

CHAPTER 1

INTRODUCTION

1.1. Background and Problem Statement

Jakarta, the capital of Indonesia is a metropolitan city which has total area 661,52 Km² with 10,37 million population in 2017 [1]. As a metropolitan with the population over 10 million people and 18 million number of vehicles make Jakarta very crowded and the traffic jam. A lot of people prefer using the private car than the public transportation, this condition caused the capacity of the roads are over and in turn the traffic jam. The available public transportation at the moment are busway, metromini, bajaj which cannot fulfill the demand of public transportation.

In the year 2015 the start government to develop public transportation projects to reduce the jam among others by building Mass Rapid Transportation (MRT). Not only the MRT, the government also has plan of the new program for transportation development to prevent the traffic jam in Jakarta which is by building the Light Rail Transit (LRT).

In this Final Assignment design and analysis of the road of LRT is limited on design and analysis of LRT railway track, design and analysis of upper structure of the fly over, the used material are reinforced concrete and prestressed concrete.

The structure of LRT Jakarta was built 9 up to 12 meter above ground level using u-shape girder . Bridge planing is based on the data and the literature required. Preliminary design is the first planning to determine the dimension of the cross sectional structure of the u-shape girder based on the span of the bridge.



Figure 1.1 LRT Jakarta Route (source:1)

1.2. LRT Overview

Quote from Wikipedia (https://en.wikipedia.org/wiki/Light_rail) [3] : Light rail, light rail transit (LRT), or fast tram is a form of urban rail transport using rolling stock similar to a tramway, but operating at a higher capacity, and often on an exclusive right-of-way.

There is no standard definition, but in the United States (where the terminology was devised in the 1970s from the engineering term *light railway*), light rail operates primarily along exclusive rights-of-way and uses either individual tramcars or multiple units coupled to form a train that is lower capacity and lower speed than a long heavy-rail passenger train or metro system.

A few light rail networks tend to have characteristics closer to rapid transit or even commuter rail; some of these heavier rapid transit-like systems are referred to as light metros. Other light rail networks are tram-like in nature and partially operate on streets. Light rail systems are found throughout the world, on all inhabited continents. They have been especially popular in recent years due to their lower capital costs and increased reliability compared with heavy rail systems.



Figure 1.2 LRT Carriages in Jakarta (source : 2)



Figure 1.3 LRT in Jakarta (source: 3)

1.3. Objectives of the study

From the background and problem statement as well as overview of LRT which have been described above, the objectives of the study is to design and analyze upper structure of LRT track, both with non ballasted and ballasted

1.4. The Scope of Study

To accomplish the above objectives, this study start with a literature review of the information pertaining to design and calculation of the railway and flyover of LRT. Some books, journals, papers pertaining to the railway and flyover of LRT design will be reviewed. Literature review and then will be followed by Methodology. In the chapter of Methodology, all parts of the the railway and flyover of LRT will be described and explained. Design and calculation of the the railway and flyover of LRT structure will be given in Chapter Four, while the results will be given and discuss in Chapter Five. In addition, design drawing will be given in Appendics.