CHAPTER 1

INTRODUCTION

1.1 Background

Indonesia is an archipelago country consists of five main island i.e Sumatera, Java, Kalimantan, Sulawesi, and Papua, some middle islands like Bali, Madura, Lombok, Sumba, Sumbawa, Halmahera and thousands of small islands. To connect those islands each other air transportation become the main transportation as well as sea transportation. Large ships serve long distance sea transportation while for short distance like crossing Sunda and Bali strait using ferry. Inter-island transportations using air and sea transportation. marine transportation is using multiple shapes huge ships.

The other function of Ferry ships is to get the passengers or goods. As the economic growth, the amount of passengers or the goods for crossing Sunda strait from Java island to Sumatera island increase. As the amount of passengers and the goods increasing and the limited ferry ships, the buses and the trucks to accumulate in the port, especially on the rainy season or holiday season. it causes the more longer interval and the costs more expensive. Furthermore, bulding a new bridge for crossing Sunda strait or Bali strait same as the Suramadu bridge is the solution to solve those problems.

In this final assignment will be designed the Substructure of Sunda Strait Bridge, a bridge that crossing the Sunda Strait connects the Java island and Sumatra. Java Island and Sumatra Island are two islands in the western part of Indonesia that are relatively densely populated. Total bridge length is approximately 28,5 km. Start from East direction as the first part is 3,8 km connecting Anyer in West Java to Ular island the bridge construction will be conventional bridge. The second part is about 11 km connecting Ular island and Sangiang island the contruction. The

construction will be designed suspension bridge. Similar to the second part, the third part have 10 km length connecting Sangiang island and Prajurit island the construction will also suspension bridge. The construction of the end part, 3,7 km length connecting Prajurit island to Lampung will also using conventional bridge.

1.2 Problem Limitation

Due to the limited data and informations, some problem limitations are needed, as follows :

1. The depth of bottom sea will be assumed to be 50 meters from sea water level.
2. The depth of hard soil layer will be assumed to be 30 meters from the bottom sea.
3. The classification of soil will be assumed to be Sand – Clay.
4. Data of soil will be assumed as follows:
   a. Unit weight of soil (γ_s) = 17 kN/m^3
   b. Friction angle (ϕ) = 30°
   c. Cohesion (C) = 4 kN/m^2

1.3 Objectives of the Final Assignment

From the above background and problem statement, the objectives of this final assignment can be mentioned as follows:
1. To design and calculate abutment and pier for bridge.
2. To design and calculate the foundation of bridge.

1.4 The Scope of Study

To accomplish those abjectives, this study started with a literature review of the information pertaining to design and calculation of Substructure of Bridge. Some books, journal, papers pertaining of Substructure of Bridge design and calculation will be reviewed. Literature review will be followed by methodology. In the chapter of methodology, dimension of abutment, pier, foundation will be

determined. Substructure calculation will be given in chapter four, while the result will be given and discuss in chapter five.