CHAPTER I
INTRODUCTION

A. Background

Soil is the foundation of a construction, be it the construction of road and building construction. There are soil types that have poor properties, and usually they often cause problems such as soils with high plasticity values, low shear strength, and large shrinkage.

Currently, many roads were damaged in Java, for example road in District Sukodono, Sragen. Road conditions in this area suffered many damages, among others, roads, bumpy and long life of the road is relatively short, thus becoming a major problem in this area. Can be seen by the invisible curve of the road due to the local soil structure has a weak bearing capacity, during the rainy season arise water puddles on the road with holes, and the surrounding land becomes very plastic and sticky. In the dry season the soil around the road becomes cracked and hard.

In the previous research conducted by Prasetyo (2016), shows the soil in Sukodono a high plasticity clay, with a value LL = 85.73%, PL = 24.69%, PI = 61.04% (Appendix 1). In the test chemical elements that do Analytical Chemistry Laboratory MIPA UGM, Sukodono soil contains soil chemical element = 16.86% Al2O3, CaO = 0.92% = 10.81% Fe2O3, MgO = 1.35%, and SiO ¬2 = 63.25% (appendix 2). Based on the value of PI = 61.04% (over 17%) and the soil soil requiring corrective action. In order to overcome the problems existing soil conditions in the area Sukodono, it is necessary to study soil improvement that is by stabilizing the soil.

Soil stabilization is an effort by adding added materials such as salt, lime, cement, and other materials in order to make the soil a better quality soil. In addition to providing added materials, soil stabilization can also be performed by compaction using mechanical devices.

Soil stabilization has been done to improve the quality of clay soil. In this study using charcoal wood powder as a mixture to stabilize the soil to achieve soil strenght support and better soil properties. Charcoal wood powder is chosen because it has the ability to improve water and air circulation, easy to obtain, and economical price.

B. Problem Formulation

Based on the background, the following problems can be formulated:

1. How are the physical and mechanical properties of the original soil from Sukodono, Sragen?
2. How are the soil physical and mechanical properties of Sukodono, Sragen that have been stabilized using charcoal wood powder?
3. What is the value of CBR Unsoaked land from Sukodono, Sragen with the addition of charcoal wood powder?

C. Objective and Benefit

1. Research Objective

1) To know the physical and mechanical properties of the original soil from Sukodono, Sragen.
2) To know the physical and mechanical properties of the soil from Sukodono, Sragen that has been stabilized using charcoal wood powder.
3) Knowing the value of soil CBR from District Sukodono, Sragen Regency with the addition of charcoal wood powder.

2. Benefit Research

1) Improving the land of Sukodono Sub-district, Sragen Regency which is stabilized using charcoal wood powder.
2) Provide solutions and alternative added materials for the stabilization of clay soil in the form of charcoal powder, thereby complementing pre-existing research.
3) As input for relevant agencies on local soil conditions, so as to plan a safe construction.

D. Scope of Problem

In order to avoid expanding the discussion of this Final Project, then in this study need the scope as follows:

1. The research was conducted in the laboratory of Civil Engineering University of Muhammadiyah Surakarta.
2. Sample is clay with disturbed condition (disturbed) taken from District Sukodono, Sragen regency with depth of land approximately 50 cm.
3. Variation of charcoal wood powder mixture as stabilization material that is equal to 10%; 15%; 20% by weight of sample with optimum moisture (w_{opt}) and maximum dry soil volume (γ_d max).
4. The powder using charcoal wood powder originating from the city of Surakarta, then made to pass the filter number 30 (0,590 mm).
5. The use of secondary data for the nature of the original soil physical properties is taken from Sangeoris (2016).
6. Test taken include:
    a) Testing of soil physical properties such as specific gravity (Gs) (ASTM D8554-58), water content (w) (ASTM D2216-71), the limits of Atterberg (ASTM D423-66), and analysis of the grain size (ASTM D421-58).
    b) Soil density testing with Standard Proctor (ASTM D 698) on original soil and mixed soil.
    c) Strenght soil support testing with unsoaked CBR (California Bearing Ratio) (ASTM D1883-87) with original soil samples and mixed soil samples. This test is carried out with optimum moisture (w_{opt}) and maximum dry soil volume (γ_d max).

E. Authenticity of Research

Research with characteristics of clay from Sukodono, Sragen which stabilized using chemical method with wood charcoal with title " Review Strength Support Soil Clay Sukodono with Addition Stabilitation Material Charcoal Wood

Powder " previously had never done research at Faculty of Engineering Department of Civil Engineering University of Muhammadiyah Surakarta.

Similar research had previously been done by Sangeoris et al (2016) under the title "Utilization of Charcoal wood powder as a Stabilization Material Against Strong Supporting Soil Clay Sukodono with Variation of Treatment", this study used charcoal wood powder as a soil stabilization material with 0% percentage; 5%; And 7.5% and the testing performed is strenght soil support (California Bearing Ratio).

Similar research had previously been conducted by Karaseran et al (2015) under the title "The Effect of Mixed Charcoal Mixture Material on Secondary Consolidation in Expansive Clay", this study used coconut shell charcoal as a soil stabilization material with 0% percentage; 4%; 6%; 8%; And 10% and the test is consolidated test.