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The Analysis of Quality Standard of Construction Process in Improving Time Performance of Fasade Construction at Apartment Project in West Jakarta

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Abstract*: Nowadays precast fasade panel is widely used for construction purposes in the country. The precast castings panel is a construction technology that can optimize the work time by producing more neat construction work. However, in the process there are many obstacles in making up to the installation of the facade panel which gives the impact of bad performance time. So it is necessary to study quality standard methods that can be recommended for corporate quality improvement steps, especially on time performance. Data collection is done on company "x" as task recipient, variables and factora are analyzed by using SPSS software version 22 to get correlation analysis result, intercorrelation, factor, linear regression analysis. Model test conducted is test model F, T and autocorrelation (Durbin Watson Test). From the results of the study were found that there are three related variables and have a significant degree of probability that is difficulty perceived by workers to understand the standards required by management, customer satisfaction, and supervision that has not been consistent. This research will give recommendation to improve the company "x" to apply ISO 9001: 2015 as quality standard as it relates to three variables such as the formation of clear SOP for each part of work and oriented to customer satisfaction.*

Keywords*: Quality, Standard, Fasade, Construction, Apartment*

1. Background of Research Problems

In order to meet the customer satisfaction is the dream of every company, especially if it can exceed customer expectations of a product or service offered. So to continue to improve the quality of the company is a mandatory law for every business actor, especially the perpetrators of construction services. Given the opening of free trade in the already advanced era of the company is required to improve the quality of the company to survive in the competition. "X" company is a construction company that is established in 1988 which initially only worked on steel frame. Following the development of the construction trend at the time, the company x began to widen the scope of work that originally only received steel and housing frame work, now company x also received precast concrete work. The precast concrete produced includes infrastructure, building structures, and facade panels. In this research, the author only discuss about precast concrete for the benefit of facade. The company does not have a quality standard management system, so there is often a cost over run due to reprocessing, as well as errors because there is no system in it to extend the work and result in delays in processing time. From the architect's point of view, the building facade is often an important thing to design. The design of a building can provide a different atmosphere for the building itself. So it is important to emphasize the quality of neatness of the product.

In the process of production work in company "x" were still found errors that occur due to several things such as lack of control and planning. So there are still many reprocessing processes, excessive use of materials, until the delay of delivery due to many factors. Due to that, the authors are interested to review the quality management system that must be applied within the company to solve the problem so as to produce quality in accordance with customer expectations. In its application, the author tries to assess the quality control system of ISO 9001: 2015 and also refers to the method of total quality management in order to achieve customer satisfaction.

2. Research Problems

Based on the background of research problems, the authors got some interesting issues to be discussed more deeply. There are four research issues that will be discussed: The first research problem is what is

the problem that are being faced in façade construction of the building project?. The second research problem is what is the explementation of quality standard in this research?. The third research problem is what are the factors and the variables of the implementation of quality standard of building façade?. The fourth research problem is what is the result of the analysis of quality standard on building façade?

3. The Literature Study

In this section will be much described about whether it is quality and other supporting theories. A total of seven points will be explained as follows:

A) Understanding of quality

According to Vincent Gaspersz (2006: 1) Quality is everything that can meet the needs or needs of customers (meeting the needs of customers). In ISO 8402 (Quality Vocabulary), quality is defined as the totality of the characteristics of a product that supports the product's ability to satisfy specified or determined requirements. Quality is often interpreted as customer satisfaction (costumer satisfaction) or confirmation of needs or requirements (Confirmance to the requirement).

B) Total Quality Management

Total Quality Management can be defined as a combination of all functions of the company into a holistic philosophy built on the concept of quality, teamwork, productivity, and understanding and customer satisfaction (Ishikawa, 1993, p.135). Another notion put forward by Drs. M N. Nasution, M.S.c., A.P.U. Said that Total Quality Management is an approach in running a business that seeks to maximize the competitiveness of an organization through continuous improvement of its products, services, labor, processes, and environment. Quality planning or quality plan defines a plan of how and when "quality events" and "quality materials" are applied to the project. Quality event itself means how quality materials are used in the project, there are activities carried out using quality materials to validate project quality. The quality material has something special meaning used to help the project manager to improve the quality of the project. Quality materials are used in quality events. Quality control is a part of quality assurance that provides guidance and ways to control the quality of materials, structures, components or systems to meet prescribed requirements. Quality control has the action in the form of testing, measurement and inspection to know / prove that engineering and design has been in accordance with the criteria that have been outlined. Then the next action is that materials, equipment and installations have been made, purchased and built according to the procedures, drawings and project specifications.

Definition According to Juran (1976), quality assurance is an activity to ensure and make the required confidence in all areas that the quality function is effectively carried out. In contrast to Gyrna (2001), quality assurance is an activity that provides evidence or facts that underlie the belief that the need for quality can be met. In a broad sense, quality assurance means all activities that can provide a quality product (service and goods). Quality assurance does not speak the scope of product quality narrowly, but talks about the whole part of an organization or company that supports the creation of comprehensive quality assurance. According to Gyrna (2001), there are three forms of quality assurance: quality audit, quality assessment, and product audit.

C) Time Performance

Time performance refers to the comparison between planned time and actual work in the field. The project according to Soeharto (1997) defines the project as a temporary, limited-term activity with a specific allocation of resources and is intended to carry out tasks with clearly defined targets. Therefore, on the implementation of a project there are often problems that occur such as lack of manpower, late supply of materials, the number of repeat jobs, less competent labor, and much more to be done by the management. Cost, quality, and time are the things that must be monitored in order to avoid any deviation between the three aspects. Therefore time performance will have a direct impact on cost and quality if less attention.

D) Apartment Project Character

The many projects done by company x are apartment buildings located in the city of Jakarta and around. Many of the projects that have a fairly tight duration, but has a considerable volume of work. Due to the precast system nature that has a neat result but also has a relatively faster processing time, the rapid development process with the precast system began to be ogled by the Jakarta developers to build the apartment to finish and operate faster. Construction process will be faster because while the process of foundation is done, company x has done detail picture of each panel. And immediately the production process is done, when the building has continued to the minimal floor to do the installation panel, company x will immediately do the installation in the area that has been determined.

E) Apartment Building

Apartment building which is often also referred to as the flat became one of the alternatives in Jakarta as the ideal dwelling due to limited land available. The number of apartments in Jakarta continues to grow rapidly, for example in 2013 the number of available apartments there are 15,068, in 2014 the number of new apartments grew to reach 20,889, and in 2015 data recorded there are 24,854 new apartments in Jakarta. Due to the difficulty of finding

residential houses dijakarta, people began to glance at an apartment in the city of Jakarta compared to having to buy a house located on the edge of Jakarta.
F) The Company "x"
In company x which became the object of this research, is a contractor in the city of Jakarta which has many types of work. Initially the company x is engaged in steel frames and general contractors. As time goes by the growing market demand forces the company to choose to diversify. In this study, the authors will examine the problems that occur in the building fasade work. The concrete facade that is in the form of concrete panels is produced in a factory located in bitung, tangerang. The concrete facade produced by the precast method is sent to the field and installed part by section, and then the sealent installation process will be made to prevent any leakage from each connection. The company x project is an apartment building located around Jakarta. Not only the apartment, precast concrete can also be used for hotel buildings, or other high-rise buildings in accordance with the will of the project owner. But in this study the authors will examine the apartment building undertaken by the company x due to the majority of projects that are done is an apartment building project.

4. Research Methodology

4.1. The research process

The research process used in this research starts from the process of looking for problems that are deemed necessary to be done. Then second phase is the problem identification.At this phase the author began to identify the problem more deeply to know the core of the problem, the cause of the problem. The third phase is formulating the problem of the author tries to explain the problem to be discussed, along with the limitations of the topic of discussion. The fourth phase is the literature study is done right after the problem has been formulated, so the subject that will be used for the theoretical foundation can be searched precisely in accordance with the subject matter. Data collection is done by distributing questionnaire, in order to get valid and accurate feed back data. Questionnaire is distributed to people or layers that are deemed appropriate and appropriate to get accurate data. After the data are collected the sixth phase is analyzing. Data analyzing is done using appropriate methods. It will obtain the results of the latest data on the problems that occur within the company after data collected and processed. Furthermore, the analysis of the results of these data to determine what factors that cause these problems arise. The seventh phase is improvement analysis proposed improvements can be made if already know the root of the problem that is happening. Proposed improvements are expected to solve these problems appropriately and effectively. After the repair is given, it is also necessary to do an analysis to find out if it has been able to solve the existing problems. After the analysis and proposed improvements made, the next stage is to provide conclusions, the conclusion will answer from the questions that exist on the formulation of the problem. In addition it will be given suggestions from the authors to provide input to the next author to conduct further research that has not been done yet feasible to be implemented.

4.2. Research respondents

In this research, the respondents the contractors. Respondents will be divided into several sections, starting in procurement, engineering, administration, field operations, managers and directors. From some parts it is considered to have covered all aspects in implementing building construction projects, so the research will get accurate results.

4.3. The Factors and The Variables

There are six factors and forty-seven variables. Factors of this research include arguments in applying quality standards, customer satisfaction, management, systems, human resources and materials, and the latter is a challenge. of the forty-seven independent variables and one dependent variables contain a combination of several relevant sources of writing and other sources of information that later became part of the six factors. As with the writing of argumentation factors in applying the quality standards, the variables included discussed why companies need to apply quality standards. Such as to survive in the business competition of building construction, the variable is lifted because at the time of the research process took place the author saw it was true, but not necessarily appropriate in the case of company x. In addition to the first variable, the research got some other things like improving the quality of service, controlling costs, quality and time. In some cases the written variables are also to reduce rework, refine and expand the target market, define the responsibilities of each worker, influence the government, improve the consistency of the work, and avoid the cost over run. It wanted to know by the author how far the relationship with company x.

In the second factor is customer satisfaction, there are four variables that relate between the application of quality standard with customer satisfaction, among others: improve customer satisfaction, increase customer loyalty to repeat order, improve the view of project owner to quality of company, and communicate requirement and expectation of project owner With the organization as a whole. Not only talking about customer satisfaction, this writing also talks about management. The management variables consist of having a quality management system that focuses on customer satisfaction, has clear duties and

responsibilities in every management and division, has uniform quality objectives at every level of management, enables all management and division to understand and be motivated on the importance of goals and Target company. Not only that, management variables also include continuous improvement, factual approach in decision making, and personnel involvement in making decisions. Factors to be discussed next is about the system. System variables include improving the scheduling system, improving the documentation system, improving the planning system, generating a risk analysis system in every worker layer, resulting in more efficient implementation, resulting in a plan-do-check-action system, and the latter providing a risk evaluation system that can be evaluated. Two factors to be discussed are human and material resources, and challenges. The variables of human and material resources are improving the quality of human resources for the achievement of company vision, training of workers, conducting periodic quality improvement evaluations, identifying and selecting suppliers with good competence, and ensuring that the goods or materials of the suppliers are in accordance with Company requirements. Challenges in applying quality standards in the company are too much writing, the time required to complete the implementation, the additional costs of implementing such as paper, tools, and more. Not only that, the next variable is the lack of facilities and infrastructure, the difficulties that are felt by the workers to understand the standards or procedures required by management, the evaluation of supervision has not been done thoroughly, the standards are changing, the commitment of leaders who have not reached the entire personnel, Consistent, upper-level management is less committed to quality improvement, the time required to write SOPs, knowledge of the quality of the workers, have competent workers, and commitment of leaders who need to be followed up with work programs. The dependent variable is time performance of façade construction. That is the sixth factors and forty-seven independent variables and one dependent variable of this research. Of the forty-seven variables, conducted various tests until found the most influential and significant variables to the time performance of the process of building construction of apartment buildings in Jakarta.

4.4. Research methods

The method used is quantitative statistic method. With five analytical methods to be used are correlation analysis, intercorrelation analysis, factor analysis, multiple linear regression analysis and model test. At the time of model testing, the authors used the t test, f test, autocorrelation test. In testing the author using SPSS version 22 with a significant level of 5%.

5. Discussion of Research Findings

5.1 Discussion of Issues

PT.X as the recipient of the construction work of the facade building construction of the apartment building has several problems in the implementation of the production process until the implementation of fasade installation in a predetermined location. At the time of the production process, sometimes encountered poor supervision system. So that resulted in some incompatibilities that will ultimately be done rework process resulting in swell the cost of production of the facade. Things that often occur, among others, the angle of the panel is not the elbow and the window is not elbow. In addition to production supervision, sometimes problems arise when doing concrete casting. Cast concrete is often unstable during the production process, so it is sometimes found that concrete has a slump that is too high or too low. The consequences of such problems will usually result in the production of facade panels. If too high, then the concrete will have a poor quality because the ratio of water to cement is too large. If too low, on the production work process will result in a porous concrete because the concrete does not fill well in every corner of the mold.

Not only got there, the problem reappeared when the rework process was done and the panel was ready to be sent. When the panel arrives at the installation location, a new constraint will appear. In the construction process of panel installation, management of the control of tools and materials is also a constraint that often occur. Coordination of the lack of tools, tools damaged, and return of equipment has not been done properly. Back to the surveillance system, monitoring of the installation is also often not done maximally. So often there is a problem of coordination between field supervisor and supervisor at the factory. There is often a communication error between the two supervisors so that the delivery is also not going well so that cause delays in construction implementation. And because of a communication error, there is a wrong type of panel installation.

5.2. Research Process

The research process is done after the results of the questionnaires that are disseminated and returned to the researchers so that the data will be processed. The research method used is quantitative method with statistical analysis. In doing the analysis this research will use correlation analysis, intercorrelation analysis, factor analysis, multiple linear regression analysis, model test, and model validation. In correlation analysis, according to Sugiyono (2007) guidance to provide interpretation of correlation coefficient with the numbers 0,00 - 0,199 which is low number, and very strong number 0,80-1,000. The author uses the value of r> 0.6 in this study

because 0.6 means having strong value. In the intercorrelation analysis is done in order to know the correlation between intercorrelation r and independent variables. Test model used in this research is by using test method F, T, and autocorrelation. After all the analyzes done and found the results, the authors will conclude which variables are most influential on the performance of time on company X. From these results will be input on company x to make improvements to the quality of the company. With the discovery of the most influential and potentially significant variables, the most appropriate method approach for the case of firm x will be easy to know.

5.3. Research Findings

After conducting in-depth examination, there are three variables in three factors. They are the difficulties that are felt by workers to understand the standards required by management, customer satisfaction, and supervision has not been consistent. Of the three variables, conducted a study to obtain the standard quality method that is considered most appropriate to solve the existing problems within the company x. In the difficulties of the workers in understanding the quality standards that management wants, it will result in the worker's performance of the work that has become his duty. Workers will be confused in doing their work so that it will potentially lead to work errors that will result in repetition. In addition to cost, of course the performance of time will not work properly. In the variable of customer satisfaction, each company will try to meet customer satisfaction. Each company is competing to satisfy its customers which impact on future repeat orders. And the last is that supervision has not been consistent, in this case the impact on less consistent results. Not without reason the authors reveal it, with a system of pay workers based on what they do it is clear they will do the job quickly and sacrifice the quality of the goods. So when they are closely watched, the fasade production as well as the installation will go well. Rather if it is not monitored, they will work regardless of quality.

Of the three variables, this research reviews which quality standards are appropriate to overcome these problems and the result is ISO 9001: 2015. ISO requires workers to write what they do, requiring the formation of a good SOP for the company, customer-oriented, forming risk analysis in order to take preventive steps. ISO 9001: 2015 according to this research that run the principle of TQM, which distinguishes the ISO 9001: 2015 audit so that the process will continue to run, if there is a mistake or new problems will be searched the best way to solve the problem and re-done until the next audit.

The conclusion in this research will answer from research problems, research are discussed a lot about the implementation of quality standards to improve the performance of the apartment building project time, did not rule out to perform other performance improvements such as cost and quality. Improvements within the company under study should not just stop there until this point, but continue to be improved on other aspects. In the first point of the research problem, it contains what the problems faced in the construction process of building façade, as explained in the discussion of research issues stated that there is a fact that the supervision during the production of fasade is not done well. So that mistakes happen that should not happen. In every part of the work has been placed supervisors to ensure all goes according to the planning, but still often happens things such as slump concrete not according to the provisions or events such as when the installation of bracket location is not in accordance with the provisions so that the facade panel can not be installed with the right time. The main problem in company x is that the company grows into a large construction company but not followed by the application of quality standards. Answering the second question, the quality standard referred to in this study is a quality standard that can solve problems that have occurred so far. The quality standard is sought by conducting a study on company x. Next question about the factors and variables can be seen in section chapter methodology of chapter 3.3, there are details of forty seven variables packed in six factors then after testing the variables found three variables that significant relationship is difficulty felt by workers to understand Standards required by management, customer satisfaction, and supervision have not been consistent. From the results of in-depth study by the author, from the three variables can be concluded that ISO 9001: 2015 is a quality standard that can solve problems that occur. Not without reason, but because ISO 9001: 2015 forces to do the recording of what is done, so if it does not happen recording can be known which sector is less supervision. Then ISO 9001: 2015 philosophizes what is good for business, also good for the company. In the preparation of SOP was done in a way that can be done by workers well but does not cause harm to the company. If the method is difficult to do or have a disability, then when the audit will be found the problem and performed remedial measures. And do not forget if ISO 9001: 2015 oriented to customer satisfaction. So that ISO 9001: 2015 is considered the most appropriate method to be done in company x.

6. Conclusion

7. References

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