# EFFECT OF FINE GRAINED SOIL (SILT) CONTENTS ON THE BEHAVIOUR OF SANDY SOIL

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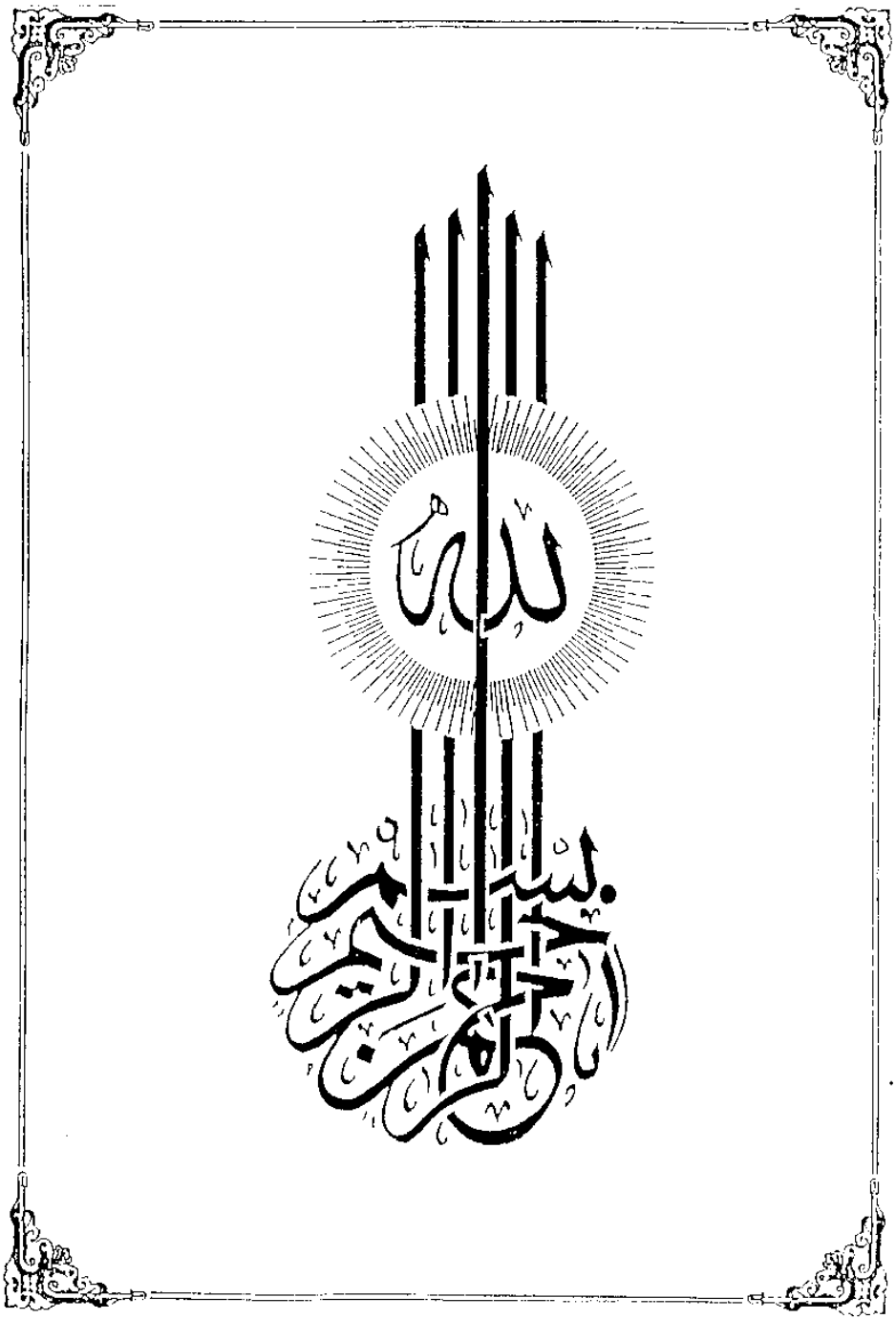

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## Notations

| | |
|---|---|
| $A_1$ | Parameter in equation (38) |
| $B_1$ | Parameter in equation (38) |
| $a_1$ , $b_1$ | Parameters in equation (25) |
| $a_2$ , $b_2$ | Parameters in equation (30) |
| $a_3$ , $b_3$ | Parameters in equation (31) |
| $E_1$ , $E_2$ | Parameters in equation (43) |
| $D_c$ (%) | Degree of compaction |
| e | Void ratio |
| $e_i$ | Initial void ratio |
| $e_{max}$ | Matimum void ratio |
| $e_{min}$ | Minimum void ratio |
| F (%) | Percentage of fines |
| K (cm/sec) | Coefficient of permeability |
| m | Parameter in equation (40) |
| n | Parameter in equation (40) |
| $\tau$ ($kg/cm^2$) | Shear strength |
| $\sigma_n$ ($kg/cm^2$) | Normal effective stress |
| $\phi$ | Angle of shearing resistance |
| C ($kg/cm^2$) | Shear constant |
| $\varepsilon$ (%) | Vertical strain at failure |
| $\gamma_{dry}$ ($gm/cm^3$) | Dry density |
| $\gamma_{d_{max}}$ | Dry density of soil in densest condition |

# INTRODUCTION

In nature, sand may be found mixed with fines such as silt and clay. Previous studies on sand indicated that proper attention was mainly given to clean sand. In natural sand deposits, it is very often to find sand containing different percentages of fine grained soils or lime. The failure of sandy soil is due to many reasons. One of them is the contained fines which reduce the resistance of sandy soil against shear stress.

The purpose of the present work is to study the effect of silt content on the shear strength and permeability of sand. Accordingly, triaxial compression and permeability tests are carried out on laboratory prepared samples of clean sand mixed with variable percentages of silt. It could be possible to find out imperical relationships between the shear strength, the normal stress and the percentage of silt. Also it could be possible to find out imperical relationships between the permeability, the percentage of fines and the degree of compaction.

# CHAPTER I

## HISTORICAL REVIEW

## A- Shear Strength

### A. 1. Types of deformation

Deformation of dry sand subjected to stresses can be distinguished into two categories: recoverable and irrecoverable strains. The relative importance of each depends mainly on the applied stress system, the properties of sand and the degree of confinement of the soil.

#### A.1.1. Recoverable deformation

Recoverable deformation is governed to an appreciable degree by:

- The compressibility of mineral grains of which it is composed (Taylor, 1948).
- Particle shape and geometry of packing (El-Sohby, 1964).

#### A.1.2. Irrecoverable deformation

Irrecoverable deformation is mainly due to sliding between particles and particle crushing.

The sliding is due to the relative movement between the particles of sand mass subjected to stress. The applied