Identification of constraint factors on the contract quality plan for the Batang Kuranji sediment control development project, Padang City

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Abstract. The implementation of the Contract Quality Plan (RMK) is an important thing because from the RMK we can guarantee the quality of work to meet standards so as to meet consumer needs. RMK must be made by the goods/services provider for any work to be carried out in the field. This research was conducted in the Batang Kuranji Sediment Control Building Project which was carried out by the contractor PT. PP (persero) tbk. This study aims to determine the constraints factors in implementing the RMK. The constraints are limited to only material constraints. The data taken is secondary data, namely data from the RMK from the contractor PT. PP (persero) tbk while the primary data was taken by questionnaire to workers and interviews with employees. The method used is descriptive quantitative then descriptive statistical analysis and t test are carried out to obtain the dominant factors in the RMK in the project. Based on the results of the research, it was found that the main factor as a constraint in the Contract Quality Plan in this project was the Delay in Delivery of Materials which had an average value of 2,700 and the smallest was the material standard required to no longer be in the market with an average value of 2,133.

1. Introduction

The implementation of the Contract Quality Plan (RMK) is a way to guarantee the quality of work according to standards so that it can meet the needs of the community or consumers. The Contract Quality Plan must be made by the goods/services provider for each work carried out. This study aims to identify the constraining factors in the implementation of the Contract Quality Plan document against its implementation standards by contractors at the PJSA.WS.IAKR Satker of West Sumatra Province.

The flood disaster (Galodo in Minang Language) that occurred in the city of Padang was caused by various factors, ranging from illegal logging to the Batang Kuranji Watershed (DAS) which had been damaged. Damage to the flow of the Batang Kuranji River must be a serious concern of the government, because there is damage that occurs along its flow from upstream to downstream due to not only one factor. The cause of this disaster is strongly suspected to be due to illegal logging activities, especially in the hills around the location of the flood.

To overcome the problem of flooding, the government conducted a flood control construction, namely the Batang Kuranji Sediment Control Building Project. This project is run by PT. PP (persero) tbk.
2. Literature Review
According to [1] in [2], the quality of contracts is distinguished conventionally and strategically. Conventionally, quality is defined as a condition that has a relationship with products, services, humans, processes and the environment in order to meet and even exceed what is expected. Meanwhile, strategically, quality is everything that can fulfill the wants or needs of service users, if it is not in accordance with the needs of using the service, then the process must be repeated. (According to [3] in [2], defining a Quality Management System (QMS) is a collection of documented procedures with standard practices for system management, which aims to ensure the suitability of a process and product (goods or services).) to certain needs or requirements Such specific needs or requirements are determined or specified by the customer and the organization.

Contract Quality Plan is a quality assurance guideline in the implementation of work, so that the final product of the work is in accordance with the technical requirements stated in the contract. The matters contained in the Contract Quality Plan are:
1. Activity Information
2. Activity Quality Objectives
3. Technical and Administrative Requirements
4. Organizational Structure
5. Duties, responsibilities and authorities
6. Implementation method
7. Schedule of Activities
8. Equipment Schedule
9. Material Schedule
10. Schedule Personnel
11. Cash Flow Schedule
12. Plans and methods, validation, monitoring, evaluation, inspection and testing and acceptance criteria.
13. List of Acceptance Criteria
14. List of Standard Codes
15. Attachments

2.1. Constraints in the implementation of the contract quality plan
Of course, not all projects implement this Contract Quality Plan, because there are still many Contractors who ignore it all, maybe they are considered not to have fatal consequences to project workers and to the building. Following are some of the factors constraining the implementation of the Contract Quality Plan [2].
1. Not fully aware of the manufacturing of RMK components in accordance with the project being worked on.
2. There are still personnel who do not really understand the quality of the project and there is no in-depth evaluation of the application of quality in the field.
3. If there are new regulations or specifications, sometimes personnel do not know because they have not been socialized, and there are still differences in perceptions in understanding the technical specifications.
4. Lack of resources such as personnel, equipment, and materials because many work packages and activity items must be worked on or monitored at the same time.
5. The process of carrying out work is hindered due to the influence of frequent rainy weather, disturbances from the community, land that is not yet free, network or utility disturbances under the ground, damage to equipment, remote project locations, difficult terrain conditions, and natural disasters, landslides
6. There are materials and work results that are not in accordance with the specifications and quality expected.
7. Still unable to distinguish the type of work to be done, between routine conditions or regular routines due to the concept of long segment work.
8. Lack of coordination between management parties in carrying out personnel work.
9. There are too many work steps that must be passed, so that sometimes it cannot be done due to field conditions.
10. There are no personnel yet to coordinate the implementation of the Contract Quality Plan (RMK), especially in filing and managing the master list of records or proof of work.

2.2. Project quality management
Quality is often used in providing the best assessment of a product in everyday life. Quality is not just limited to that assessment, it is the degree to which a set of inherent characteristics satisfies a stated need or expectation that is generally implied or obligatory.

Quality is defined as a comprehensive description or characteristics of goods or services that indicate the ability to fulfill specified or implied requirements [4]. The definition of quality above clearly emphasizes the satisfaction of customers or product users. In a construction project, customer can mean the assignor.

In [2] "The definition of quality is differentiated conventionally and strategically. Conventionally, quality is defined as a condition that has a relationship with products, services, people, processes and the environment in order to meet and even exceed what is expected. Meanwhile, strategically, quality is everything that can fulfill the wants or needs of service users, if it is not in accordance with the needs of the service users, the process must be repeated.

According to [5] regarding quality management as a control and indicator of the success of a project. The result is that quality management is a major factor in the success of a project, and an integral part of the construction process. According to [6] "The process of implementing quality standards must be carried out with a systematic based approach through sequential subsystem stages, from input, process, output, outcome, to impact, so that the final results obtained are in accordance with the required quality standards.

Quality is the nature and characteristics of a product or service that makes it meet the needs of the customer or user (customer) [7]. From the definition above, it is the first step to determine the quality of an object, starting from program preparation, planning, monitoring, inspection and quality control.

According to [8] defines a Quality Management System as a set of documented procedures and standard practices for system management that aim to ensure the conformity of a process and product to a particular need or requirement. The need or requirement is determined or specified by the customer and The Quality Management System defines how organizations implement quality management practices consistently to meet customer and market needs [8].

3. Research Method
The research method used was interviews and observations of contractors on several work packages, as well as to find out the constraints in some Contract Quality Plans (RMK) and a research questionnaire was given to them. The sample in this study were 30 people [9] in [10] who were involved in the project starting from the site manager to the field implementer. In this study, the data were processed using the t test method, before testing the validity and reliability of the RMK factors that were thought to have an effect on the project activities.

3.1. Research sites
The research location is at PT. PP (persero) tbk. In the Batang Kuranji Sediment Control Building Project, located in Padang City, West Sumatra Province.

3.2. Research time
The research was conducted in January-June 2019.
3.3. Research data
The data taken during the research were the RMK document data from the Satker and from the Contractor, as well as the distribution of a special questionnaire on only material constraints in the Batang Kuranji Sediment Control Building Construction Project.

4. Results
Based on the interview and entered into the fishbone diagram, it was found that the initial factors that caused the constraints to implementing RMK were as shown in Table 1 and Figure 1. as follows:

| Table 1. Factors causing obstacles to implementing RMK |
|------------------------------------------------------|
| X1 There is a delay in the approval of the design / drawing (working drawing) |
| X2 There is a delay in material delivery |
| X3 The required material standard is no longer in the market |
| X4 Material damage during delivery |
| X5 Imperfect / unclear performance specifications |
| X6 Too many work steps are done at the same time |
| X7 Revised Design job |
| X8 Floods, storms, riots, demonstrations or other unexpected circumstances. |
| X9 Late land acquisition |
| X10 Poor weather conditions |
| X11 The Contractor is not fully aware of the Contract Quality Plan |
| X12 There are still personnel who do not understand about the Contract Quality Plan |
| X13 Change of job design |
| X14 Difference between volume on contract and volume on field execution |
| X15 Decrease in productivity |

From Table 1 above, a fishbone diagram was created and where these variables fall into four categories (Man, Material, Method or Environment) as in Figure 1, below.

**Figure 1.** Fishbone Diagram of the factors causing the application of RMK in the Batang Kuranji Sediment Control Building Construction Project located in Padang City, West Sumatra Province. (interview results, 2019)
Each specific variable constraint from Material is made a list of questions and produces the following results:

The results of the data validity test show the questions in items X1.2, X1.3, X1.4, X1.5, X2.1, X2.2, X3.1, X3.2, X3.3, X4.1, X4.2, and X4.4 is valid, because the calculated r value is greater than r table = 0.4629. Meanwhile, the questions X1.1 and X4.3 are invalid, because the calculated r value is smaller than the r table value.

4.1. One sample T test

One sample t test is an analysis technique to compare one independent variable. This technique is used to test whether a certain value is significantly different from the average of a sample.

Table 2. The following is the result of One sample T Test data processing.

| Var       | Information                                                                 | Test Value = 0 |
|-----------|------------------------------------------------------------------------------|----------------|
|           |                                                                               | T   | Df | Sig. (2-tailed) |
| X1.2      | Late delivery of materials                                                    | 31.729 | 29 | 0               |
| X1.3      | The material standards required are no longer in the market                   | 18.582 | 29 | 0               |
| X1.4      | Material damage during shipping                                               | 23.647 | 29 | 0               |
| X1.5      | Imperfect / unclear implementation specifications                             | 23.924 | 29 | 0               |
| X2.1      | Too many steps of work being done at the same time.                          | 23.312 | 29 | 0               |
| X2.2      | Revision of job design                                                        | 23.837 | 29 | 0               |
| X3.1      | Flood, Hurricane, Riot, Demonstration or other unexpected circumstances       | 26.718 | 29 | 0               |
| X3.2      | Delay in Land Acquisition                                                     | 26.444 | 29 | 0               |
| X3.3      | Bad weather conditions                                                        | 21.745 | 29 | 0               |
| X4.1      | The contractor is not fully aware of the Contract Quality Plan                | 19.746 | 29 | 0               |
| X4.2      | There are still personnel who do not understand about Project                 | 19.539 | 29 | 0               |
| X4.3      | Job design changes                                                            | 26.444 | 29 | 0               |
| X4.5      | Decreased productivity                                                        | 23.339 | 29 | 0               |

Source: Research Results (2019)

4.2. Ranking

The way to rank in this study is a manual way by using the mean and standard deviation if there is an average of the same variables. See Table 3. below.

Table 3. Ranking of Barriers to Implementation of RMK

| Rank | Var                                      | Constraints to the Implementation of RMK | Mean  |
|------|------------------------------------------|-----------------------------------------|-------|
| 1    | X1.2                                     | Late delivery of materials               | 2.700 |
| 2    | X3.1                                     | Flood, Hurricane, Riot, Demonstration or other unexpected circumstances | 2.667 |
| 3    | X1.5                                     | Imperfect / unclear implementation specifications | 2.500 |
| 4    | X3.3                                     | Bad weather conditions                   | 2.500 |
| 5    | X1.4                                     | Material damage during shipping          | 2.467 |
| 6    | X3.2                                     | Delay in Land Acquisition                | 2.433 |
| 7    | X4.3                                     | Job design changes                       | 2.433 |
| 8    | X4.5                                     | Decreased productivity                   | 2.400 |
| Rank | Var | Constraints to the Implementation of RMK                          | Mean |
|------|-----|------------------------------------------------------------------|------|
| 9    | X2.1| Too many steps of work being done at the same time.              | 2.367|
| 10   | X2.2| Revision of job design                                           | 2.267|
| 11   | X4.2| There are still personnel who do not understand about Project Quality | 2.233|
| 12   | X4.1| The contractor is not fully aware of the Contract Quality Plan   | 2.200|
| 13   | X1.3| The material standards required are no longer in the market      | 2.133|

Source: Research Results (2019)

From Table 3 above, the highest obstacle in the implementation of the contract quality plan is the delay in material delivery (X1.2), this occurs based on the results of the interview obtained because after the flash flood disaster the entrance to the area or location of the repair of the canal is damaged, causing obstacles to entering the location, it is recommended to also repair other infrastructure.

5. Conclusion

Based on the results of research and location surveys that the author has carried out on the Batang Kuranyi Sediment Control Building Project, distributing questionnaires and direct and indirect interviews with all engineers, the authors conclude that:

1. The main factor. Obstacles in implementing the Contract Quality Plan according to the overall perception of respondents based on the highest are delays in material delivery, floods, storms, riots, demonstrations or unexpected circumstances, imperfect / unclear implementation specifications, bad weather conditions, and material damage during delivery.

2. There are 2 factors that can be ignored due to the invalid validity test, namely: being late in the approval of the design / drawing (working drawing) and the difference between the volume in the contract and the volume in field implementation, based on the results of the interview as well as the design / drawing agreement and the difference between the volumes The contract and implementation in the field do not become a significant obstacle there because it is clear if this problem occurs there will be an official report that will be made with certainty, such as the minutes are added less.

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Acknowledgments
The author's gratitude goes to the head of the PJSA.WS.IAKR Satker of West Sumatra Province, the team and related parties in this research so that this paper can be completed.