CHAPTER I

INTRODUCTION

1.1. Background and Problem Statement

Soil is one of nature's most abundant construction materials that is directly available in the site. Almost all of the civil engineering constructions is built upon or inside soil. All of pavement structure are also laid over the soil called subgrade or road bed soil as shown in Figure 1.1. and Figure 1.2. for flexible pavement and rigid pavament respectively.

The condition or strength of the pavement are depend on the quality of subgrade. The more strength of subgrade material the less of the thickness of the pavement structure and inverse, the less strength of subgrade material the more thick of the pavement structure.

The strength of subgrade soil are measured by their CBR value for flexible pavement and by Modulus Resilient (MR) for rigid pavement. Soil can be classified as a good subgrade if have 5 to 10 % of CBR value or 10.000 to 20.000 psi of MR value.

Almost of road or pavement structure in Indonesia are laid over the weak subgrade since historically in Indonesia were built in the Dutch era where the traffic were small and in the development the pavement structure were improved without improving the subgrade. Those condition also occur in the road of Semarang to Purwodadi, the road located in North-Eastern of Central Java, where the subgrade will be studied in this Final Assignment.

Type of the soil in North-Eastern of Central Java generally an expansive clay which consists of montmorillonite mineral, which have high shrinkage and swelling. Over those type of soil, the 64 km length of pavement of the road connecting Semarang to Purwodadi are laid. As the reason, the structure pavement condition is always damage and in worst condition. The damages like a pot-hole, permanent deformation and crocodile crack are encountered. Most efforts have been conducted to solve the damage or to reduce the swelling and shrankage potential among other by using goetextile, constructing sand-drian etc., but no one of those efforts success.

Figure 1.1: Basic flexible pavement structure

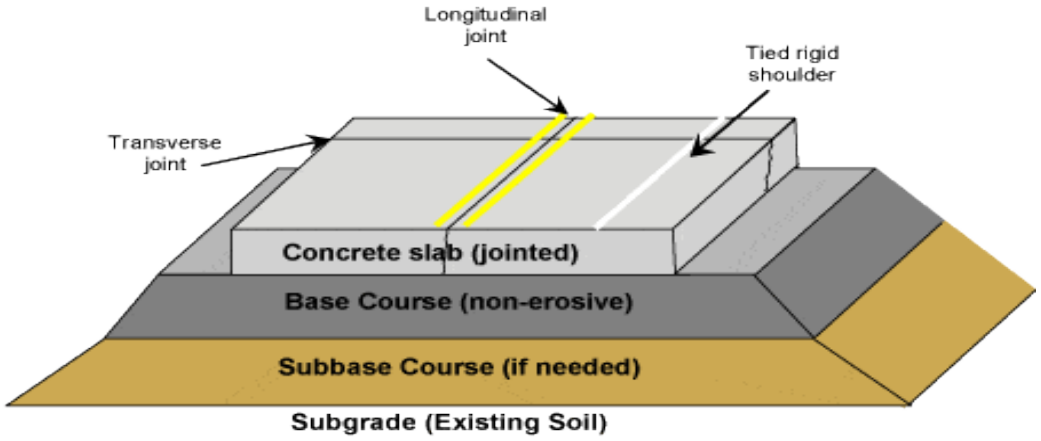

Figure 1.2: Basic rigid pavement structure

Since those methods to solve pavement damages are not succeed, in this final assignment, feldspar will be studied as stabilization material. Soil stabilization is a method to improve the soil properties and its bearing capacity by adding another soil or other materials like Portland cement, lime, asphalt and sand.

1.2. Problem Limitations

In this final assignment, stabilization of clay soil are limited using fine feldspar with 0.075 ml uniform particle size and 5 to 20 % feldspar content by weight of soil increment 5%. The other limitation, test which are perform only CBR, Atterberg Limit Test and Direct Shear Test.

1.3. Objectives of the Study

From the above descriptions, this final assignment has the following objectives:

a. To study the feasibility of using Feldspar as a soil stabilizer,
b. To determine suitable Feldspar and Expansive Clay Soil mixtures to use as subgrade material of the pavement.
c. To applied Feldspar and Expansive Clay Soil mixtures as subgrade.

1.4. Scope of the study

To accomplish those objectives, this study started with a literature review, given in chapter 2, which contains the information that related to coherency of expansive clay, Feldspar as a soil stabilization, and characteristics of the present Feldspar in some different water content, as well as tests which have to be conducted to the soil stabilization. Based on the results of the literature review, a

research design and methodology, given in chapter 3, was developed involving preliminary research to find the appropriate stabilizer, in this study was Feldspar as control, as well as an extensive laboratory testing and experiments. Furthermore, the data obtained from the test were analyzed and given conclusions which recommendations were made in chpater 4, chapter 5, and chapter 6.