

CHAPTER I

INTRODUCTION

1.1 General Statement of the Problem

The tremendous increase in both land and air traffic has led to a demand for more satisfactory road and air-field construction. In order to reduce construction costs, engineers must try to improve the locally available materials which have inadequate engineering properties, or the properties of the existing soil will have to be modified, if suitable materials are not readily and cheaply obtainable.

Soil stabilization, by definition, is the technique for treating soils to improve its engineering performance, such as increasing strength and durability, altering permeability and swelling. Many stabilization methods involve the use of admixtures. Portland cement and lime are the two most widely used and successful stabilizers. But there are limitations on the use of cement in treating certain problem soils. For example, mixing difficulties are experienced with heavy clays and undesirable effects resulted from certain chemicals present in some soils. These difficulties can often be overcome by adding some chemicals to the soil-cement mixtures. Another chemical widely used in soil stabilization is

lime, which have been shown to improve greatly the workability and properties of the soils.

Nong Ngoo Hao is located in Amphur Bangphli, Smutprakarn Province. The sub-soil condition composes generally of soft clay with low load carrying capacity and high compressibility. The construction of road and air-field in these area may accomplished by the method of removing the existing soil and then replaced by better materials, the other methods such as electro-osmosis, sand-drained or pile foundation, which take the high costs in constructions. At the present time, the lack of construction materials is the significant problem in general constructions. For solving the lacking construction materials problem, it should be tried to improve the properties at the existing soft soil to gain higher strength by stabilized with lime and cement.

Consequently, this stabilized soil can be used for subgrade or subbase constructions and unnecessary to use the other materials for replacing in the existing soft soil.

1.2 Purpose of the Study

The beneficial effect on the compressive strength is obtained by adding a small amount of lime and cement on soil which the most fraction is clay. Encouraged by the results, this research is initiated with the following objectives :

(1) to extend the stabilization technique by using lime and cement as stabilizers,

(2) to investigate the engineering behavior of clay stabilized with lime and cement,

(3) to study whether the selected soil can be stabilized with economical amounts of lime and cement.

1.3 Scope of Study

This study is limited to soft clay selected from Nong Ngoo Hao, Smutprakarn Province. The effects of the following variables on strength and durability response of the stabilized soil are investigated :

- (1) soil properties,
- (2) amount of lime and cement used in stabilization, and
- (3) curing period.

The two factors which are studied as being vital indicators of the engineering properties of the stabilized soil are ;

- (a) strength, as measured by the unconfined compression test,
- (b) durability, measured as the resistance to prolonged immersion in water and to alternative cycles of wetting and drying.