

CHAPTER 1

1. INTRODUCTION

A difficult problem in Civil Engineering work exists when the sub-grade is found to be clay. Soils having high clay content have a tendency to swell when their moisture content is allowed to increase. This moisture may come from rains, floods, leaking sewer lines, or from the reduction of surface evaporation when an area is covered by a building or pavement. Frequently, these clayey soils cause the cracking and breaking up of pavements, railways, highway embankments, roadways, foundations and channel or reservoir linings. The high cost of repairing the damaged structures has drawn attention to the need for more reliable investigation of such soils and necessitates methods to eliminate or at least reduce the effect of volume change in the soil and increase the strength.

Soil stabilization is a technique aimed at increasing or maintaining the stability of soil mass and chemical alteration of soils to enhance their Engineering Properties. Stabilization can be used to treat a wide range of sub-grade materials from expansive clay to granular materials. This allows for the establishment of design criteria as well as the determination of the proper chemical additive and admixture rate to be used in order to achieve the desired engineering properties.

Benefits of the stabilization process can include higher resistance values, reduction in plasticity, lower permeability, reduction of pavement thickness, elimination of excavation material hauling or handling. Stabilization of expansive soils with admixtures controls the potential of soils for a change in volume, and improves the strength of soils.

1.1 Expansive Soils:

Expansive soil is one among the problematic soils that has a high potential for shrinking or swelling due to change of moisture content. Expansive soils can be found on almost all the continents on the Earth. Destructive results caused by this type of soils have been reported in many countries. In India, large tracts are covered by expansive soils known as black cotton soils. The major area of their occurrence is the south Vindhya range covering almost the entire Deccan Plateau. These soils cover an area of about 200,000 square miles and thus form about 20% of the total area of India (ref 9). The primary problem that arises with regard to expansive soils is that deformations are significantly greater than the elastic deformations and they cannot be predicted by the classical elastic or plastic theory.