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## FACTORS CAUSING TIME DELAYS COMPLETION OF CONSTRUCTION PROJECTS (CASE STUDY ON FACILITIES BUILDING CONSTRUCTION PROJECT SPORTS STAGE 5 CONSTRUCTION OF THE EAST STAND)

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**ABSTRACT**

Inaccuracy in planning project activities during project implementation greatly affects implementation delays in the field. The purpose of the study is to determine and analyze: (1) the causal factors that contribute to project completion delays, (2) the causal factors that contribute to the dominant delay in project completion, and (3) delay risk management. In the Sports facilities (Eastern Tribune Development) project. Cirebon Regency. This study is a type of quantitative descriptive study. Data collection was done through FGD, interviews and questionnaires distributed to 10 qualified respondents in the construction sector. The resources of this study are the cause of the delay in the completion of the projects. A House of Risk (HOR) approach was used to analyze the data. Research results show that (1) Cirebon Regency Sports Facilities Building (Eastern Tribune Development) project has 14 risk events and 17 identified risk causes that cause delays. (2) Control factors that cause delays in project completion include: material factors, contract document factors, project owner factors, and contractor and design consultant factors, and (3) delay risk management options, including: (a) good communication and coordination. with the owner; (b) apply a comprehensive planning approach to procurement of materials, (c) coordinate current project drawings between consultants and field workers, (d) contact consultants and supervisors.

**Keywords**: *Reference factor, Risk house, House construction*

## 1. INTRODUCTION

When implementing a construction project, conflicts often arise between plans and execution. This gap can cause delays in project completion, causing cost overruns. Factors that can delay the completion of a project include: inappropriate construction methods, quality of work, inappropriate materials and reduced labor[1]. When implementing a construction project, conflicts often arise between plans and actual execution. Inaccuracy in planning project activities during project implementation greatly affects implementation delays in the field[2]. Therefore, careful planning is necessary to help manage work progress, accurate work completion schedules, and project implementation progress.

In the sports building construction project (Eastern Tribune Development), the project was delayed due to a dispute. This dispute comes from many parties, each party has different problems, so it takes a lot of time to find out the reasons for the delay and find an appropriate solution. In addition, it is necessary to analyze delays and determine how to minimize these delay factors.
Three common risks in the implementation of a construction project, often referred to as the project management triangle, are cost, time and quality risk. If this risk is not addressed immediately, it will hinder the success of the project. In projects, there are many sources of risk that cause interruptions in the implementation of the project. Activity section latency is high which indicates that this section is not well managed due to lack of resources from both project manager and project manager[3].

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The project is delayed if planning and monitoring are not carried out properly. There are many things that can happen in a construction project that increase the working time, which ultimately delays the completion of the project. Project completion is delayed due to reduced productivity. Project delays affect other aspects of the project. For example, cost overruns are associated with efforts to speed up work and increase the total cost of a project. Another common effect is a decline in quality because work is forced to be completed quickly and many technical issues are overlooked in order to reduce project delays[4].

The goal of the construction project is to complete the project quickly, using the costs effectively and efficiently. Systematic organization of project activities requires project management from start to finish. Delay in the completion of a project is an undesirable situation because it can cause loss to investors and contractors due to time extension and additional costs. Therefore, project managers must be able to use their time in project activities as efficiently as possible so that the project is completed within the agreed schedule and costs[5].

The purpose of the study is to determine and analyze:
1. the causal factors that contribute to project completion delays,
2. the causal factors that contribute to the dominant delay in project completion,
3. delay risk management. In the Sports facilities (Eastern Tribune Development) project. Cirebon Regency.

## 2. RESEARCH METHODOLOGY

This study is a type of quantitative descriptive study. Data collection was done through FGD, interviews and questionnaires distributed to 10 qualified respondents in the construction sector. In this study, only the opinions of experienced and qualified parties with at least 5 years of experience in the field of construction projects are the subject of research.

The weighting of the criteria in this study is done through a peer review process. For a more representative representation of the material, the experts participating in the FGD will involve internal experts such as contract holders, including design, project implementers, project quality and quality assurance, process safety program, field engineers and technical maintenance line managers. to provide an assessment of preventive measures or risk management related consequences, events, relationships and difficulties in terms of conflicts or delaying factors that cause delays in the completion of the sports facilities construction project (East Tribune Development).

A House of Risk (HOR) approach was used to analyze the data. The HOR method approach is divided into two phases, namely HOR1 and HOR2. HOR1 is used to identify or identify priority risk factors in prevention, while HOR2 is used to prioritize effective risk management according to budget and available resources[6].

The instruments in this research are the causes of delays in project completion. The 5 indicators for these 17 variables can be seen in Table 1.

**Table 1.** Indicators and Variables for Delay in Project Completion

| Indicators | Variables |
|---|---|
| 1. Contract factors/ Documents | a. Insufficient planning documents |
| | b. Delay in issuing planning documents |
| | c. Nonconformities in planning documents |
| 2. Material/equipment factors | a. Increase in raw material prices |
| | b. Delay in arrival of raw materials |
| | c. Inconsistencies in some aspects of material details |
| | d. Miscalculation of the total volume of materials |
| | e. Difficulty obtaining materials |

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| Indicators | Variables |
|---|---|
| | f. Damage/loss of materials and components |
| | g. Tool damage during work |
| 3. Environmental factor | a. Bad weather conditions |
| | b. Security breaches during the project |
| 4. Project Owner Factors | a. Delay in payment of work progress |
| | b. Poor communication and coordination between the owner and other parties |
| | c. Keterlambatan dalam proses pengambilan keputusan |
| 5. Contractor Factors | a. Application of inappropriate construction methods |
| | b. The work scheduling plan does not refer to work effectiveness |

Source:[7][8][9]

## 3. ANALYSIS AND RESULT

### 3.1 Validity and Reliability Analysis of Research Instruments

Based on the risk event validity test of the 17 instruments, three variables were incorrect, so these three variables were not used. The validity test of the quantitative method gave an average I-CVI value of 0.812. This determines that the 14 questions asked to the respondents are considered valid and sufficient to measure the risk event variables. The reliability test was recognized as reliable with an intraclass correlation coefficient (ICC) of $0.840 \geq 0.80$. Based on the qualifications of the respondents, it was appropriate because the respondents used in this study were objective and representative when they answered the survey on this matter. due to delays in the completion of construction projects.

### 3.2 Causal factors that influence delays in project completion

Based on the identification, there are 14 risk events associated with project delay, which are related to 17 risk factors that may cause delays in the Cirebon Regency Sports Facilities Development Project (Eastern Tribune Development).
Based on theory-based research, especially the results of the sports hall construction project (Eastern Division Construction), the investigation of the causes is slow. Delays can be forgiven and compensated, especially those caused by investors giving entrepreneurs more time, but this is not the case in the current situation. Everything is the fault of the investor, some is the fault of the contractor, so there are many disputes that delay the completion of the project[10]. The reason for the delay in the completion of the Cirebon Regency construction project (Eastern Tribune Development) is listed in the category of simultaneous delays, which means that delays caused by investors and contractors are entitled to additional time and compensation for related costs with the extension of the deadline. This condition affects speed, quality and price. To overcome these delays, this study tries to apply the steps of the risk house method to analyze the delays and find appropriate risk management steps.

### 3.3 Causal factors that have a dominant influence on delays in project completion

Based on the calculation of Risk Priority Numbers (RPN) and Overall Delay Probability (ADP), this is a continuation of the delay risk analysis process. Aggregate Risk Value (ARP) to find the delay agent that has the greatest impact or dominant factor causing delays in Cirebon Regency Sports Facilities Construction Project (Eastern Tribune Development). The most common and many problems are primary operations. The results of the analysis of the dominant factors causing delays are shown in Figure 1.

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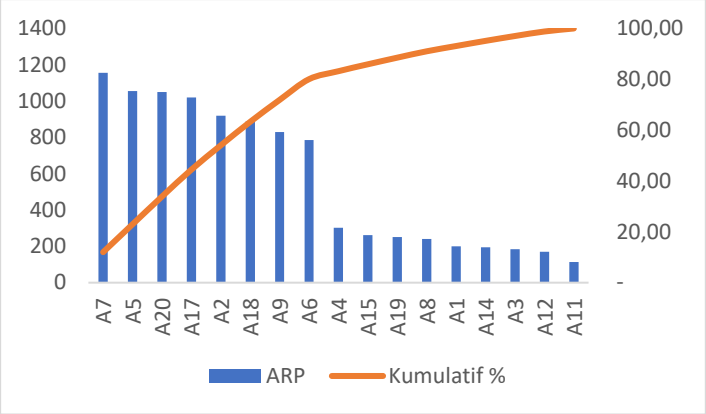


**Figure 1.** Pareto Chart ADP (Aggregate Delay Potential)

The ADP Pareto chart provides advanced cumulative percentages up to 80 percent. At the same time, other delay factors were considered insignificant. Therefore, the eight most dominant delay factors, viz. (1) materials must be ordered in advance, (2) unstable material prices, (3) duration and work order plans that are not properly organized, are the focus of further analysis, (4) lack of coordination and communication between contractors, consultants, and project owners, (5) faulty plans of design consultants, (6) errors and delays in decision-making, (7) inaccurate selection of materials, and (8) some. materials are hard to find.

**Table 2.** Ranking of Pareto Results from ADP (Aggregate Delay Potential) using the House of Risk (HOR-1) method

| Code Agent | ARP | Rang-king | % Cumulative | Delay Agent |
|---|---|---|---|---|
| A7 | 1155 | 1 | 12,00 | Materials must be ordered in advance |
| A5 | 1055 | 2 | 22,96 | Material prices are unstable |
| A20 | 1050 | 3 | 33,87 | The duration and planned work sequence are not arranged correctly |
| A17 | 1020 | 4 | 44,47 | Lack of coordination and communication between contractors, consultants and project owners |
| A2 | 920 | 5 | 54,03 | The design made by the planning consultant is invalid |
| A18 | 890 | 6 | 63,28 | Errors and delays in decision making |
| A9 | 830 | 7 | 71,90 | Inaccurate material selection |
| A6 | 785 | 8 | 80,06 | Some materials are hard to find |

Source: Result Analysis, 2024

### 3.4 Handling the risk of delays in the Cirebon Regency Sports Facilities (Eastern Tribune Development) project

In the House of Risk (HOR) approach, the strategic planning process is carried out using the second step of the House of Risk (HOR) matrix to develop mitigation measures to overcome potential delays.

**Table 3.** Second phase House of Risk (HOR) Matrix results

| Risk Agent | Risk Management | | | | | | | | | | ARP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PA1 | PA2 | PA3 | PA4 | PA5 | PA6 | PA7 | PA8 | PA9 | PA10 | |
| A7 | 10395 | 3465 | 3465 | 10395 | 3465 | 0 | 0 | 0 | 1155 | 0 | 1155 |
| A5 | 1055 | 9495 | 3165 | 3165 | 1055 | 0 | 0 | 3165 | 3165 | 0 | 1055 |
| A20 | 3150 | 3150 | 1050 | 1050 | 1050 | 0 | 0 | 0 | 0 | 0 | 1050 |

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| Risk Agent | Risk Management | | | | | | | | | | ARP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PA1 | PA2 | PA3 | PA4 | PA5 | PA6 | PA7 | PA8 | PA9 | PA10 | |
| A17 | 3060 | 9180 | 1020 | 9180 | 3060 | 9180 | 0 | 3060 | 3060 | 1020 | 1020 |
| A2 | 0 | 0 | 0 | 0 | 2760 | 920 | 0 | 0 | 0 | 0 | 920 |
| A18 | 0 | 0 | 0 | 0 | 0 | 890 | 0 | 8010 | 0 | 890 | 890 |
| A9 | 830 | 0 | 0 | 0 | 0 | 830 | 7470 | 0 | 0 | 0 | 830 |
| A6 | 0 | 0 | 0 | 0 | 785 | 0 | 0 | 785 | 0 | 785 | 785 |
| Tek | 18490 | 25290 | 8700 | 23790 | 12175 | 11820 | 7470 | 15020 | 7380 | 2695 | |
| Dk | 4 | 3 | 3 | 2 | 3 | 3 | 2 | 4 | 2 | 2 | |
| ETD | 4.623 | 8.430 | 2.900 | 11.895 | 4.058 | 3.940 | 3.735 | 3.755 | 3.690 | 1.348 | |
| Ranking | 3 | 2 | 9 | 1 | 4 | 7 | 8 | 6 | 5 | 10 | |

Source: Result Analysis, 2024

The Efficiency/Difficulty (ETD) value is the sum of the Efficiency Ratio (TEk) and the Difficulty (Dk). The priority value results from ordering the efficiency/difficulty (ETD) values according to the difficulty of performing the activity K from highest to lowest. Mandatory 1 is given to preventive actions with the highest severity total effective value. The highest precautions are the most effective preventive measures.

From the results of the House of Risk (HOR) analysis of the second stage, ten proposals were drawn up to mitigate delay risks, i.e. (1) general planning of the material warehouse, (2) introduction of new methods in the planning of material. stocks , (3) procurement of materials at a higher price. inexpensively, (4) coordinate consultants and field workers in designing work deemed competent, (5) ensure good communication and coordination with owner, (6) coordinate with consultants and monitor execution, (7) prepare drawing checklist, (8) ) update material lists to facilitate the selection of materials, (9) coordination of consultants and field workers in the design of approved drawings, and (10) storage of certain types of.

Based on the results of the research, it became clear that the factors affecting the project delay affect the continuity of the project work and also affect the project budget. From this explanation, it can be seen that in fact, project delays are bound to occur in construction works, so it is necessary to do good project management and prepare alternative methods to minimize the impact of factors that affect project delays. A delay is a situation where the contractor and the project owner are betting that the project will not be completed before the agreed time. This means that everyone involved in a construction project, including investors, developers and inspection consultants, can experience delays[11]. Project delay (construction delay) is a delay in the execution of works according to the employment contract, which is legally related to circumstances that lead to certain compensation claims. Project delays are caused by the contractor not completing the project on time according to the work contract[12].

Overcoming project delays requires specific measures that not only measure the risk, but can also address the risk of each delay factor to achieve appropriate and effective control methods. The HOR (House of Risk) method has the ability to overcome risks in an integrated way by identifying the level of risk and reducing initiatives for each factor causing delays. The HOR method is widely used in the manufacturing industry.[6].

It can be seen from the research results that the risk of delay is mitigated by removing obstacles or otherwise ensuring the progress of the work and moving it back to the plan, and if this is not possible, the line plan is maintained. Initially, it may be necessary to change the schedule, which will then be the basis for assessing the progress of the work next time.

From the theory of risk management, it can be seen that in the Cirebon Regency Sports Building Development Project (East Tribune Development) Cirebon Regency, risk management is included in the category of risk minimization, risk of risk occurrence or reducing the impact of damage.

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## 4. CONCLUSION

Based on the results of the analysis and discussion, it can be concluded as follows:

1. There were 14 risk events and 17 identified risk causes that influenced delays in the Cirebon Regency Sports Facilities Building (East Tribune Development) project.
2. Control factors that cause delays in project completion include: material factors, contract document factors, project owner factors, and contractor and design consultant factors.
3. Delay risk management options, including:

a. good communication and coordination. with the owner;
b. apply a comprehensive planning approach to procurement of materials,
c. coordinate current project drawings between consultants and field workers,
d. contact consultants and supervisors.

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