

CHAPTER I

INTRODUCTION

1.1 Background

Infrastructure is a facility made specifically to support community activities in carrying out daily life and several other interests, infrastructure is very influential on the development of remote areas because infrastructure can be a driving force for economic development. Because infrastructure is one of the important aspects in driving economic development, experts are needed to make it. To become an expert in infrastructure development, of course we have to undergo education in the field, one example is civil engineering. Building civil engineering is engaged in the construction of physical infrastructure such as construction, construction of roads, airports and so on. To build such infrastructure requires a complex process, which consists of collecting data on natural conditions, design and planning, and implementation so that the infrastructure built is in accordance with the standards set by SNI (Indonesian National Standard) so that the infrastructure built is strong and safe.

One of the ways to create graduates who are competent in the field of civil engineering, Atma Jaya University gives a final assignment, where one of the final assignments given is in the form of building construction planning. The process of building construction tasks includes : Top structure planning , Bottoms structure planning and Cost and time planning. And the project given is Redesign of 3 storey building of Assalafiyah Islamic School which will be made and explained in this report.

1.1.1 Top Structure Planning

In top structure planning includes: roof design, beams, columns, floor slabs and stairs. This plan contains the design that has been provided in the form of project drawings that we made using the Autocad application, calculations of earthquake load analysis and all planning calculations according to the applicable SNI and discussed in sub-chapter 2.1 which is the contents of this report, the goal is that the construction of this building can stand robust, appropriate and safe from the process of design, planning, and implementation to construction.

1.1.2 Bottom Structure Planning

In bottom structure planning includes: soil bearing capacity analysis, foundation planning, settlement analysis and liquefaction potential. This plan contains the design and calculations that we made based on a review of the processed data analysis of soil bearing capacity, soil type and superstructure loads. and also the calculation of land subsidence analysis and discussed in sub-chapter 2.2 which is the contents of this report, with the aim that the foundation is strong to support the building.

1.1.3 Cost and Time Planning

In cost and time planning includes: calculation of work duration, analysis of work unit prices, preparation of network diagrams, S curve and resource scheduling. This plan contains the calculation of work duration, analysis of work units, preparation of network diagrams, S-curve and scheduling of resources in accordance with AHSP PUPR and Yogyakarta Government Regulations and is discussed in sub-chapter 2.3 which is the contents of this report, with the aim of knowing the design costs to be incurred.

1.2 Statement of the problem

1.2.1 Top Structure Planning

1. How to design the structural elements of roofs, stairs, slabs, earthquakes, load analysis, beams, columns, and foundations when receiving, load variations due to dead loads, live loads, and earthquake loads, based on the calculation results.
2. How to design a building structure from the initial structure to the final structure, in order to obtain a structure capable of carrying the design load.

1.2.2 Bottom Structure

1. How to design the structural elements of the foundation based on the calculation result.
2. How to design a foundation that is able to carry the load of the superstructure with a sturdy, strong and safe.

1.2.3 Cost and Time Planning

1. How to how to calculate all the required material requirements, unit price analysis, unit labor price analysis, duration of implementation, preparation of

schedules, the relationship between S-curve activities and resource scheduling.

1.3 Scope of The Problem

1.3.1 Top structure planning

1. The roof structure design uses materials from steel.
2. Slabs, beams, and columns use reinforced concrete structural elements.
3. The dead load, live load, earthquake load as the basis for analyzing the loads acting on the structure of the building to be designed.
4. The process of structural analysis is carried out with the help of the ETABS program.

1.3.2 Bottom Structure Planning

1. Foundation use reinforced concrete structural elements.
2. Carrying capacity using theory

1.3.3 Cost and Time Planning

1. This design only analyzes the cost component and processing time.
2. Data processing to analyze costs and time using Microsoft Excel application programs.
3. Cost and time analysis in this design uses data from the Yogyakarta Perwali development project no. 84 of 2021 concerning AHSP and no. 59 of 2022

1.4 Objective

1.4.1 Top Structure Planning

1. Be able to plan the design of the upper structure of a building.
2. Be able to design roofs, columns, beams, floor plates, stairs and determine the amount of reinforcement needed.
3. The design of the building structure to obtain the dimensions of the structural elements in terms of strength and stability against force action.

1.4.2 Bottom Structure Planning

1. Be able to plan the design of the lower structure of a building.
2. Be able to design foundations and determine the amount of reinforcement needed.

3. The design of the building structure to obtain the dimensions of the structural elements in terms of strength and stability against force action.

1.4.3 Cost and Time Planning

1. Knowing the calculation of the volume of work and the Budget Plan at the Assalaffiyah Islamic boarding school project in Yogyakarta.
2. Knowing the comparison of budget costs using Yogyakarta city units for price analysis in 2020 and 2021.

1.5 Methodology of Research

1.5.1 Top Structure Planning

In this planning calculation and analysis using the LRFD (Load Resistance and Factor Design) and SNI methods. The LRFD design concept has the principle that the stress that occurs in each structural element must be less than the allowable stress. The SNI regulations used include SNI 1726:2019 (Earthquake-resistant Planning), SNI 1729:2015 (Steel), SNI 1727:2013 (Loading), SNI 2847:2019 (Structural concrete requirements for buildings).

1.5.2 Bottom Structure Planning

In this planning calculation and analysis using the LRFD (Load Resistance and Factor Design) and SNI methods. The LRFD design concept has the principle that the stress that occurs in each structural element must be less than the allowable stress. The SNI regulations used include SNI 1729:2015 (Steel), SNI 2847:2019 (Structural concrete requirements for buildings) and Correlation of soil and rock properties in Geotechnical Engineering book.

1.5.3 Cost and Time Planning

The methods used in this design calculation analysis include PERMEN PUPR 2022, Perwali Yogyakarta development project data no. 84 of 2021 concerning AHSP and no. 59 of 2022 analysis of unit prices, Bill of Quantity, calculation of activity duration network diagrams, Barcharts, resource scheduling and S-Curves.

1.6 Outline of Final Project Report

The final report entitled Redesign Assallafiyah Islamic Boarding School consists of a cover page, statement page, abstract, endorsement page, preface page, table of contents page, page attachments, pictures and illustrations page, table list page, abbreviations and symbols page. . Most of the preparation of this Final Project lies in the second part which consists of five chapters. The outline of the writing systematics applied to the preparation of this Final Project is as follows:

Chapter I : This chapter is an introduction that contains background, problem, scope of problem, purpose, methodology, and systematics of writing.

Chapter II : Project Design Details in this chapter a detailed project design summary containing 3 design practices, including superstructure design, substructure design, and cost and time planning.

Chapter III : Conclusion Is the closing of the results of the design in the Final Project Report. Contains conclusions for 3 designs, include Top tructure design, bottom structure design, and cost and planning time.