Hashemite University
Faculty of Engineering
Civil Engineering Department

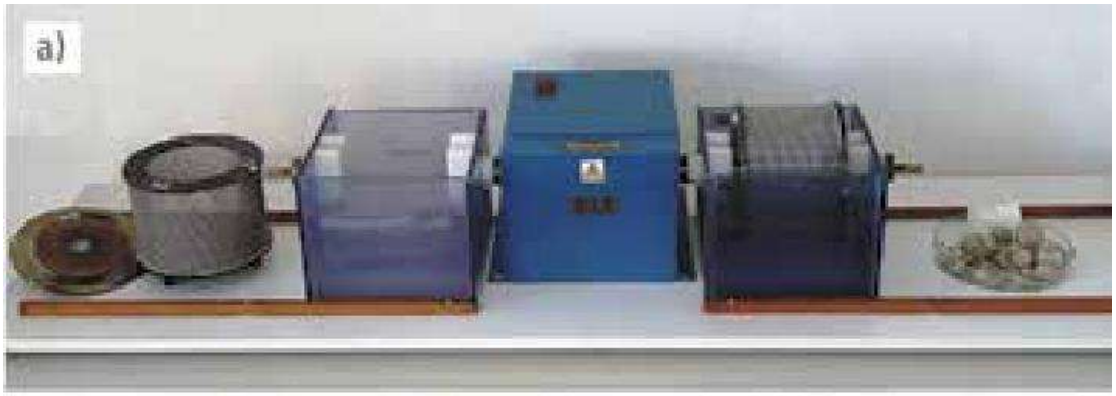
PHYSICAL GEOLOGY LAB

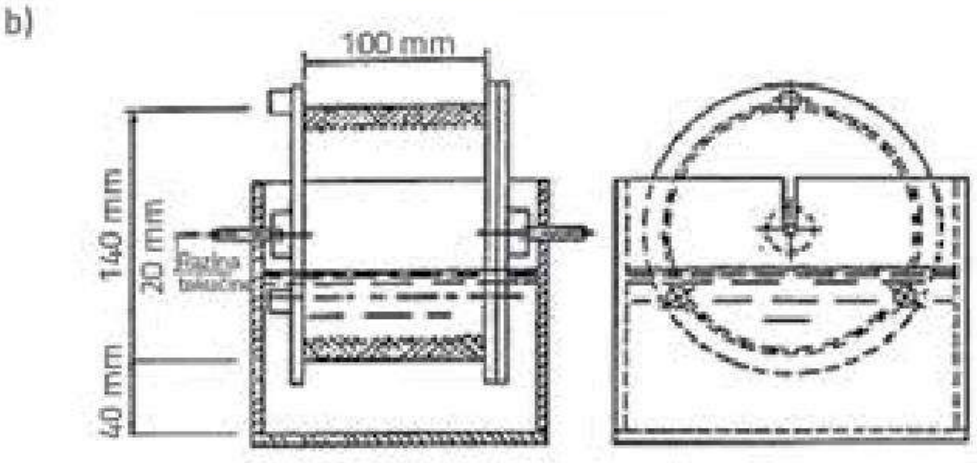
List of Expirements

1. Introduction of physical Engineering Geology lab VS Civil Engineering and Structure and composition of earth.
2. Mineral properties & identification
3. Igneous rock identification (ID)
4. Sedimentary rock ID
5. Metamorphic rock ID
6. Slake Durability test
7. Point load test (Strength of rocks)
8. Angle of Repose (Mass movements and slope processes)
9. Rock Quality Designation RQD (Structural features = folds, Joints, Faults,..)

Physical geology Engineering Lab

Device Name: Slak Durability device
Used For: to determine the durability index.
Experiment associated with it: slake durability test.
Courses associated with it: Physical Geology engineering.





The Hashemite University
Engineering College
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الجامعة الهاشمية
كلية الهندسة
قسم الهندسة المدنية

Machine Identification Card

Name	**Manufacturer**
SLAKE DURABILITY APP	ELE EUROPE
Machine Description	**Model No.** EL77-0510/01

The device consists of a double-ended motor drive unit that rotates two 5.5x3.9in (140x100mm) dia. sturdy wire mesh drums at 20 revolutions per minute in water tanks. Two water tanks are included with the SA-80 and have built-in, quick-release drive units.

Safety Instruction	**Maintenance Record**
• TURN OFF POWER BEFORE RELEASE DRUM FROM TROUGH.	**Running**

The experiments conducted on this machine

- **SLAKE DURABILITY TEST**

The experiments summary

- **To determine abrasion resistance in wetting and drying cycles of shale and similar soft rocks in embankments and other construction-related applications**

Slake durability test Procedure:

- Sample of 10 rock pieces, each weighing between 40 and 60 g, providing a total sample weight ranging from 450 to 550 g.
- The sample is placed in a screen drum and both the drum and the sample are oven-dried at a temperature of 110° ± 5° C to a constant weight.
- After the sample cools to room temperature, the drum is coupled to a motor and rotated immersed in distilled water at a speed of 20 rpm for 10 min.
- The sample is again oven-dried at a temperature of 110° ± 5° C to a constant weight.
- The sample is subjected to a second wetting and drying cycle.

$$ID_2 = \frac{W_A - W_D}{W_B - W_D} \times 100$$

- Where:
- ID_2 = slake durability index (second cycle), (%)
- W (weight of sample before drying + drum)
- W_B = mass of drum plus oven-dried sample before the first cycle, (g)
- W_A = mass of drum plus oven-dried sample retained after the second cycle, (g)
- W_D = mass of drum, (g).

- A visual and an index classification are established according to the appearance of the remaining rock pieces and the range of the ID_2 as shown in the following tables.

Visual description of the rock samples retained in the test drum after the second cycle (after Franklin and Chandra. 1972).

Type	Description
I	Pieces remain virtually unchanged
II	Consist of large and small pieces
III	Exclusively small fragments

Slake durability index classification (after Franklin and Chandra. 1972).

ID_2 (%)	Durability classification
0 – 25	Very Low
26 – 50	Low
51 – 75	Medium
76 - 90	High
91 – 95	Very High
96 - 100	Extremely High

Physical geology Engineering Lab

Device Name: Digital Point Load Tester
Used For: to estimate the strength of rocks
Experiment associated with it: point load test
Courses associated with it: Physical Geology Engineering

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Machine Identification Card

Name

Digital point load device

Manufacturer

MATEST-ITALY

Model No.

A125

Machine Description

- It consist of load frame for applying loads up to 56KN , on which a manual hydraulic jack is mounted. the instrument accepts core specimens up to 4" (101.6mm) diameter which are loaded by tow coneshaped points.

Safety Instruction

• Use protective face shield.

Maintenance Record

Running

The experiments conducted on this machine

- point load test

The experiments summary

- Measuring of rock strength

Point load Procedure:

- The diametral test is conducted on rock core sample. Minimum of 10 test specimens are required to find out the average value of point load strength index.
- This test can be conducted on the core specimens which are completely dry or after soaking it for 7 days.
- Measure the total length (**l**) and diameter (**d**) of the core specimen. Specimen of **l/d=1.5**, are considered to be suitable for this test.
- Place the specimen horizontally between two platens in such a way that the distance between the contact point and the nearest free end (**L**) is at least 0.75times the diameter of the core (**d**).
- Measure the distance between two platen contact points (**D**) with the help of the scale attached with the loading frame. (Note-In case of diametral test, the diameter of the core (**d**) and the distance between two platens (**D**) will be same)
- Apply load to the core specimen such that failure occur within 10-60 sec. record the failure load '**P**'.

$$\text{Point Load Index, } Is = P/D2$$

- Is (50), corresponding to a specimen of 0.05 m in diameter =(P / D2e) * F :
- **F** is the size correction factor **=(De / .05) 0.45**
- Indirect Compressive Strength **u = 24 Is (50)**