COST ANALYSIS OF STRUCTURAL AND MEP WORKS IN THE THIRD PHASE OF THE GALAXY BEKASI HOSPITAL PROJECT

FINAL PROJECT

Submitted in Partial Fulfillment of the Requirements
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FOR THIS FINAL PROJECT

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ABSTRACT

The Final Project is one of the graduation requirements for the Diploma III Quantity Surveying Department at Bung Hatta University, Padang. This report discusses about calculation of structure and MEP work, bill of quantity, time schedule, and cashflow in the Galaxy Bekasi Hospital project. This project is the third phase is constructing a new building with a total area of 6598,2 square meters, comprising eight floors and one rooftop, has a contract value of 44.450.000.000 rupiah, with a division of 35% for structure works and 25% for MEP works. The calculation and analysis included calculating the bill of quantity using the detailed estimation calculation method, formulating the time schedule, and preparing the cash flow. Quantities are taken from drawings and measured directly with the help of AutoCAD and PlanSwift applications. The cost of materials and wages used in analyzing project costs is based on the unit price of labor and materials in Bekasi City in 2024. This calculation shows that the costs for structure and MEP works, comprising foundations, pile caps, tie beams, columns, beams, slabs, stairs, steel structure, clean water installations, dirty water installations, rainwater installations, electrical installations, lighting, HVAC, security system, sound systems, fire protection, and internet system (before VAT) is estimated at Rp. 23.433.100.701,38. Based on the calculation of the detailed estimate, a time schedule is in the form of an S curve and cash flow. The Galaxy Bekasi Hospital project's third phase has a project duration of 11 months. The payment system for this project is monthly progress with an advance payment of 20% and a retention of 5%.

Keywords: structure works, mep, time schedule, s curved, cash flow, planswift, autocad, monthly progress, calculate, measurement

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All the praise goes to Allah SWT, the Almighty, for blessing, love, opportunity, health, and mercy, so I accomplished my final assessment with the title "**COST ANALYSIS OF STRUCTURAL AND MEP WORKS IN THE THIRD PHASE OF THE GALAXY BEKASI HOSPITAL PROJECT"**. This final assessment is one of the compulsory courses in the sixth semester and also one of the requirements for completing lectures in the Quantity Surveying Department at Bung Hatta University.

On this occasion the author would like to express his gratitude to all those who have helped in completing this Final Assessment. So that this Final Assessment can be completed accordingly and on time. The author would like to express his gratitude to :

1. Allah SWT, the Almighty, who has given His strength and blessings, so that the author can complete this report.
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5. QS 21 colleagues who have helped provide encouragement and inspiration for the author.

Considering the many problems and shortcomings encountered in the process of writing the Final Project, the author is aware that there are still many mistakes and shortcomings in the Final Project. Therefore, the author expects constructive suggestions and criticism from the readers to improve the quality of this Final Project. Hopefully, this Final Project can be useful and increase the knowledge, especially in the field of Construction Economics Engineering (QS).

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CHAPTER I
INTRODUCTION

1.1 Background of Research

A construction project can be defined as a series of activities that are carried out on a one-time basis and have a limited duration. In this series of activities, a process is employed whereby project resources are transformed into an activity result in the form of a building. Construction projects can be characterized by three key dimensions: uniqueness, resource involvement, and organizational complexity (Ervianto, 2005). Additionally, the completion process is subject to three constraints, collectively known as the "triple constraint," which include adherence to specifications, time scheduling, and cost planning. These constraints must be met simultaneously.

Ervianto (2005) identifies three characteristics of construction projects:

a. Projects are unique. Construction projects are not identical; each project comprises a distinct set of activities.
b. Projects are temporary. Construction projects are time-limited, and the workforce involved is always changing.
c. Construction projects require The construction of any given project necessitates the input of a number of resources, including the input of workers and the input of "things" (money, machines, methods, materials).

In the construction industry, many professionals are required to achieve the desired outcome, like an architect and civil engineer. One such role is that of a quantity surveyor (QS). A quantity surveyor is a construction industry professional with expert knowledge of construction costs and contracts. Their responsibilities include calculating the volume and cost of a building and managing all aspects of the contractual and financial aspects of a construction project. According to the Royal Institution of Chartered Surveyors (RICS) in 1971, "A quantity surveyor is an expert in measurement and assessment in the field of construction so that work can be described and price costs can be estimated, analyzed, planned, controlled, and accounted for". With all the skills that a quantity surveyor has, the project's

owner will trust the construction project to them. QS has a very important role in construction as they are responsible for overseeing the financial aspects of a project, including pricing and cost management.

The hospital is an essential building for human civilization. That is the place where people get treatment when they are sick. Because of that, the construction of the hospital project has to calculate and measure the volume of the building precisely. If they are not calculated correctly, that project may fail or even be stalled. That's why QS is critical in keeping the project running correctly.

A building is comprised of several key components, including its structure, architectural, mechanical, electrical, plumbing, and landscaping elements. The combination of all these components determines the cost of a building. To illustrate, the structure works comprise a foundation, tie beam, pile cap, column, beam, slabs, and stairs. The mechanical, electrical, and plumbing work is comprised of clean water installations, dirty water installations, rainwater installations, electrical installations, lighting, HVAC, security systems, sound systems, and fire protection. The architectural work is comprised of wall, ceiling, door and window frame, and floor.

The title that will be raised in this discussion is "Cost Analysis Of Structure And MEP Works In The Third Phase Of The Galaxy Bekasi Hospital Project" with the scope of structure work being foundations, pile caps, tie beams, columns, beams, slab, and stairs. For MEP, there are clean water installations, dirty water installations, rainwater installations, electrical installations, lighting, HVAC, security systems, sound systems, and fire protection. In this case, the skill of a quantity surveyor is needed because they have accuracy and some experience in calculating the cost of building a project.

1.2 Identification of the Problem

The problems that will be discussed in this final assessment are:

1. How to calculate a building volume on the structure and mechanical, electrical, and plumbing (MEP) works in the third phase of the galaxy bekasi hospital project?

2. How to make a Bill of Quantity (BOQ)?
3. How to make a time schedule according to BOQ, and what is the function?
4. How to make cash flow according to time schedule

1.3 Purpose of the Research

The purposes of this research are:

1. Calculating the volume of structure and MEP works in the third phase of the galaxy bekasi hospital project.
2. Make a bill of quantity of structure and MEP works in the third phase of the galaxy bekasi hospital project.
3. Make a time schedule for structure and MEP works in the third phase of the galaxy bekasi hospital project.
4. Make a cash flow of structure and MEP works in the third phase of the galaxy bekasi hospital project.

1.4 Scope of Research

This final assessment will be limited to cost analysis of structure works comprising a foundation, pile caps, and tie beams as the bottom structure. There are columns, beams, slab, stairs, and an attic steel structure as the upper structure. In regard to MEP, there are a number of installations, including clean water, waste water, sewage water, rainwater, electrical, lighting, HVAC, security systems, sound systems, fire protection, and internet system in the third phase of the galaxy bekasi hospital project with a total area of 6598,2 square meters comprising eight floors and rooftop.

The calculation will start from volume measurement, calculating the bill of quantity, planning for time schedule and cash flow according to the shop drawing and specification of the building. This research used analysis of unit price analysis *(AHSP)* on Regulation of the Minister of Public Works and Housing *(PERMEN PUPR)* number 8 of 2023.

The purpose of this limited scope is to avoid the deviation from the issue raised, so that the discussion in this report does not deviate from the original purpose.

1.5 Benefits of Research

The benefit of this final assessment is to increase expertise as a quantity surveyor in calculating estimates, both volume and bill of quantity, time schedules, and cash flows. A quantity surveyor must be thorough when measuring and knowledgeable about the cost of a construction project.

1.6 Writing Systematics

There are four chapters in this final assessment.

CHAPTER I: INTRODUCTION

This chapter discusses the background of the research, the identification of the problem, the purpose, the benefits of the research, and writing systematics.

CHAPTER II: PROJECT DATA

This chapter discusses general data and a short description of the project. It comprises the project name, contract value, working schedule, scope of works, payment system, advance payment, retention, defects liability period, and the area of the building.

CHAPTER III: CALCULATIONS AND ANALYSIS

This chapter discusses measurement in quantity takeoff, unit price analysis, bill of quantity, time schedule, and cash flow.

CHAPTER IV: CONCLUSION AND SUGGESTION

The conclusion is made according to the identification of the problem, and the advice is compiled based on Chapter III.