

# **CHAPTER ONE**

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### **1.1 General Introduction**

Storage reservoirs and overhead tank are used to store water, liquid petroleum, petroleum products and similar liquids. The force analysis of the Reservoirs or tanks is about the same irrespective of the chemical nature of the product. All tanks are designed as crack free structures to eliminate any leakage. Water or raw petroleum retaining slab and walls can be of reinforced concrete with adequate cover to the reinforcement.

Water and petroleum and react with concrete and, therefore, no special treatment to the surface is required. Industrial wastes can also be collected and processed in concrete tanks with few exceptions. The petroleum product such as petrol, diesel oil, etc. Are likely to leak through the concrete walls, therefore such tanks need special membranes to prevent leakage. Reservoir is a common term applied to liquid storage structure and it can be below or above the ground level. Reservoirs below the ground level are normally built to store large quantities of water whereas those of overhead type are built for direct distribution by gravity flow and are usually of smaller capacity.

Understanding the behavior of expansive soil and adopting the adopting the appropriate control measure have been great task for geotechnical engineers. Extensive research is going on to find the solutions to contracture in Expansive soil.

### **1.2 Significance of the Study:**

Expansive soils prevail over a large area of Sudan and have caused significant damages to irrigation systems, water lines, sewer lines, buildings, roads and other structures located on these soils. Damage caused by expansive soils is estimated by the writers to exceed \$6,000,000. Based on Soil surveys and soil properties collected from Gazira state, over one third of Sudan's area may have potentially expansive soils. All potential construction sites in the Clay Plain been evaluated for expansive soils.

### **1.3 Statement of the problem:**

Expansive soils contain minerals such as smectite clays that are capable of absorbing water. When they absorb water, they increase in volume. This change in volume can exert enough force on a building or other structure to cause damage.

Expansive soils will also shrink when they dry out. This shrinkage can remove support from buildings or other structures and result in damaging subsidence. Fissures in the soil can also develop. These fissures can facilitate the deep penetration of water when moist conditions or runoff occurs. This produces a cycle of shrinkage and swelling that places repetitive stress on structures.

It is possible to build successfully and safely on expansive soils if stable moisture content can be maintained or if the building can be insulated from any soil volume change that occurs. It needs a suitable procedure for success. This may need many steps. If it is not applied the failure will be expected.

### **1.4 Research Questions and Hypotheses:**

1. To what extent do the expansive soil can valid for design a RC rectangular Water Tank?.
2. What are the guidelines for designing the water retraining structure according to IS Code?
3. What are the suitable and flexible programs used for design of the rectangular RC tank?
4. What are the factors determine the suitable location for tank?

### **1.5 Objectives of the study:**

1. To make a study about the analysis and design of water tanks.
2. To make a study about the guidelines for the design of liquid retaining structure according to IS Code.
3. To study ways of expansive soil treatment on base of ground water tank.
4. Select suitable location for tank far away of pollution sources.