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Factors Causing Cost Overrun in Construction Projects in Central Sulawesi

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ABSTRACT

Cost overrun is a major challenge in the construction sector, potentially leading to project delays, increased expenditures, and even project failure. Therefore, identifying the factors that contribute to cost overruns is essential for improving the efficiency and success of construction projects. This study focuses on identifying the key factors causing cost overruns in construction projects. By understanding these factors, effective mitigation strategies can be implemented to reduce the risk of cost overruns. The research will employ a descriptive method to evaluate the relationship between various contributing factors. The descriptive research will involve several stages, including the identification of causal factors, questionnaire design, data collection, data analysis, determination of key factors, and control of these factors.

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INTRODUCTION

Cost overrun is a common phenomenon in construction projects, where the actual costs exceed the planned budget. This issue can lead to significant financial losses, project delays, and a decline in the quality of work delivered [Puteri, 2022].

One of the main causes of cost overrun is inaccurate cost estimation. Inaccurate estimates can result in unrealistic budgets, thereby increasing the risk of budget overruns. In addition, material-related factors, such as the rising prices of construction materials due to market fluctuations, can also cause actual project costs to exceed the allocated budget [Dwipurwanto, 2022].

Labor-related factors also significantly contribute to cost overruns. Low productivity or a mismatch between worker skills and contractor expectations, as well as a lack of labor discipline, can affect project implementation and increase costs. Moreover, equipment-related factors such as the availability and condition of machinery can cause delays and lead to cost overruns [Dwipurwanto, 2022].

Ineffective project management is another key contributor to cost overruns. Failures in coordinating various project aspects—such as resource allocation, work scheduling, and team communication—can lead to increased costs [Puteri, 2022]. Additionally, environmental factors such as unfavorable weather conditions may result in project delays and added costs [Dwipurwanto, 2022].

To address these challenges, it is important to identify the main causes of cost overruns and implement effective control measures. This includes detailed planning, maintaining effective communication among stakeholders, and utilizing digital technologies to monitor project costs in real time. Through such measures, projects are more likely to remain within budget and be completed on schedule.

Construction management is the process of managing all aspects of a construction project from planning to control, ensuring the efficient and effective allocation of resources to achieve satisfactory outcomes in line

with project goals. The key resources required during the construction process include cost, time, human resources, materials, and equipment.

A construction project consists of a series of interrelated activities aimed at achieving specific project objectives. In construction, three critical aspects must be considered: time, cost, and quality. In the construction industry—as in other service industries—agreements regarding cost, quality, and project timelines are established in the contract before construction begins. Each project must meet certain predefined constraints, including staying within budget, adhering to the schedule, and meeting quality standards. These three constraints—commonly referred to as the triple constraints—serve as the primary benchmarks for project implementation [Remi, 2017].

Cost overrun remains a prevailing issue in the construction industry, affecting cost performance to this day. From the contractor's perspective, cost overruns represent losses or additional expenses that reduce expected profit margins. From the owner's perspective, cost overruns imply the need for additional funding beyond the agreed contract value. In general, cost overruns lead to increased expenditures—an outcome that all business stakeholders seek to avoid [Anugerah, 2022].

In general, the factors contributing to cost overruns in construction projects include cost estimation, execution and labor relations, materials, labor, project documentation, natural/environmental factors, economic feasibility, equipment, and financial aspects [Sari, 2020]

METHODOLOGY

The stages undertaken to complete this research include: identification of causal factors, questionnaire development, data collection, data analysis, determination of dominant factors, and formulation of recommendations.

In the identification stage, a comprehensive literature review and survey were conducted to obtain both theoretical and empirical data regarding the key factors contributing to cost overruns in construction projects. These factors include planning, resource management, fluctuations in material prices, project delays, and external influences such as policies and economic conditions.

In the questionnaire development stage, questionnaires were formulated based on the previously identified factors to gather respondents' perspectives on the main causes of cost overruns in construction projects. The questionnaire was structured to collect information related to planning, resource management, material price changes, policies, and other external factors affecting project costs.

In the data collection stage, the questionnaires were distributed to respondents with experience in construction project management in order to obtain data on the relationships between the contributing factors to cost overruns. Respondents were selected based on their expertise and experience in handling construction projects, ensuring that the data collected would accurately reflect real conditions in the field.

In the data analysis stage, the collected questionnaire data were tabulated and presented in tables. A reliability test was then conducted to assess whether the respondents' answers were consistent or stable over time. Following this, descriptive analysis was performed to determine the mean value of the variable scales in the questionnaire. The mean values ranged from 1 to 5, with a level of agreement from strongly disagree (1) to strongly agree (5).

In the determination of dominant factors stage, after the data analysis, the most significant factors contributing to cost overruns in construction projects were identified based on the analysis results.

Finally, in the recommendation formulation stage, recommendations were developed based on the identified dominant factors contributing to cost overruns. These recommendations aim to minimize the occurrence of cost overruns in construction projects, particularly in the context of Central Sulawesi.

RESULTS AND DISCUSSION

Based on the completed questionnaires, validity and reliability tests were conducted using the SPSS software. The validity test results indicated that all items were valid, as they met the requirement of r-count ≥ r-table. The results of the reliability test are presented in Table 1, while the validity test results are shown in Table 2.

Table 1. Reliability Test Results

N of Items	Koefisien Cronbach's Alpha	Remarks
34	0,975	Reliabel

Table 1 shows that the reliability test results using the SPSS program produced a Cronbach's Alpha value of 0.976. This value is considered acceptable or reliable, as it exceeds the minimum threshold of 0.600, indicating a high level of internal consistency among the questionnaire items.

Table 2. Questionnaire Responses and Validity Test Results

No	Statement	Total Score	Mean	Pearson Correlate	Remarks
1	Not accounting for the effects of inflation and escalation	40	3,33	0,765	Reliabel
2	Not accounting for contingency costs	45	3,75	0,770	Reliabel
3	Uncertainty in cost estimation	41	3,42	0,685	Reliabel
4	High material prices	39	3,25	0,650	Reliabel
5	Insufficient fund allocation	39	3,25	0,645	Reliabel
6	Delays in worker payments	39	3,25	0,822	Reliabel
7	High frequency of design or execution changes	43	3,58	0,716	Reliabel
8	Excessive rework due to non-compliance with specifications	49	4,08	0,793	Reliabel
9	Lack of coordination between construction manager, planner, and contractor	43	3,58	0,679	Reliabel
10	Conflicts or disputes within the project	46	3,83	0,749	Reliabel
11	Incompetent project manager	49	4,08	0,700	Reliabel
12	Increase in material prices	44	3,67	0,783	Reliabel
13	Delayed material delivery to the project site	47	3,92	0,674	Reliabel
14	Material shortages during construction	48	4,00	0,827	Reliabel
15	Limited availability of materials in the market	42	3,50	0,671	Reliabel
16	Poor material quality	41	3,42	0,809	Reliabel
17	Material changes requested by the owner	50	4,17	0,823	Reliabel
18	Material damage in storage	50	4,17	0,823	Reliabel
19	Labor shortage	48	4,00	0,927	Reliabel
20	Poor labor quality	49	4,08	0,750	Reliabel
21	Lack of labor discipline	47	3,92	0,728	Reliabel
22	Low worker motivation	40	3,83	0,802	Reliabel
23	Poor worker attendance	46	3,92	0,873	Reliabel
24	Poor communication among workers	47	4,08	0,882	Reliabel
25	Lack of equipment availability	49	4,08	0,826	Reliabel
26	Equipment damage	49	3,67	0,710	Reliabel
27	Poor equipment quality	44	3,75	0,789	Reliabel
28	Difficult access to the project site	45	3,83	0,853	Reliabel
29	Project site located far from city centers or distribution hubs	46	3,83	0,768	Reliabel
30	Natural disasters	46	3,75	0,731	Reliabel
31	Labor strikes	45	4,25	0,827	Reliabel
32	Accidents	51	4,08	0,836	Reliabel
33	Weather conditions	49	3,83	0,816	Reliabel

From Table 2, it can be interpreted that the most dominant factors influencing cost overrun are: labor strikes, changes in materials by the owner, material damage during storage, excessive rework due to non-compliance with specifications, incompetent project managers, poor labor quality, poor communication among workers, lack of equipment availability, and accidents.

Labor strikes can be anticipated by building a healthy working relationship between management and workers through intensive communication, transparent employment agreements, and the fair fulfillment of workers' rights. Recommendations include holding regular meetings with worker representatives, providing adequate incentives and facilities, and preparing backup strategies in case of labor disruptions.

Material changes by the project owner often lead to additional costs and delays. Efforts to prevent this include defining material specifications from the outset and implementing a proper change order mechanism

so that every change is well-documented. Recommended actions include inserting clauses in the contract regarding the impact of changes on cost and time, and involving technical consultants before any change decisions are made.

Material damage during storage can be minimized by providing standardized warehouses, conducting regular inspections, and implementing a well-organized stock recording system. Recommendations include using technology-based inventory control systems, assigning dedicated logistics personnel, and establishing procedures for handling easily damaged materials.

Excessive rework due to poor quality can be prevented by tightening quality control from the beginning, performing material testing, and applying both quality control and quality assurance procedures. Recommendations include involving field-based quality experts, providing workers with training on quality standards, and implementing a Total Quality Management (TQM) approach.

Incompetent project managers can create major problems during implementation. The solution is to assign experienced and certified managers. Recommendations include applying a rigorous selection process for project managers, offering additional leadership and risk management training, and conducting periodic performance evaluations.

Low-skilled labor often causes delays and budget waste. To overcome this, technical training before execution is needed, along with the use of certified workers and continuous skill development programs. Recommendations include collaborating with certified training institutions, implementing a competency certification system, and giving appreciation to high-performing workers.

Poor communication among workers can lead to errors and repeated work. The solution is to conduct daily briefings, build a cooperative work culture, and use project management software. Recommendations include establishing clear formal communication channels, conducting team communication training, and appointing leadership that connects all team members.

Limited equipment availability can obstruct project progress and trigger cost overruns. Solutions include early planning for equipment needs, preparing usage schedules, and applying preventive maintenance. Recommendations include preparing backup rental contracts, using an equipment scheduling system, and assigning a dedicated team to handle equipment.

Workplace accidents not only cause financial loss but also endanger workers' safety. The solution is to enforce strict occupational health and safety (OHS) discipline, provide safety training, and require the use of personal protective equipment (PPE). Recommended actions include assigning a dedicated on-site safety officer, creating a fast incident reporting system, and rewarding projects that achieve a "zero accident" status

CONCLUSION

Based on the results and discussion, it can be concluded that the most dominant factors influencing cost overruns are: labor strikes, changes in materials by the project owner, material damage during storage, excessive rework due to non-compliance with specifications, incompetent project managers, poor labor quality, poor communication among workers, lack of equipment availability, and accidents.

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