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SECTION A

GEOTECNICAL AND FOUNDATION ENGINEERING

Question.

Ans.**Geotechnical Report on Tanda Dam:**

**Introduction:**

Nkari Dam from Cross River Basin Development Authority, Calabar, the Preliminary Geological Investigation carried out by Calabar Cement Company Limited in 1976 for Portland cement manufacture. Other materials included a report of the Task Force committee on Limestones(1989) from the Industries Division of the Ministry of Commerce and Industries, Uyo, Akwa Ibom State, map of the geological survey of Nigeria (Sheet 79,1:250,000). Some other geological publications that contain some geological information about the study area are the Journal of Mining and Geology (Vol. 30 No.2, 1994), the Global Journal of Pure and Applied Science (Vol 5 No.1 1999) under the caption “A Regional Hydrostratigraphic Study of Akwa Ibom State, Southern Nigeria.

**Tests Performed on Dam site for Soil Investigation:**

Following tests shows their result that are performed on Dam site for the

Investigation of Soil of that area that helps in preparing a Geotechnical

Report.

**1-Sieve Analysis of Soil**

2-**Determination of Moisture Content of Soil**

**3-Analysis Specific Gravity of Soil**

4-**Determination of Free Swell Index of Soil**

**5-Determination of Liquid Limit of Soil**

**6-Determination The Plastic Limit of Soil**

**7-California Bearing Ratio Test (CBR)**

**8-Unconfined Compression Strength**

**Test Results**

**Soil Type Silty Clay**

**AASHTO Classification A-7-5**

**% Passing Sieve No.200 29.40**

**Liquid Limit (L.L) % 20.5**

**Plastic Limit (P.L) % 34.0**

**Plasticity Index (P.I) % 6.5**

**Optimum Moisture Content 11.7**

**Maximum Dry Density (MDD) (Kg/) 0.94**

**California Bearing Ratio (CBR) % 11.42**

**Unconfined Compression Strength (KN/) 210.18**

**Natural Moisture Content 12.4**

**Specific Gravity 1.7**

**Quiz**

 **Softwares used in Geotechnical Engineering:**

A high variety of geotechnical software can be found in this

category. **Geotechnical software** is defined as software designed especially in

order to deal with geotechnical issues such as slope stability, seismic analysis,

foundations, etc. The famous softwares used in the field of Geotechnical

Engineering are mentioned below-

**1- 3DEEP:**

This software is fully integrated with a design software package for

automatic model generation. It is a virtual reality software for deep

excavations.

**2- GEO5**

It can be used for Excavation design, Shallow foundation and deep

foundation design, stability analysis, settlement analysis and for various

other field tests.

**GEO STUDIO**:

The GeoStudio suite includes eight products which can be used for

analysing slope stability, ground water seepage, stress deformations and

various other geotechnical problems

**3- PLAXIS**

PLAXIX 2D , Plaxis 3D is a finite element package intended for the two

dimensional and 3 dimensional analysis of deformation and stability of

soil structures, as well as groundwater and heat flow, in geo-engineering

applications such as excavation, foundations, embankments and tunnels.

4- **FLAC3D**

It is used in advanced geotechnical analysis of soil, rock, and structural

support in three dimen*sions. FLAC3D* is used in analysis, testing, and

design by geotechnical, civil, and mining engineers.5- **EDUSHAKE**

It is normally used for earthquake and Geo Technical analysis,

6- **MATLAB**

It uses mathematical simulation for analyzing structural and foundation

problems using series of arrays.

7- **ALLPILE** (**Pile Analysis)**

AllPile is a Windows-based analysis program that handles virtually all

types of piles, including steel pipes, H-piles, pre-cast concrete piles,

auger-cast piles, drilled shafts, timber piles, jetted piles, tapered piles,

piers with bell, micropiles (minipiles), uplift anchors, uplift plate, and

shallow foundations.

8- **DARTISLAB**

Dartis Lab is a geotechnical software for easily processing lab test data.

Dartis Lab features Water content, Index, Specific gravity, Particle size

and USCS classification of soil.

**9- DEEPX**

DeepXcav is a software program for the design of embedded earth

retaining walls with limit-equilibrium and advanced non linear

elastoplastic analysis methods. DeepXcav offers a one-stop complete

geotechnical and structural solution for deep excavation.

**10-DEEPFND**

DeepFND is a powerful interactive software for deep foundation and pile

design. Axial, lateral, settlement, structural and geotechnical analysis

options.

**11-Qult**

Bearing Capacity analysis for shallow foundations.Some other simple softwares are: **SEEP2D, STABL, SVFlux, SVSlope,**

**UTEXAS.** These are simple progammes and are not much versatile as

compared to the above mentioned softwares.