

CHAPTER I

INTRODUCTION

1.1. Background

Train is an economics and efficient of land transportation compare to other moda of land transportation like bus and truck. In movement, using one locomotive, that mean one engine, one fuel, one driver and one asistent, train can bring haundred of passengers and tonnes of good. While bus and truck with one engine, one fuel, one driver and one asistent only can bring about fourty passengers and maximum twenty tonnes of good.

There are two types of train, passenger and freight trains. The passenger train is a series of wagon pulled by locomotives used to bring passengers. Meanwhile, freight trains are trains that are used to carry goods (cargo), such as fertilizers, mining products (sand, stone, coal or minerals etc). [1]

Train have special way called railway which consist of two rail beam which is assembled over sleeper. Those two rail beam and sleeper constructed over ballast layer as shown in Figure 1.1. Beside constructed over ballast, railway also constructed without ballast and called non ballasted track as shown in Figure 1.2.

As highway construction, in railway construction, railway geometry will determine the comfortable and safety of the train. In this final assignment will be calculated railway construction as well as designed of railway geometry and railway switch.

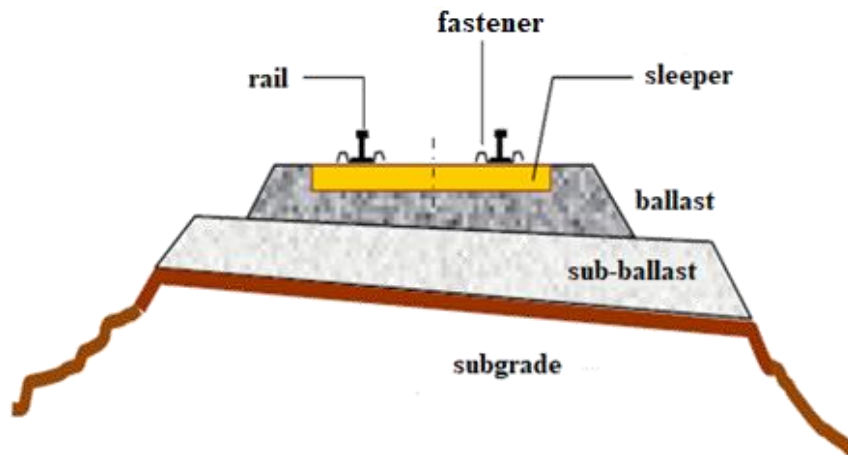


Figure 1.1. Cross section of ballasted railway structure

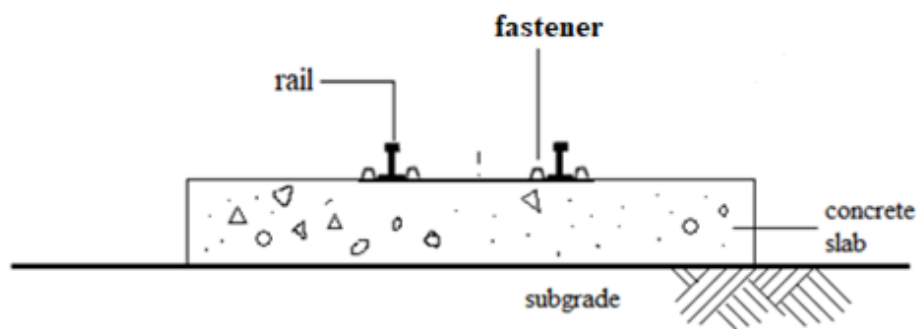


Figure 1.2. Cross section of non ballasted railway structure

Railway geometry is the shape and size of the railway, both in the horizontal and vertical direction which of the railway, slope, and elevation of the rail [2]. Railway geometry, is quite different with highway geometry. Train cannot move geometry, maximum grade is 2,5 ‰ and minimum radius of curvature is 150 m [3]. Detail about railway geometry will be explain in Chapter II Literature Review and the calculation will be give in Chapter IV.

To change from the lane to other lane railway is equipped with the construction called switch. Switch is the construction in the railway that have function to change the lane track of the train as shown in Figure 1.3. Railway switch consists of a pair of rails which are tapered so that they can move trains from one lane to other and called point (switch) blades by shifting the pointed rails as shown in Figure 1.4. Detail about switch will be explain in Chapter II Literature Review and the calculation will be also give in Chapter IV. Geometry design and switch construction calculation will include in this.



Figure 1.3. Railway switch

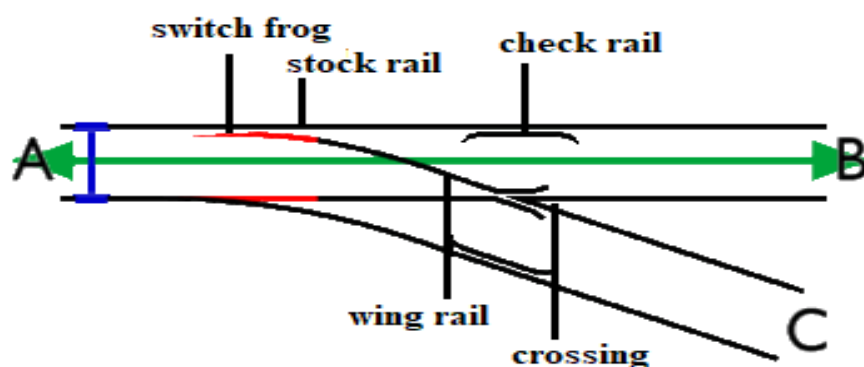


Figure 1.4. Sketch of railway switch

1.2. Objectives of the study

The objectives of the study are as follows :

1. To design railway construction both for ballasted and non ballasted track,
2. To design railway geometry and switch construction.

Both designs are for Indonesia Railway standard or specifications.

1.3. Problem limitations

Based from background that explained above, this final assignment have following limitation :

1. The rail used is rail type UIC 54,
2. Using track width 1067 mm,
3. Sleeper using concrete sleeper,
4. Railway constructed over hard and soft soil for hard soil CBR value taken 5 %,
5. Using precast slab track system for calculation of non ballasted track.

1.4. Scope of the study

To achieve those objectives, the study began with reviewing all of the literatures especially pertaining on railway construction. Study will continue with Methodology, where methods to fulfil the objectives will describe, continue with equations will used on ballasted track and non ballasted track. Design and calculation of railway design will given Chapter IV and Chapter V will give a conclusions and recommendations of the study.