**PW 05: WATER CONTENT AND SWELLING (FOAMING) OF SAND**

1. ***WATER CONTENT***
2. **Objective of the Experiment**

Measure the water content of gravel and sand

1. **Necessary Equipment**

* A furnace
* A balance (scale)
* A flat metal container

1. **Materials Used**

* A sample of sand
* A sample of gravel

1. **Operating Procedure**
2. Weigh the wet sample, denoted Mh.
3. Place it in a flat metal container and put it in the furnace.
4. After drying, weigh the entire setup again. Record this as Ms.
5. Calculate the water content, denoted ω: ω= ((Mh−Ms)/Ms) ×100
6. Repeat the measurement three times.
7. **Work required**

* Fill in the tables
* Comment on the results
* Make a conclusion

**Table 1: Water Content of Wet Gravel**

| **Designation** | **Test 1** | **Test 2** | **Test 3** | **Average** |
| --- | --- | --- | --- | --- |
| Mh |  |  |  |  |
| Ms |  |  |  |  |
| W |  |  |  |  |

**Table 2: Water Content of Wet Sand**

| **Designation** | **Test 1** | **Test 2** | **Test 3** | **Average** |
| --- | --- | --- | --- | --- |
| Mh |  |  |  |  |
| Ms |  |  |  |  |
| W |  |  |  |  |

1. ***SWELLING (FOAMING) OF SAND***
2. **Objective of the Experiment**

Measure the swelling of the sand

1. **Necessary Equipment**

* A balance (scale)
* Swelling mold
* Container
* Sieve

1. **Materials Used**

* A sample of sand

1. **Procedure**

* **Sample Preparation::**
  + **Extract a sample of sand** from a given site. Ensure that it is representative of the material.
* **Measurement of In-Place Volume:**
  + **Measure a known volume of sand in place.** Use a graduated bucket or a container of known volume for this step.
* **Weighing the Sand:**
  + **Weigh the in-place sand** to obtain its weight (Weight P).
* **Filling the Mold:**
  + **Fill the swelling mold** with the extracted sand. Avoid compacting the sand; leave it in its natural state.
* **Measurement of Swelled Volume:**
  + **Once the mold is filled, measure the volume of sand in the mold** (Volume Vf​).
* **Calculation of Swelling:**
  + The swelling rate (F) is calculated as follows: F= ((Vf−Vi)/Vi) ×100

Where Vi​ is the initial volume of sand (in place) and Vf is the volume after extraction..

1. **Work required**

* Fill in the tables
* Comment on the results
* Make a conclusion

**Table 1: The Swelling (foaming) of the sand**

| **Designation** | **Test 1** | **Test 2** | **Test 3** | **Average** |
| --- | --- | --- | --- | --- |
| Vf |  |  |  |  |
| Vi |  |  |  |  |
| F |  |  |  |  |