CHAPTER I

INTRODUCTION

I.1. BACKGROUND

One of Construction engineering problems is clayey soil, where the problems are due to its undesirable properties such as low strength and high hydraulic conductivity. In order to proceed with constructions under such conditions, some techniques are required to improve such poor properties of the soil. Recently, it has been found that appropriate chemical stabilization can improve undesirable characteristics of clay.

Fly ash, as a waste material in Indonesia, is one of the most potential waste from manufacturing industry, it is continuously available due to population's increasing demand in energy uses, utility services and infrastructures in several cities.

The purpose of this research is to investigate the possibility to utilize such a waste as soil stabilizer. However, generally fly ash is considered as pozzolanic which is not cemetitious. It could be to combined with Ca-rich materials such as lime, cement, etc. to form cementitious ones; such as calcium silicate hydrate (CSH), calcium aluminate hydrate (CAH), calcite (CaCO3), etc. among soil particles due to the hydration and long-term pozzolanic reaction. Concentration of this research is to stabilize the clayey soil using fly ash mixed with some amount of cement to improve on such unfavorable properties of the soil as low strength and high hydraulic conductivity.

I.2. PROBLEM STATEMENT

This research will cover the problems of:

- Does fly ash and cement have the possibility to improve the properties of clayey soil such as low strength and high hydraulic conductivity?
- What is the best combination to get the best result of stabilizing the clayey soil?

I.3. PROBLEM LIMITATION

The limitation of this research:

1. Clay was taken from Dusun Ngablak, Desa Sitimulyo, Kecamatan Piyungan, Kabupaten Bantul, DIY.
2. Fly ash was taken from PLTU Karang Kandri (PT. S2P) Cilacap, Central Java.
3. The Unconfined Compression Test was used to measure shear strength of clay.

I.4. RESEARCH OBJECTIVES

The objectives of this research are:

- To evaluate the stabilization of the unfavorable properties of clay using fly ash and cement.
- To reduce and give solution of the pollution problem of fly ash, that is better used as stabilization material.

- To give the improvement of the geotechnical knowledge to the writer and community about soil stabilization using wasted materials.

I.5. RESEARCH ORIGINALITY

There are a lot of researches about soil (clay) stabilization, especially clay stabilized with fly ash that were tested with various methods. However, the research of fly ash combine with cement to stabilized clay soil, which is tested by Unconfined Compression Test, has not been done by other researchers.