ASTONJADRO

pISSN 2302-4240
eISSN 2655-2086

Volume 14, Issue 3, September 2025, pp.0745-0752
DOI: http://dx.doi.org/10.32832/astonjadro.v14i3.17922 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

Study of ISO 9001:2015 Quality Management System Implementation in RTG PAD Manufacturing Project at Perawang Port

Ido Rizky Harahap, Gina Cynthia Raphita Hasibuan, Ridwan Anas

Master of Civil Engineering Study Program, Department of Civil Engineering, University of North Sumatera, Medan, INDONESIA

E-mail: idorizkyharahap@students.usu.ac.id, gina.hasibuan@usu.ac.id, ridwananas@usu.ac.id

| Submitted: October 03, 2024 | Revised: October 05, 2024 | Accepted: December 30, 2024 |

| Published: September 18, 2025 |

ABSTRACT

ISO or (International Organization for Standarization) is a worldwide non-governmental organization with representatives in many countries that creates and disseminates standards in the commercial, industrial and proprietary fields. The ISO organization itself was founded in Geneva, Switzerland in 1947. The construction industry in Indonesia continues to experience rapid development. The number of construction projects causes more and more construction service companies to develop and causes increasingly fierce competition between construction service companies (Contractors). Increased competition between companies makes companies aware of quality. One of the important requirements is the ownership of ISO 9001 Certificate. This study aims to determine the level of implementation of a quality management system based on ISO9001: 2015, constraints that occur in the implementation of the ISO 9001: 2015 quality management system and strategies to improve the implementation of the ISO 9001: 2015 quality management system in the RTG Pad Manufacturing project at Perawang Port. In this study the method used is a quantitative method that is descriptive. Data is collected through questionnairesso that it is expected to obtain accurate data on the implementation of the quality management system. From the results of data analysis of the implementation of the ISO 9001: 2015 quality management system in the RTG Pad Manufacturing project at Perawang Port, it was found that theimplementation level was 81.09% in the "Good" category. The obstacles faced in its application include the lack of commitment from top management being one of the reasons why the implementation of ISO 9001 is not running optimally. Strategies that companies can do to improvethe implementation of the quality management system include top management maintaining consistency in implementing the principles of the ISO 9001: 2015 quality management system.

Keywords: Quality; Quality Management System; ISO 9001:2015.

INTRODUCTION

Construction project development is very important for a country, one of the indicators of a developed country can be seen from construction development. The development of the construction industry is currently supported by government attention and large-scale infrastructure investments [1]-[3]. In Indonesia, the construction field is governed by strict laws and regulations. ISO 9001 certificates have an important role in ensuring quality, safety, customer satisfaction and provide concrete evidence that a company complies with global standards in quality management, which can be a determining factor in winning new contracts and projects [4]-[6].

PT Telaga Hita Swakarya is one of the national private construction implementers that has been ISO 9001: 2015 certified since 2022 and has implemented it in the implementation of construction service projects. One of the applications of ISO 9001: 2015 in the RTG Pad construction project at Perawang Port. This project is one of the developments to increase the availability of modern facilities and equipment and the implementation of an international-based service system from PT Pelabuhan Indonesia (Persero) [7]-[9]. Based on this background, research was conducted at PT Telaga Hita Swakarya to find out the extent to which the company implemented the ISO 9001: 2015 quality management system so that it was known that the company had complied or not with global standards in quality management and also the factors that became obstacles in the application

of ISO 9001: 2015 quality standards in the RTG Pad manufacturing project at Perawang Port [10]-[12].

ISO 9001:2015 is an international standard for quality management systems that can be applied to various fields, including the construction sector. Implementation of this standard aims to ensure that every process in a construction project is carried out in accordance with the principles of quality, consistency, and customer satisfaction. In construction, this quality standard covers the planning, implementation, and control stages of work to ensure compliance with technical specifications and end-user needs [13]-[15]. The main principle of ISO 9001:2015 is a process-based approach. In a construction project, every stage, such as material procurement, human resource management, field work execution, and quality inspection, must be regulated by well-documented procedures. This facilitates quality control while minimizing the risk of errors and waste. For example, during the material procurement stage, the contractor must ensure that selected materials meet technical standards and are tested before use [16]-[19]. During the implementation stage, the work must follow the approved working drawings and specifications. Furthermore, ISO 9001:2015 emphasizes the importance of top management involvement in ensuring quality. In construction, this means the project leader is responsible for implementing the quality policy, providing clear communication, and providing sufficient resources. Risk and opportunity evaluation is also crucial, ensuring that any potential delays, technical errors, or defects in results can be anticipated early. Internal audits and management reviews are conducted periodically to assess the effectiveness of the implemented quality management system [20]-[23].

RESEARCH METHODS

Overview

This research was conducted at Perawang Port which is located in Riau Province, Indonesia. This port is known as one of the largest river ports in Riau which is located along the Siak River and serves as the main port for the surrounding industrial area. In this study, the method used is a quantitative method that is descriptive in nature, namely providing a description and situation as it is so that it is only a revelation of facts and data obtained. The research flow chart is used to clarify the steps of a study. More details can be seen in the picture below.

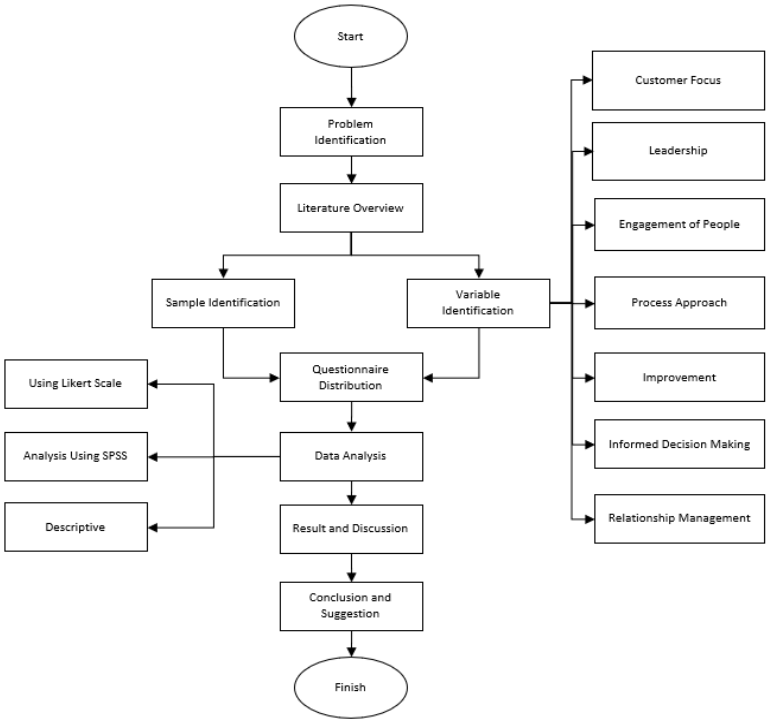

Figure 1. Research flow diagram

pISSN 2302-4240
eISSN 2655-2086
Volume 14, Issue 3, September 2025, pp.0745-0752
DOI: http://dx.doi.org/10.32832/astonjadro.v14i3.17922 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

Methods

The information collection method is the method used to accumulate the information to be studied. Data is collected through questionnaires and coupled with interviews that have been prepared beforehand so that it is expected to obtain accurate data regarding the implementation of the quality management system [24]-[26]. The questionnaire is a statement set by the author that has been represented in the 7 (seven) principles of ISO 9001:2015 [27]. The ISO 9001:2015 principles are then referred to as research variables. There are 2 (two) kinds of data that will be used, namely [28].

a. Primary Data

To obtain primary data, the author distributes questionnaires or questionnaires as information to obtain accurate data. Respondents will fill out the questionnaire according to their personal opinion without coercion from any party [29]-[31]. So that the data can be processed using software, the questionnaire data uses an ordinal scale in the form of a Likert Scale. The Likert Scale answer form consists of Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree [32]. Then the Likert Scale is used to measure a person's attitudes, opinions and perceptions about social events or events [33].

Table 1. Likert scale weights

Sign	Description	Weight
SS	Strongly Agree	5
S	Agree	4
N	Neutral	3
TS	Disagree	2
STS	Strongly Disagree	1

b. Secondary Data

Secondary data is a source of research data obtained indirectly through intermediary media. Secondary data for this research is obtained from literature studies, previous research literature, journals related to the problems studied.

Research Sample

The sampling technique used in this research is Purposive Sampling. According to [29], Purposive sampling is a method of determining samples with specific estimates. The reason for determining purposive sampling is because not all samples have standards that match what the author has determined.

Table 2. Research Sample

No	Respondents	Total
1	Owner	9
2	Consultant	3
3	Contractor	10
4	Assiciation	1
Total		**23**

The criteria for respondents determined by the author to fill out a questionnaire based on purposive sampling are those involved in project implementation directly with a minimum project work experience of 2 years and a minimum education of D3 (Diploma III). The sample criteria are determined for the following reasons:

a. Because what was analyzed were the perceptions of personnel directly involved in the implementation of the RTG Pad Construction Project at Perawang Port;
b. With a D3 background or and a minimum of 2 years of work experience, respondents are expected to have quite mature insights and experience so that they understand enough and are able to analyze well.

Data Analysis

After distributing and calculating the questionnaire data, the data is processed to test the validity and reliability using the SPSS application which then calculates the percentage of application on each research variable. The test is carried out so that the results obtained are of high quality based on the criteria of the testing technique. The following is the test carried out:

a. Validity Test

According to [29], the validity test of a questionnaire is the authenticity of a questionnaire whose results have parallels between the questionnaire results and the criteria. The validity test relates to the correlation of the score of each item obtained with the total scoreusing Pearson correlation. To determine the validity of the questionnaire data (questionnaire) can be tested using the Product Moment Correlation formula as follows:

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{(N\sum X^2 - (\sum X)^2) - (N\sum Y^2 - (\sum Y)^2)}} \dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Description:

r_{xy} = Correlation coefficient of each question item
x = Score of each question item
y = Total score of each question item
$\sum Y$ = Total score of Y distribution
$\sum X$ = Number of total scores of X distribution $\sum XY$ = Number of multiplication-of X and Yscores
N = Number of respondents (sample)
$\sum X^2$ = Sum of squares of X distribution scores $\sum Y^2$ = Sum of squares of Y distribution scores

The questionnaire is declared valid if the calculated r value is greater (>) than the r table value, the questionnaire items are declared valid and can be used.

b. Reliability Test

Reliability test is the extent to which the measurement results using the same object will produce the same data [29], In this study, what will be used is internal consistency reliability testing with the Cronbach's alpha approach. The formula is as follows:

$$r_{11} = \left[\frac{k}{(k-1)}\right]\left[1 - \frac{\sum \sigma^2 b}{\sigma^2 t}\right] \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Description:

r_{11} = Instrument reliability coefficient (total test)

k = Number of valid question items

$\sigma^2 b$ = Number of item variants

$\sigma^2 t$ = Total score variance

A research instrument is said to be reliable if the Cronbach's Alpha value is> 0.60 [16]. Therefore, the decision-making criteria in the reliability test are as follows:

- If the Cronbach's Alpha value is> 0.60, then the question items in the questionnaire are reliable.
- If the Cronbach's Alpha value is <0.60, then the question items in the questionnaire are not reliable.

c. Analisa Deskriptif

According to Sugiyono [29] that the descriptive method is amethod used to describe or analyze

pISSN 2302-4240
eISSN 2655-2086
Volume 14, Issue 3, September 2025, pp.0745-0752
DOI: http://dx.doi.org/10.32832/astonjadro.v14i3.17922 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

something research results.

$$S = \frac{T_{Total}}{N_{Total}} \times 100\% \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Description:

S = Percentage achieved

T_{Total} = Total research score for each variable

N_{Total} = Total maximum score of each variable

From the results of the score values obtained, then grouped as follows [29].

Table 3. Categories of percentage of score achieved

No	Score Interval	Category
1	85% to 100%	Excellent
2	66% to ≤ 84%	Good
3	51% to ≤ 65%)	Simply
4	36% to ≤ 50%	Less Good
5	0% to ≤ 35%	Not Good

RESULT AND DISCUSSION

From the results of the analysis of the level of application of the ISO 9001: 2015 quality management system in the RTG Pad Manufacturing Project at Perawang Port, it is known that the average level of application is 81.09% which is classified into the **"Good"** category (as parameter reference in Table 3)**.** The results of the analysis of the level of application of the ISO 9001: 2015 quality management system are depicted in the form of a chart as below:

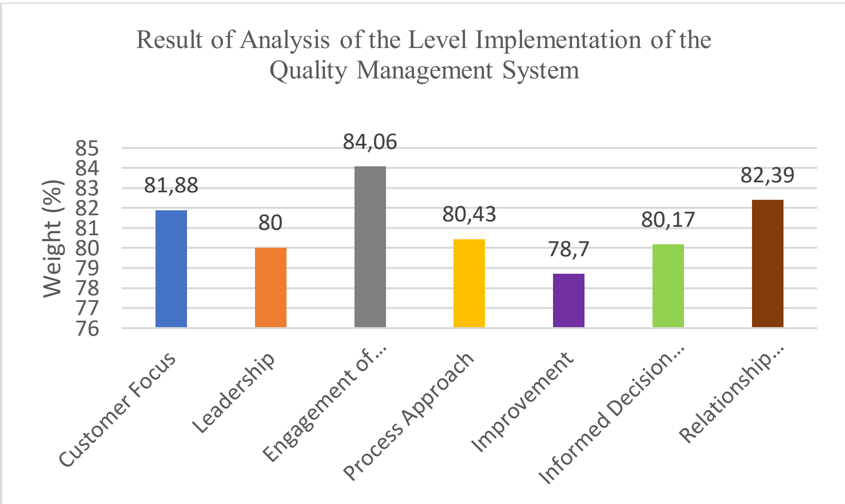

Figure 2. Results of Quality Management System Implementation Level

The results of this study when related to previous research [29] have the same largest percentage, namely in the Engagement of People principle, which shows that the contractor in carrying out the project has facilitated the involvement of both internal and external people in achieving organizational goals. However, there is a difference in the lowest percentage, where the lowest percentage in previous research [29] was in the principle of Customer Focus (Customer Satisfaction) while the lowest percentage in this study wasin the principle of Improvement. This could have happened due to differences in the questionnaire statement points presented. The statement points become the benchmark for respondents' assessment of the contractor. this study when compared to previous research, the statements presented are more technical in accordance with the circumstances in the field.

Based on the results of interviews with Representative Managers, the implementation of a quality management system based on ISO 9001: 2015 still has several obstacles including the lack of understanding of employees in the application of ISO 9001: 2015, the lack of socialization of ISO 9001: 2015 to all employees, the unfulfilled training given to employees with certain positions to improve the ability to carry out each job and there are still personnel or even project leaders who have not implemented documented information such as the absence of meeting minutes after conducting review meetings in the field, not making purchase orders when you want to purchase goods, the absence of written material approval forms so that the ISO 9001: 2015 quality management system does not run optimally. As for strategies that can be done by the company to improve the implementation of the quality management system, including conducting continuous socialization to increase employee understanding in the implementation of the quality management system such as by conducting regular safety talks, through information boards that can be seen by all employee members and making information about the company's vision and mission in each division room. Routinely carry out internal audits / review of existing procedures so that itbecomes a continuous improvement of the quality management system, looking for human resource qualifications that match the needs in each position needed. In addition, to improve the ability of the workforce can be given training in accordance with the position so that it becomes a workforce that is feasible with the ISO 9001: 2015 quality management system.

CONCLUSION

Based on the results of research analysis using quantitative methods on 23 respondents consisting of project owners, contractors, consultants and associations, it is concluded that the average level of implementation of the quality management system with a percentage of 81.09% is classified as good (as parameter reference in Table 2). Analysis of constraints in the implementation of the ISO 9001: 2015 quality management system can be concluded that the main obstacle is the lack of commitment from top management (directors, managers, project managers and other officials in the company) this is one of the reasons why the implementation of ISO 9001 is not running optimally. Top management has not encouraged the company's team to actually implement ISO 9001. The strategy to improve the implementation of the ISO 9001: 2015 quality management system that can be done is that top management maintains consistency in carrying out the principles of ISO 9001 which can be applied by conducting continuous socialization activities to increase employee understanding in the application of the quality management system, looking for human resource qualifications that are in accordance with the needs of each position needed, routinely conducting reviews of existing procedures so that it becomes a continuous improvement of the quality management system and providing training such as risk-based thinking training in ISO 9001:2015, gap analysis ISO 9001:2015, document training ISO 9001:2015, maintenance training ISO 9001:2015 and other training that can improve the ability of the workforce in implementing the quality management system ISO 9001:2015.

ACKNOWLEDGMENTS

The author would like to thank those who have helped in the implementation of this research.

REFERENCES

[1] Artha, Putu Gede. (2013). Implementation of ISO 9001:2008 Quality Management System in the Alaya Resort Ubud Project. Electronic Scientific Journal of Civil Engineering Infrastructure. 2(1).

[2] National Standardization Agency. (2015). Quality Management System-Requirements. SNI ISO 9001:2015. Jakarta.

[3] Cognoscenti Consulting Group. (2020). International Standard ISO 9001:2015 Quality Management Systems-Requirements. Retrieved February 2, 2024, from https://diploma.chemistry.uii.ac.id/wp-content/uploads .

[4] Darmawan, A. Wacono, S. and Saputra, Jonathan. (2020). Evaluation of the Implementation of the ISO 9001 Quality Management System at PT. X Contractors. Construction and Material Journal. 2(3).

[5] Desman, Febyanti and Syamsuir. (2023). Analysis of the Implementation of Construction Quality Management System Based on ISO 9001:2015 at PT Murni Karya Mandiri. Civil Engineering and Architecture Journal. 1(2).

[6] Dewi, Ni Ketut S. (2018). Analysis of the Implementation of New ISO-9001:2015 in Construction Project Implementation. 12th National Civil Engineering Conference. Batam: 18-19 September. Bali: Udayana University.

[7] Fadli. (2022). Implementation of ISO 9001:2008 Quality Management System for Construction Services Companies. Construction Journal. 1(10).

[8] Ferdiana, Fanny. (2023). Application of Quality Management System Levels in Construction Projects (Quality Inspection, Quality Control, Quality Assurance, and Total Quality Management). Indonesian Scientific Journal. 8(7), 4.

[9] Fitriani, Heni and Putranto, Ganung Yusuf. (2022). Analysis of the Implementation of ISO 9001:2015 Based Quality Management System at PT. Waskita Karya Company. Civil Engineering Journal of Teuku Umar University. 8(2).

[10] Hairuddin, Akhmad. (2022). Analysis of ISO 9001:2015 Quality Management System in the Integrated Hajj and Umrah Service Center (PLHUT) Building Construction Project in Jeneponto Regency. Construction Journal. 1(10).

[11] Kadarisman, Darwin. and Muhandri, Tjahja. (2008). Definition and Concept of Quality. Bogor: IPB Press.

[12] Ministry of Public Works and Public Housing. (2011). Professional with Quality Management System. Retrieved February 7, 2024, from https://pu.go.id/berita/Profesional-dengan-sistem-manajemen-mutu .

[13] Ministry of Public Works and Public Housing. (2011, March 23). Professional with Quality Management System. Retrieved February 7, 2024, from https://pu.go.id/berita/profesional-dengan-sistem-manajemen-mutu .

[14] Konsultaniso. (2021). History of ISO 9001 Quality Management System. Retrieved May 10, 2024, from https://konsultaniso.web.id/sistem-manajemen-mutu-iso-90012008/sejarah-sistem-manajemen-mutu-iso-90012008/ .

[15] Komala, Dewi., et al. (2014). Introduction to Standardization. Jakarta: Indonesian National Standardization Agency.

[16] Kurniawan, Simon. and Johan, Johny. (2022). Evaluation of the Effect of Implementing the ISO 9001:2015 Quality Management System on Service User Satisfaction at PT X Reviewed from the Implementer's Side. Journal of Muara Science, Technology, Medicine, and Health Sciences. 6(2).

[17] Lanin, Ivan. (2023). 7 Principles of Quality Management ISO 9001:2015. Accessed February 3, 2024, from https://ipqi.org/princi-iso-9001 .

[18] Lasa, Donatus. (2022). Implementation of ISO 9001:2015 Quality Management System in the Ciputra School of Business Makassar Building Construction Project. UKIPaulus-Makassar Civil Engineering Journal. 4(1).

[19] Martina, Anastasya. (2016). Analysis of Implementation of ISO 9001 Quality Management System in Indonesian and Romanian Construction Company. World Applied Sciences Journal. 34(12).

[20] Novita, Edriani and Gunawan. (2023). Identification of Quality Management Systems Based on ISO 9001:2015 in Construction Service Provider Companies in Bengkulu City. Teras Jurnal. 13(1).

[21] Government of Indonesia. Law Number 2 of (2017). concerning Construction Services. Jakarta.

[22] Prasinda, Yulita and Kaming, Peter F. (2022). Study of the Implementation of ISO 9001 Quality Management System in the Construction Industry in NTT. Journal of Sustainable Construction. 2(2).

[23] Rauzana, Anita. (2017). Implementation of Quality Management System in Construction. American Journal of Engineering Research (AJER). 6(12).

[24] Redi., AANP & Putra., I Nyoman Mardika (2021). ISO 9001:2015 Introduction to Quality Management Standards. Retrieved February 3, 2024, from https://mie.binus.ac.id/2021/04/07/iso-90012015-pengantar-standar-manajemen-mutu .

[25] Santosa, Made Arya. (2013). Implementation of Quality Management System Standard (ISO) 9001:2008 at Contractor PT. Tunas Jaya Sanur. Electronic Scientific Journal of Civil Engineering Infrastructure. 2(1).

[26] ISO RMI Certification. (2020). Understanding the History of the Importance of ISO 9001. Retrieved on February 2, 2024, from https://www.sertifikasiiso.org/pengertian-sejarah-pentingnya-iso-9001 .

[27] Shaikh, Fazal A. (2020). Implementation, Advantages and Management of ISO 9001 in the Construction Industry. Civil Engineering Journal. 6(6).

[28] Gulo, Salehman. (2023). Analysis of Quality Management Implementation in the Implementation of the Brastagi Supermarket Construction Project [Thesis]. Medan: Medan Area University.

[29] Hernata, Alfan and Sulistiawan, Muhammad. (2023). Implementation of Quality Management System Based on ISO 9001:2015 in the DPRD Faction Building Construction Project of Kudus Regency [Thesis]. Semarang: Sultan Agung Islamic University.

[30] Sumurung, George. (2020). Analysis of Quality Assurance on Product Quality Performance in Building Project X in Jakarta. Proceedings of the 2020 National Civil Engineering Seminar: 2. Surakarta: Faculty of Engineering, Muhammadiyah University of Surakarta.

[31] Tahrir, Muhammad. (2018). Analysis of the Effectiveness of the Implementation of the ISO 9001:2008 Quality Management System in Project Implementation (Case Study of the Enrekang-Makale-Rantepao (MYC) Road Reconstruction Project). Journal CC-By Attribution 4.0 International. 2(2).

[32] Umam, Khairul. (2021). Obstacles in Implementing ISO 9001. Accessed on February 3, 2024, from https://konsultaniso.web.id/konsultan-iso/kendala-dalam-menerapkan-iso-9001.

[33] Wijaya, I Putu. (2022). Implementation of ISO 9001:2015 Quality Management System in Construction Projects [Thesis]. Bali: Bali State Polytechnic.