the score	:	5844 - 6960		
Good,if the score	:	**4731 - 5844**		
Enough,if the score	:	3618 - 4731		
Less,if the score	:	2505 - 3618		
Very Poor, if the score	:	1392 - 2505		

From Table 5 above it is known that the effectiveness of implementing ISO has a score of 5054 and is at the interval level of 4731 – 5844. After knowing the effectiveness level of each ISO principle, next is the result of the overall ISO implementation effectiveness score. Based on the score results (Likert scale analysis and class intervals) in table 4 it is known that the effectiveness of implementing ISO has a score of 5054. Based on table 5 regarding Criteria for Effectiveness Value, the effectiveness of implementing ISO is in the GOOD category

CONCLUSION

Based on the discussion of the research results, it can be concluded that the effectiveness of the implementation of the Quality Management System ISO 9001; 2015 which is used as a guarantee of implementation quality, obtained a score of 5054 and is in the interval 4731 - 5844 which is included in the good category which means that the implementation of

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road and bridge project supervision in the province of South Sulawesi running according to predetermined standards.

Based on the description and conclusions above, the advice that can be given regarding the level of effectiveness of ISO implementation that has been going well is that companies engaged in project supervision services (supervision consultants) are required to maintain and improve the performance they have been doing so far.

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