

Chapter I

INTRODUCTION



1. General Statement of the Problem

For safety and economy, highway engineers are constantly searching for "good" materials to carry the traffic loads applied on the highway pavement. However, such desirable materials are not everywhere available. In many countries, it is found that the engineers have to be faced with the problem of lacking good quality construction materials. This kind of problem can be solved by either designing the pavement structures in order to meet those restrictions imposed by an unsatisfactory soil, or improving the properties of the existing soil. Soil stabilization, by definition, is the name given to those method of construction in which soils are treated to improve their engineering properties, such as increasing strength and durability, altering permeability and decreasing valume change. Adding admixtures to soils is a very practical method of soil stabilization. Among the many admixtures avaible for soil stabilization, asphalt, lime and portland cement are the most widely used and successful stabilizers.

In Thailand, vast amount of silty or sandy soils are widely found in many parts of the country, such as silty sand in the North-East and beach sand in the South. However these materials are not suitable to be utilized as subbase or base course in road construction and a suitable materials such as crushed stone is not available within

an economic hauling distance. It is believed that these sandy soils should be good construction materials if they are properly handled and treated. The Materials and Research Division of the Department of Highways has made a study of these two kinds of sandy soils, silty sand and beach sand, in order to improve their engineering properties. Hvem Stabilometer and Cohesimeter were used to test series of stabilized soil. The results revealed that there is a possibility of improving silty sand strength by using a) soil + 2 % lime + 3 % cement b) soil + 5 % emulsion c) soil + 3 % lime + 3 % emulsion and d) soil + 3 % cement + 3 % emulsion (14). For beach sand, Soo-Ngam (17) found that its strength properties can be improved by stabilizing with a) 4 % emulsion b) 3 % lime + 2 % emulsion and c) 4 % cement + 2 % emulsion.

2. Purpose of the Study

Encouraged by the results obtained by the Materials and Research Division, the purpose of this research was to further evaluate the strength characteristics of sandy soils (silty sand and beach sand) stabilized with three types of stabilizers; emulsion, lime-emulsion and cement-emulsion. The study was also made on the effects of curing time and curing type on the strength properties of stabilized soil. It was expected that the results of the investigation should provide some valuable information to the improvement of the engineering properties of such sandy soils.

3. Scope of Study

The present study was limited to two sandy soils, silty sand from the North-East and beach sand from the South of Thailand. Soil, soil plus lime, and soil plus cement were mixed with various percentave weight of cationic emulsion. It should be note that, in this study, lime and cement were used as the additives of soil-emulsion. According to the results obtained by the materials and Research Division, the amount of lime and cement used were considered to be 3 percent. The influence of stabilizers on shear strength was investigated by carrying out two methods of testing, unconfined compression test and undrained triaxial test. A study of the effect of curring time was conducted by curing the compacted specimens in sealed plastic gags at room temperature for different periods of 1, 3, 7, 15 and 30 days. The air-dried curing was also made in order to study the different effect on strength of stabilized soil compared with those of curing in sealed plastic gags.