

Risk Analysis of the Development of Flats That Affect the Performance of Construction Process in Marunda, North Jakarta

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ABSTRACT :This research is conducted in order to analyze risk management factors on the performance of the construction process, especially from the aspect of implementation time, which is the implementation stage of the development of flats (rusun) Marunda, North Jakarta. Instruments used in this study using two research instruments, namely Expert instruments and instruments of respondents. Research variables used were obtained from literature study and questionnaire distribution. Questionnaires were distributed to forty selected respondents as construction executives and five construction experts and all the questionnaires were returned in accordance with established provisions. Primary data from respondents were processed by statistic using SPSS (Statistical Package for the Social Sciences) version 22. Validity test, reliability test, intercorrelation analysis, factor analysis and multiple linear regression analysis.

KEYWORDS :Risk analysis, Construction process performance, Marunda flats.

I. INTRODUCTION

The city of Jakarta is a rapidly growing city and is a barometer of welfare benchmarks from other regions. The total area of Jakarta city reaches 662.52 km², including Kepulauan Seribu (source: Central Bureau of Statistics (BPS) of DKI Jakarta Province). According to BPS DKI Jakarta Province, in 2003 the number of Jakarta residents has reached 9,116,248 inhabitants, whereas in the year 2013 the number of residents of DKI Jakarta has reached 10,101,000 inhabitants of the total population of Indonesia which reached 254,9 million inhabitants. For the survey of BPS DKI Jakarta about housing needs are as follows: In 2003 requires 256,291 housing units, in 2013 requires 315,238 housing units.

Based on the above data, the increase of population of DKI Jakarta Province per 10 years to 893,752 people, with the housing needs per 10 years to be 58,947 housing units. While the population growth rate of DKI Jakarta Province per year to 89,375 people, with housing needs per year to 5,895 housing units. To overcome the number of residents with the needs of the house and the limitations of existing land, the government of DKI Jakarta to innovate by building flats (rusun) for middle-scale s / d scale. (Jakarta Provincial BPS: Scale Up 20%, Medium Scale 40% and Under Scale 40% of the total population of DKI Jakarta).

The people of DKI Jakarta still need a lot of decent and comfortable places to live, seeing that there are still residents of DKI Jakarta who live on the perimeter of river / river, under highway / flyover, in city parks, on railway, fish, and much more. Seeing this condition, the government of DKI Jakarta made an innovation by conducting the development of a flats designated for lower middle-class citizens or residents who live not in place according to the rules of the City Planning Office of DKI Jakarta Province. With the existence of these flats, residents who live not in place will be relocated to flats that have been / will be built by the government of DKI Jakarta. Implementation of this relocation is

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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not easy because of many factors that can make it a constraint, such as people who do not want to move, transportation facilities that do not support, the price of evictions are not appropriate (according to citizens) and much more. Therefore, it is very important that this research is done, so that the process of development of apartment project (rusun) Marunda, DKI Jakarta Utara can be done as planned in the beginning, both from time dimension, cost dimension and quality dimension.

II. LITERATURE REVIEW

The definition of risk management is a structured and systematic process of identifying, measuring, mapping, developing alternative risk management, and monitoring and controlling risk management (Djohanputro, 2008). An understanding of the things that can be an obstacle in a process, understanding how to overcome it, understanding to anticipate potential factors that can be a risk (DjoenSantoso, Stephen Ogunlana, Takayuki Minato 2003). According to Clough and Sears, 1994, risk management is as a comprehensive approach to deal with all events that cause losses.

Project Risk Management

Project Risk Management is a process for planning, identifying, analyzing and responding to project risks (Dr.Ir. Erizal, MAgr, Department of Civil and Environmental Engineering). Project Risk Management can mean another as a systematic formal process of identifying, analyzing and responding to all forms of risks that occur throughout the course of the project process to achieve acceptable minimum thresholds that can be eliminated in the control process (Jamal F.Al-Bahar and Keith C. Crandall, 1990). Risk management is all a series of risk-related activities: planning, assessing, handling and risk monitoring, Kerzner, 2001. The objective of risk management is to recognize risks in a project and develop a strategy for reduce or even avoid it, on the other hand should also be sought ways to maximize the opportunities available, in order to be an advantage, Wideman, 1992. Risk management is an attempt to know, analyze and control risk in each activity with the aim of obtaining greater effectiveness and efficiency, Darmawi, 1996.

Risk During Construction Period

In the construction process there will always be various implementation risks, among others: 6 (six) risk factors of construction process - God factor, physical factor, financial factor, environmental factor, design factor and construction factor (Jamal F.Al-Bahar, 1990) . Various risk factors of implementation according to DjoenSantoso, Stephen Ogunlana, Takayuki Minato, namely: physical factors (earthquakes, land contours, wind, flood, fire), personal factors (technicians and laborers, subcontractors, staff and supervisors, engineers, consultants, clients), technical factors (materials, tools, field conditions, baseline conditions, construction process), occupational safety factors, design factors, political factors, financial factors, work contract factors, environmental factors.

In this study there are variable X as many as 69 variables and Y variables as much as 1 variable. Variable X definitions include: difference understanding of image specification between Owner and Contractor (X1), unclear articles (X2), incomplete document (X3), non-loan assistance (X4), late payment by Owner (X5) , incorrect design (X6), untested design (X7), design changes (X8), changes in technical specifications (X9), structural error (X10), incorrect work methods (X11), difficulties of using new technology (X13), APP estimation error (X14), time estimation error (X15), improper human resource provision (X16), existence of change order (X17), report daily / weekly / monthly / incomplete (X18), non-acceptance of Contractor's work by Owner (X19), Contractor's non-timely and quality work (X20), claim of Contractor to Owner (X21) answer to maintain quality (X22), (X23), late construction of facilities and access (X25), accurate soil data (X26), soil test results that are not achieved in accordance with the provisions (X27), foundry cracking foundry (X28), unloading plug installation (X29), casting of columns that do not match the image coordinates (X30), non-vertical foundry casting (X31), foundry foundation with aqueous conditions (X32), non-humidified floor casting with water / curing (X33), foundry mixing water in trumix (X34), unbanked floor but (X35), unformed concrete / slump test results (X37), foundry not matching the specified quality of concrete (X38), errors of the survey team in marking (X39) , quality of material not in accordance with specification (40), difficulty of mounting of formwork / scaffold at high location (X41), work of setting and assembling of iron (X42), slope of structure after reach height (X43), sabotage and job destruction (X44) , corrugated plates (X45), corrugated floor tiles (X46), non 90

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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'(X47) wall bridges, wall paintings, non-uniform plafonds (X48), MEP boards (X50), installation of non-precision door frames (X51), late ceramics installation (X52), unloading ceramic work of floor and wall (X53), manpower (X54), small work productivity (X57), labor wage increases in certain times (X58), accidents and safety in work (X59) (X60), material price increment (61), non-fulfillment of demand with arrival (X62), lack of material storage and work equipment (X63), unworkable material / equipment X64, loss of material (X65), inaccurate procurement of materials and equipment (X66), inflation (X67), payment system from Contractor to Worker / Worker (X68), unfinished licensing from beginning to current project (X69) and all of the four variables above, can affect the construction process of the development of Flats in Marunda, North Jakarta (Y).

Benefits of Risk Management

The usefulness of risk management is to increase the chances and impact of positive events and reduce the opportunities and impacts of adverse events (Dr.Ir. Erizal, MAgr, Department of Civil and Environmental Engineering). According to Darmawi, 2005 the benefit of risk management is to facilitate decision making when dealing with complicated issues so that the intended target can be achieved, such as: safety, peace of mind, minimize cost, stabilize income, minimize / eliminate disruption in process, a process, social responsibility to employees and society.

III. RESEARCH METHODOLOGY

The Research Process

The process of research is done by several stages, such as: Phase I Risk Identification, this stage is the stage of background and formulation of research problems, literature study, determination of respondents and research methods, determining factors and research variables, questionnaire making and data retrieval. Then followed by phase II Risk Analysis, this stage is the stage of data processing factors and research variables, stages of analysis and discussion. Then followed by stage III Causes of Risk, this stage is the stage of analysis of the causes of the risks derived from the analysis and discussion. With the last stage, namely stage IV Risk Impact, this stage is a stage that contains the impact of the discussion and the causes of risk, as well as conclusions and suggestions.

Research Respondents

Respondents in this study involved professionals involved in the implementation of the development of Flats in Marunda, North Jakarta. Selection of respondents is based on the needs of research, namely to know the factors that affect the performance of the construction process of the construction of the flat, where it is related to the background of the problem and in this case the selection of respondents conducted on the main contractor.

The selection of respondents from the main contractor, it is intended that this study get accurate data due to the interaction of the questionnaires distributed to the respondents.

Research Instruments

Understanding of the research instrument is a form of assistive tool used in research activities by collecting data so that the purpose of the research conducted can be achieved. The tools used in the research can be the distribution of questionnaires, data collection from the study sites and interviews to the parties needed in the study.

Given the data or information obtained from an activity / environment, then the data can explain the characteristics of the activity / environment.

Research instrument is obtained through two ways, namely through primary data and secondary data. Understanding primary data is the main data for research analysis and secondary data is supporting data for research analysis.

Primary Data

The definition of primary data is data obtained by researchers directly from respondents, both in the form of individuals and in the form of institutions. Through this way, therefore the data obtained is called the main data.

In this study, the primary data was conducted by distributing questionnaires to experts and personnel involved in the process of developing a flats apartment Marunda, North Jakarta.

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Secondary Data

Understanding secondary data is data obtained by researchers indirectly from respondents, both in the form of individuals and institutions. This secondary data obtained by researchers from the literature / libraries related to construction management, especially the risk management of construction processes that affect the performance of the development process of flats in Marunda, North Jakarta.

Research Methods

Understanding research methods is a way in solving the problems of a study. In a research method there are several stages of activity, which among others is the initial stage of research up to the final report stage of the study. Stages in this research process may consist of reviews (survey), analysis and case studies. According to Robert Yin (2002), in carrying out the research need a strategy to get the purpose of the research, it includes 3 (three) things, namely: the type of questions that are used, control of the events studied, the focus of ongoing events or just completed .

The type of questions used in achieving the objectives of the study, then the type of question should be related to the research method to be used. In this study selected by Survey Method in order to answer research question.

Understanding survey methods is a way of investigating to obtain actual data from the symptoms that arise from a project, whether about economic, social, political and other symptoms. This investigation phase is conducted simultaneously on a number of individuals or units, either by survey or by sample.

IV. ANALYSIS OF RESEARCH AND DISCUSSION

Risks in the construction of the Marunda flats

This study aims to find out the things that become obstacles in the development process of Marunda apartment which later from the data determined solution of completion. In the process of building the apartment Marunda consists of various kinds of variables that can be a constraint, among other variables X (free) and variable Y (bound). For the X variable obtained from literature study and Y variable is the purpose of this study, which is obtained through the background of research problems. In this study there are variables X (free) there are 69 variables X (free) and 1 variable Y (bound). This variable is obtained after passing expert expert test first, which then distributed to the field (Contractor), so that all variables in the questionnaire format can be filled and given input by the Contractor team, so that the data obtained for the research will be much more detail and accurate.

Stages of research done by doing the first stage, which is doing stages correlation variable X with variable Y, which produces as follows: X1, X2, X3, X21, X9, X16, X27, X31, X33, X38, X42, X45, X57, X59, X60 and X63. Then continue by doing Intercorrelation test, which is doing analysis between variables X, which aims to know the closeness of the relationship between independent variables with other independent variables. In the intercorrelation analysis, variables that have a correlation value > 0.4 with more than half the total number of variables tested, will be removed from the model. Of the 20 variables tested, then to pass in this intercorrelation analysis the variable must have at least 10 pairs with other variables that have correlation value < 0.4 . From the intercorrelation analysis results obtained 7 independent variables that have a correlation value < 0.4 , which then followed by the stages of factor analysis.

Factor analysis is performed to form several groups of selected independent variables from the results of intercorrelation analysis that are considered valid to explain the factors that can affect the performance of the development process of the Marunda apartment. Factor analysis begins with the Barlett of Sphericity test and Keizer Meyer Olkin Measure of Sampling Adequacy (KMO). This test is performed to measure intercorrelation level between variables and whether or not there is a factor analysis with $KMO > 0.5$ criteria and Bartlett's test of Sphericity at significant numbers < 0.05 .

The value of KMO obtained is 0.671, above which is hinted at 0.5 and Bartlett's significant number 0.001, below 0.05 so that factor analysis can be done and there is no significant relationship between independent variables inside and outside factors.

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Of the 7 independent variables analyzed, will then form two component factors. The independent variable of the component of factor 1 is X1, X3, X16, X25, X27, X51. The independent variable of component factor 2 is X57.

Regression Test

Regression method used in this research is regression analysis with stepwise method. With this method all free variables analyzed will be filtered so that the free variable that can explain the dependent variable. These variables are called as predictor variables.

Model Summary^e

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.760 ^a	.578	.564	.3412	
2	.855 ^b	.731	.714	.2766	
3	.892 ^c	.797	.775	.2449	
4	.910 ^d	.828	.804	.2291	2.073

- a. Predictors: (Constant), X25
- b. Predictors: (Constant), X25, X1
- c. Predictors: (Constant), X25, X1, X57
- d. Predictors: (Constant), X25, X1, X57, X16
- e. Dependent Variable: Y

Based on the above table, the number of regression model that formed is 4 regression model. The first regression model consisted of only 1 variable, that is the predictor variable that is X25 with the value of R2 0,578. This value of R2 gives the meaning that X25 variable contributes 57,8% to dependent variable (Y, performance of Marunda apartment development process). The value of R2 from combination of model 2 is 0.731. To get big contribution of variable X1 to variable Y, hence calculated difference between regression model 1 and regression 2 model that is equal to 15,3%. And then with the same calculation X57 contributed 6.6%, X16 contributed 3.1%, while the remaining 17.2% described outside of these independent variables.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
4	(Constant)	-2.994	.779		-3.842	.001		
	X25	.583	.099	.546	5.896	.000	.715	1.398
	X1	.716	.139	.404	5.137	.000	.991	1.010
	X57	.176	.052	.282	3.383	.002	.885	1.130
	X16	.136	.060	.199	2.268	.031	.800	1.249

- a. Dependent Variable: Y

Based on the above table, the regression equation constant value is -2.994, the variable coefficient of X25 is 0.583, the coefficient of variable X1 is 0.716, the coefficient of variable X57 is 0.176, the coefficient of variable X16 is 0.136. From the values of coefficients of these variables, obtained the regression equation as follows:

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$$Y = -2,994 + 0,583 X25 + 0,716 X1 + 0,176 X57 + 0,136 X16$$

V. CONCLUSION AND IMPROVEMENT

The implementation of Marunda apartment development process is still experiencing some obstacles in the field due to the factors that become dominant in the implementation, among others: contract review factor, design and technology review factor, technical factor and power and material factor. For contract review factor has variable X1, while design and technology review factor has X16 variable, while technical factor has X25 and X57 variable.

From the factors and variables mentioned above, the dominant constraints faced in the development process of the Marunda apartment project, among others are the delay of development of facilities and access (X25), the difference in image understanding and technical specifications between Owner and Contractor (X1), small work productivity (X57) and improper human resource provision (X16).

Similarly, the factors and variables that can be a constraint in achieving the performance of the Marunda apartment construction process, so that the planned time performance can not be achieved, because the implementation time is up to January 2018, while up to April 2018 is still in the finishing work phase. It states that the project is delayed implementation time.

Recommendations for improvement of technical factors with the delayed variables of construction of facilities and access to employment (X25) get some views from the parties, among others: according to the Contractor that this variable can be improved with the support of the Owner to land conditions for the construction of facilities and access immediately prepared (permit, community environment and so on), so that the Contractor can immediately carry out the stage of his work. While according to the Owner is the work program, work program, work tool program as well as capable personnel in the construction of facilities and access to work in the project. According to AdwoaBoaduaYirenkyi-Fianko Nicholas Chileshe, 2015, by improving the internal management process of the Contractor by identifying the work needs of both material, work tools and labor, work schedule, project situation and conditions, so that work can be carried out according to the schedule already determined so as not to impede other work and with the support of the Owner in licensing and the condition of the project environment is safe and conducive.

For contract review factor with variable of understanding of image specification between Owner and Contractor (X1), the improvement recommendation (improvement) according to Contractor make improvement of understanding of drawing specification between Owner and Contractor is with a mature and correct understanding first among Consultant Planner with Owner, so that when the Contractor to discuss the design drawings with the Owner, it will be easier to achieve mutual understanding, thereby reducing the level of errors in the field. According to Owner improvements in these variables by doing the image and document learning contracts are correct and deep so that during the clarification process, all the pictures and problems can be discussed in detail and in depth. Meanwhile, according to Abdulaziz M. Jarkas Theo C. Haupt, 2015, that is by doing high intensity in the clarification of the design drawings, requesting the image of the design is not complete and discuss all design drawings in detail, detailed and complete from the Contractor to Owner.

According to the Contractor, the proposed improvements to the technical-labor and material factors with the small work productivity variables (X57) are with the support of internal management, both of the workforce, the work tool, the work material up to the employment bonus when it reaches the target which has been determined, so that personnel will work more willingly to achieve targets determined by the management. According to the Owner is with the availability of a capable workforce and support tools and good contractor management. According to AdwoaBoaduaYirenkyi-Fianko Nicholas Chileshe, 2015, is to improve communication between the Project Head and the team as a whole, so that the programs and targets to be achieved can be communicated clearly and in detail. This should be done on a regular basis, so that the project team will always be sustainable.

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