

CHAPTER I

INTRODUCTION

1.1. Background

Roads are essential infrastructure that connect one area to another for the passage of vehicles or ground and sea transport modes. The function and role of roads are crucial in our daily lives, impacting various aspects of society, such as the economy, security, and more. Besides their primary roles in economic development and security, roads also serve a social purpose by connecting individuals with one another. Generally, roads come in various types based on their usage criteria, such as highways, which are characterised by wider and larger road bodies and typically have two lanes or opposing directions. Given the vital role of highways in supporting economic, security, and social well-being, it is important to recognise that all aspects of life are rapidly advancing, leading to growing demands from society for adequate infrastructure parameters to support various community activities. To realise the development of roads that meet the required infrastructure parameters, detailed planning and design are necessary, aligning with the principles of civil engineering, particularly in geometric road design and road pavement. This involves addressing the basics of road design related to curves or alignments, both horizontally and vertically, the variety of road lanes and traffic lanes, as well as the thickness and type of pavement used based on technical requirements that comply with existing standard regulations. The ultimate goal of this planning is to produce road infrastructure that is safe, comfortable, and can be used in accordance with the specified parameters and ultimate objectives.

1.2. Problem Formulation

The problem formulation for this Final Project in Road Design Practice includes the following questions:

1. What are the appropriate requirements and procedures for determining and designing a road alignment based on the region's topographic map and terrain contours?
2. How can software tools be applied to generate longitudinal profiles and superelevation diagrams with the road's rotational axis?
3. How can the appropriate type of curve be selected and the corresponding excavation and embankment volumes be estimated accurately?

4. What are the suitable methods to address and mitigate soil settlement issues?

1.3. Purpose

The objectives of conducting this road design project are as follows:

1. Selecting and designing the road alignment from point A to B that is most effective and efficient based on the contour map of the Temanggung region.
2. Drawing longitudinal profiles, cross-sectional profiles, and superelevation diagrams for the selected road alignment design.
3. To enhance and develop skills in using software applications for road design planning.
4. To understand the calculations involved in determining curve angles and estimating the required volume of excavation and embankment.
5. To comprehend the calculations of immediate settlement, primary consolidation settlement, soil bearing capacity, ground improvement using geotextiles, and slope stability analysis.

1.4. Problem Constraints

In this Final Practice Road Design project, the problem constraints are outlined as follows:

1. Road design starting from point A to point B.
2. Coordinates of point A (in meters): (4507.489; 5956.655).
3. Coordinates of point B (in meters): (11077.996; 4325.004).
4. Planning the road surface elevation at point A on the embankment.
5. Vertical alignment and horizontal alignment of the road based on applicable regulations.
6. Settlement calculations are limited to immediate settlement and primary consolidation only.
7. Vertical and horizontal alignments must comply with applicable design standards and regulations.