

# CHAPTER I

## INTRODUCTION

### A. Background

The ground is the basis of a building construction as well as road construction, some types of land usually have bad characteristics, and generally the land itself often generates problems like the soil which has high plasticity, the low shear strength, and big expansive soil.

In java itself, it is still oftenly found any road in trouble onditiion which most of the cause is the condition of the soil which is less stable. The problem thath is oftenly found on the condition of soil which is less stalbe is the expansive of the soil which is high. The condition of road which is on trouble, it usually has any holes and also crackes and that are the example exist in the subdistrict of Sukodono Sragen City. The problem cause the age of the road decreased due to the less stable of soil itself. To overcome the problems the existed soil in the area of Sukodono, it needs to be done and conducted any research for the sake of improving the soil namely by using the the way of stabilizing the soil by means of additional powder of wood charcoal to know the shear strength especially in the area of Sukodono, Sragen. The powder of wood charcoal itself has the ability to improve the sirculation of water, air and string carbon, it is easy to be found and the economical price itself. This reasearch is hoped to be able to improve and increase the physical as well as mechanical characterisitcs on the clay soil wpecially in the area of Sukodono, Sragen.

### B. Problem Solving

By adding wood charcoal powder with direct shear test on clay so can take the formulation of problem as follows :

1. How is the physical characteristic and the value of shear strehgt DST the original soil from the subdistrict of Sukodono, Sragen City?

2. How the physical characteristics and the shear strength value DST of soil with the condition which has been stabilized using the powder of wood charcoal as much as 10 % , 15 % ,and 20 % ?

### **C. The purpose and benefits of research**

#### **1. Research Purposes**

- 1) Knowing the physical characteristic and the value of DST original soil from subdistrict of Sukodono regency of Sragen?
- 2) Knowing the physical characteristics and the values of DST the soil which has been stabilized using the powder of wood charcoal as much as 10% ,15% ,and 20% ?

#### **2. Benefits of Research**

- 1) Stabilizing the condition of soil in the subdistrict of Sukodono Sragen Regency by using the method of stabilizing with powder of wood charcoal.
- 2) As an alternative to clay soil improvement using stabilization method using charcoal powder using compaction test and DST.

### **D. Scope of Problem**

To simplify and clarify the discussion of this Final Project, then in this research need the scope as follows:

- 1) The research was done inside the lab of civil engineering muhammadiyah university of surakarta .
- 2) The sample soil is clay soil with disturbed condition taken in Bendo Village Sukodono District of Sragen Regency with depth > 50 cm.
- 3) The variation of additional with the powder of wood charcoal as the stabilizing material is as much as 10 % , 15 % , 20 % .
- 4) The powder of wood charcoal which is used is from Surakarta, then made to pass the filter number 30 (0,59 mm)

5) Test conducted include :

- a) The testing of physical characteristics of soil which is about the specific gravity (Gs) a (ASTM D8554-58), Water Content (w) (ASTM D2216-71), Granules analysis of the size (ASTM D421-58) and Atterberg limit (ASTM D423-66, D424-58 and D427-61).
- b) The testing of soil compaction with Standart Proctor (ASTM D698) On the original soil and mixed soil with additional powder of wood charcoal 10 %, 15 %, and 20 %.
- c) Direct Shear Test (ASTM D5607-8) with original soil sample and mixed soil sample with optimum water content.

#### **E. Authenticity Research**

Research stabilization land use powdered wood charcoal this has never been done before by mukti aji (2016) and meiriza sangeoris (2016) with the percentage a mixture of powdered wood charcoal 0 %, 5 % and 7.5 % will but less experienced a significant increase. To get the result that more significant needs to be doing research similar with the percentage a mixture powdered wood charcoal greater.