



Hashemite University
Faculty of Engineering
Civil Engineering Department

PHYSICAL GEOLOGY LAB

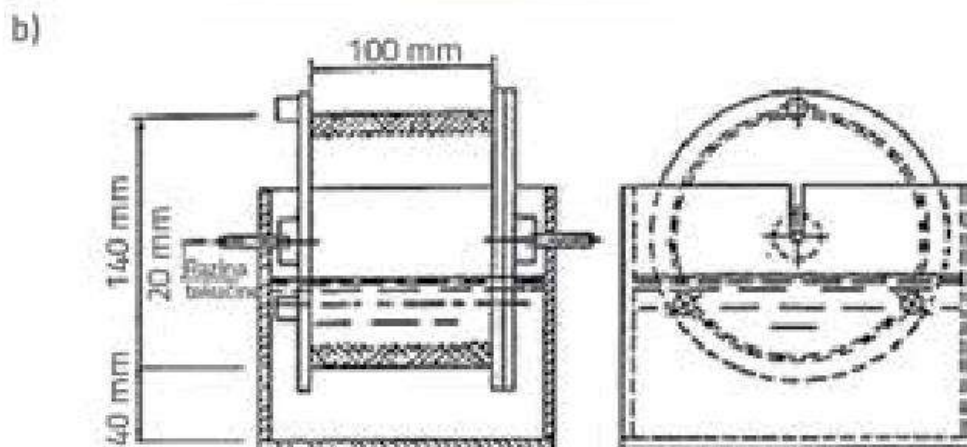
List of Experiments

- 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.





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الجامعة الهاشمية
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Machine Identification Card

Name

SLAKE DURABILITY APP

Manufacturer

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

- TURN OFF POWER BEFORE RELEASE DRUM FROM TROUGH.

Maintenance Record

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 $110^{\circ} \pm 5^{\circ} \text{C}$ 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 $110^{\circ} \pm 5^{\circ} \text{C}$ 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

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.

Model No.

A125

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**'.

Point Load Index, $I_s = P/D^2$

- $I_s (50)$, corresponding to a specimen of 0.05 m in diameter $= (P / D^2) * F$:
- **F** is the size correction factor $= (D_e / .05) 0.45$
- Indirect Compressive Strength $\sigma_c = 24 I_s (50)$

