ANALYSIS OF DELAYS IN HOUSING CONSTRUCTION PT. TATA BUILDING FACILITIES USING THE FAUL TREE ANALYSIS METHOD

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Abstract-

Analysis Delay in Housing Development is an activity that aims to build a facility and infrastructure within the planned time provisions but in the implementation stage it cannot be completed within the agreed time, therefore the author conducts research using the Faul (Tree Analysis) FTA method which is used qualitatively has 2 (two) basic notation types: events and logic gates. Event notation consists of symbols, among others.

Keywords: Housing, Construction, Delay Analysis

1. Introduction

Construction project is an activity that aims to build a facility and infrastructure within the planned time frame. According to Nurhayati (2010), a project can be interpreted as an effort or activity organized to achieve important goals, objectives and expectations using the budget and available resources, which must be completed within a certain period of time.

Construction project is an effort to achieve a result in the form of infrastructure. Construction projects have unique characteristics that are not repeated, so the process that occurs in a project will not be repeated in other projects (Ervianto, 2004). In a construction project there are fundamental limitations in the form of budgeted costs and quality and time that must be met, these three things are called triple constraints.

Therefore, the importance of making effective and efficient time scheduling a priority in planning a construction project. With the development of technology and science, good scheduling in the construction of a project can certainly affect the efficiency and performance carried out, thus causing a project to be carried out quickly, quality and cost-efficient. In every project on the time schedule that has been planned, and the project implementer must follow the time schedule as a guideline in development.

This research uses a case study of the Permata Cikarang Cluster Housing Building.

II LITERATURE REVIEW

This literature study is carried out to study more deeply the Faul Tree Analysis Method based on references that are relevant to the research being conducted. these references are based on relevant scientific books and journals.

1. Analysis Housing Construction Delay.

The definition of delay according to Ervianto (1998) is as an implementation time that is not utilized in accordance with the activity plan, causing one or

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more activities to be delayed or not completed according to the planned schedule. Project delays can be caused by the contractor or from the owner. Delays can also occur but not caused by these two parties. Delay in construction projects means an increase in the implementation time of project completion that has been planned and stated in the contract document. Completion of work not on time is a lack of productivity levels and of course all of this will result in waste in financing, both in the form of direct financing spent on government projects, as well as in the form of investment overruns and losses on private projects.

Project delays are often the source of disputes and claims between the owner and the contractor, so it will be very expensive, both in terms of the contractor and the owner. The contractor will be subject to penalty fines in accordance with the contract. In addition, the contractor will also experience additional overhead costs while the project is still ongoing.

From the owner's side, project delays will have the impact of reducing revenue due to delays in operating the facility. Delays in project completion can be avoided or reduced if the project schedule assessment is done properly. The active role of management is one of the main keys to successful project management.

2. Faul Tree Analysis (FTA) data.

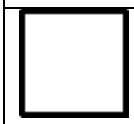
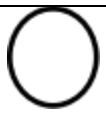
FTA is a technique used to identify a risk that plays a direct role in the occurrence of failure. This method is done with a top down approach, which begins with the assumption of failure or loss from the top event and then details the causes of a top event to a basic failure (root cause).

In its application, the qualitatively used FTA technique has two basic notation types: events and logic gates. Event notation consists of symbols,

3. Faul Tree Analysis (FTA) method.

Analysis Construction Delay Using the Faul Tree Analysis (FTA) Method. It is a one-way diagram and connects the information developed in the failure analysis and its consequences. FTA is a tree-like structure, which is presented in the form of lines from a logic that is connected to external system failures usually called TOP events, and can develop to regional failures called start events. FTA is widely used for studies related to risk and reliability that cause failure of an engineering system. Potential events that cause the failure of an engineering system and the probability of their occurrence.

According to Pasaribu, et al, (2017). There are symbols and terms used in Faul Tree Analysis (FTA). namely the Event symbol, Gate Symbol and Transfer Symbol, the diagram symbol used to express the relationship is called a Logic Gate. The output of a logic gate is determined by the events that enter the gate. Adpun gembar and explanation of each symbol is as follows.

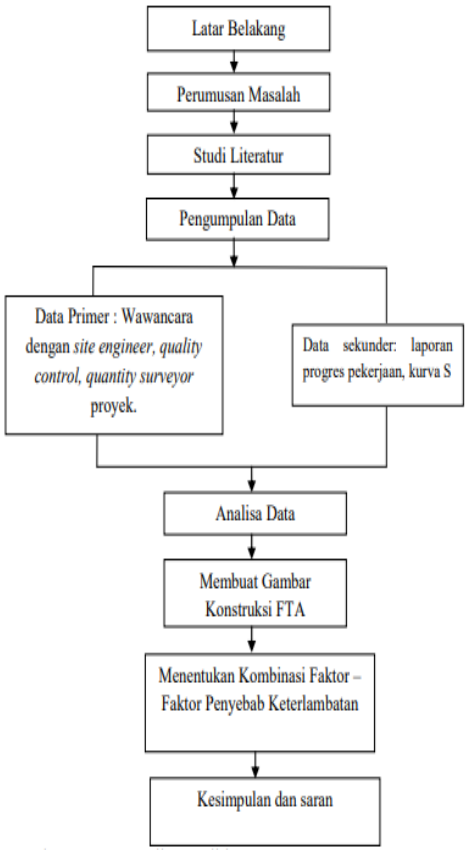
Symbol	Symbol Name	Description
	*Top Event*	The peak event for which the cause of failure is to be determined is located in the restricted section.
	*Basic Event*	Basic events that do not require further analysis
	*Conditioning Event*	A certain [conditional] event that is used in logic gates when certain conditions are met
	*Undeveloped Event*	Undeveloped event so there is no need to look for the cause of failure due to unavailability of information
	*Transferred Event*	Further descriptions of events are on the next page

III RESEARCH METHODS

A. Research Stages

Research is an activity to obtain or gain knowledge or answers to the problems faced. In a study, a researcher must know the stages of research so that the research conducted can be systematic, structured and also logical. Therefore, the author makes a coral in the

research as follows.



B. Data Analysis

At this stage all the data that has been collected will be presented in depth to obtain results and conclusions. To be able to make it easier to analyze the problem, a control analysis technique is used which consists of:

A. Identify overdue work items

B. Identification of factors causing delays

C. Data Collection The data sources used in this study come from work documents that cannot be carried out on time with the results of interviews that researchers conducted with each informant, among others.

a. Company Data

b. Interview

c. Documentation

d. Recordings

IV Results and Discussion

Table 4.1 Main Activities of the Development Project.

Activities	Plan (days)	Realization (days)	Late (days)
Main Steel	297	376	79
Steel Appurtenances	261	317	56
Pile	120	120	0

Table 4.1 shows that the construction project activities are divided into 3 parts, namely main steel work, steel appurtenances, and piles. The construction project has spent 1 year and 2 months from mid-August 2022 to mid-October 2023 with an initial work plan for 1 year from mid-August 2022 to mid-August 2023. This means that it can be concluded that this project has been delayed for 2 months.

The explanation above is about the main activities of the development project. From these data it can be seen that the housing development is experiencing delays in this project from the main steel and steel appurtenance work. Experiencing a delay of 2 months, these things that occur are interrelated with each other

because of the problems of one of the fields above can affect other workmanship. This research was only conducted on the housing construction process of PT Tata Bangunan Sarana Bekasi.

CONCLUSIONS

From the results of the research conducted in this task, the following conclusions can be drawn: The main factors causing delays in development projects using the Fault Tree Analysis (FTA) method are the production process is not going well, the management system is not good, and the design process is hampered. The results of the calculation of the minimum cut set of each of the main problems are as follows:

1. The total contract value obtained fines or penalties between Rp 323,100,890, - to Rp 2,843,287,832, - 69 3. the results of the Fault Tree Analysis (FTA) of the delay in the jacket structure construction project are in the form of a diagram that explains what prevention must be done in overcoming threats, for example for the threat of "material is not available in the market", the prevention step is to look for alternative materials abroad or find a subscription supplier that guarantees material availability. This diagram also explains what are the steps to recover or reduce the impact (mitigation) of the consequence (consequence) that occurs, for example in the consequence "Construction was successfully completed. However, it experienced a slight delay between 1 week and 2 weeks due to unsupportive facilities and infrastructure" then the impact reduction step is to carry out routine maintenance or buy equipment that the company does not yet have. In the step "buying equipment that the company does not yet have" there is a barrier factor, namely limited funds in the range of 1 week to 8 weeks (2 months) caused by various factors and subject to a fine or penalty of 0.1% per day from the total contract value of the jacket structure construction project of Rp 64,620,178,000, -. From

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