

Round 1

Experiment Design for Marine Structures Lab

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Name of the Lab: Marine Structures Lab

Name of experiment: Slump Test

FOCUS AREA: Experimental Analysis methods

About the Experiment: The slump test indicates the behaviour of a compacted concrete cone under the action of gravitational forces. The slump test is a practical means of measuring the workability i.e., consistency of concrete, where the nominal maximum size of the aggregate does not exceed 38 mm. Changes in the value of slump obtained during a job may indicate changes in materials, in the water content or in the proportions of the mix, so it's useful in controlling the quality of the concrete produced.

1. Learning Objectives and Cognitive Level:

Sr. No	Learning Objectives	Cognitive level	Action Verb
1.	<i>Students will be able to</i> define the meaning of workability and consistency of concrete	Remember	Define
2.	<i>Students will be able to</i> define mix proportion and its effect on slump value	Remember	Define
3.	<i>Students will be able to</i> define volume of slump cone	Remember	Define
4.	<i>Students will be able to</i> calculate the volume of the slump cone by measuring its dimensions	Apply	Calculate
5.	<i>Students will be able to</i> calculate the quantity of cement, water, coarse aggregate and fine aggregate based on the given mix	Apply	Calculate

6.	<i>Students will be able to analyse the uniformity for different batches of similar concrete under load conditions</i>	Analyse	Analyse
7.	<i>Students will be able to evaluate the different shapes of slump obtained during the test like true, collapsed, zero and shear</i>	Evaluate	Evaluate

2. Instructional Strategy:

2.1 Instructional Strategy: Expository

2.2 Assessment Method: Formative Assessment

2.3 Description of section:

- Detailed theory is provided by considering all the aspects which develops intuition and deeper understanding of concepts, also reference will be provided for further information.
- In order to understand the process followed in simulation a complete set of procedure will be provided which helps the students to perform simulation.
- Step by step procedure which is carried out in lab manually is being simulated which gives exposure to real laboratory apparatus, empowering independent learning.
- Pre-quiz and post-quiz will be provided to test the understanding of the students before and after performing the experiments.
- Assignment questions will be provided to the students to make them explore more on the experiments.
- Once the students go through the virtual lab experiments, they can perform those experiments in real lab effectively.

3. Task & Assessment Questions:

Sr. No.	Instructions given by the Teacher	Tasks to be done by the Students	Assessment questions aligned to the task
1.	State the meaning of workability and consistency of concrete	Click on the button to display workability and consistency of concrete	Q3
2.	State mix proportion and its effect on slump value	Click on the button to obtain the mix proportion and its effect on slump value	Q1
3.	Define volume of slump cone	Display volume of slump cone	Q2
4.	Calculate the volume of the slump cone by measuring its dimensions	Click on the measured dimension and calculate the volume of slump cone	Q7
5.	Calculate the quantity of cement, water, coarse aggregate and fine aggregate based on the given mix	Click on the mix ratio given and calculate the quantity of materials required	Q5
6.	Explain the uniformity for different batches of similar concrete under load conditions	Display the uniformity of different batches of concrete under load conditions	Q6
7.	Explain different shapes of slump obtained during the test like true, collapsed, zero and shear	Click on the obtained slump and display the shape of slump obtained	Q4

Additional Assessment Questions:

1. Slump cone test is not suitable for

- a. Very dry mix
- b. Collapsed slump
- c. Aggregate size >38mm
- d. All the above

2. Slump value is measured as the difference in height between the

- a) Height of the mould and the average value of the subsidence
- b) Height of the mould and the highest value of the subsidence
- c) Height of the mould and the lowest value of the subsidence
- d) All the above

3. Workability of concrete depends upon

- a. Water Content
- b. Mix Proportion

c. Aggregate Size

d. All the above

4. Zero slump concrete indicates

a. High water cement ratio and wet mix

b. Low water cement ratio and Dry mix

c. Very harsh mix

d. Lean concrete mix

5. Consistency is a term which indicates the

a) Degree of fluidity

b) Degree of mobility

c) Both a and b

d) None of the above

6. Which of the following is correct?

Collapse slump indicates

1. High water cement ratio

2. Low workability mix

3. Harsh and Lean mix

4. Slump test is unsuitable

a) 1,2 and 3

b) 2,3 and 4

c) 1,2,3 and 4

d) 1,3 and 4

7. Slump test is the more precise test to obtain workability of concrete. (Say True or False).

4. Simulator Interactions:

Sr. No	What students will do?	What Simulator will do?	Purpose of the task
1.	See the displayed objectives and apparatus used then click on next button	Display objective and apparatus used	Recall the experiment
2.	Understand the volume calculation of the slump cone, click on next button	Display the measurement of height and diameter and display the volume of slump cone	To provide basic environment to start the experiment
3.	Click ON button to start the calculation then click on next to proceed, click on tare to set the initial value and repeat the process for all the materials used	Display the measurement of quantity of cement, coarse aggregate, water and fine aggregate required for the mix proportion	To observe the weights of the materials used in the experiment and its effect on mix proportion
4.	Click on the arrows beside every tray containing weighed materials then click on the trowel to mix all the materials, click the next button to proceed	Display dry mix of the materials	To obtain the uniformity in mix
5.	Click on the measuring jar to add the required quantity of water, click next button	Display add measured quantity of water and mix it thoroughly and uniformly	To obtain the uniformity in mix
6.	Click on the slump cone to place it on the base then click on the connecting pin to fix it, click next button	Display place the cleaned slump cone on a horizontal slump base	To avoid other particles from effecting the mix
7.	Click on the trowel to fill the mould then click on tamping rod to avoid voids after each layer, the process is continued for 4 layers, then click next button	Display fill the mould in four layers, each layer is tamped 25 times by a tamping rod	To avoid voids in the slump cone so that the concrete mix is perfectly set
8.	Click on the tamping rod to remove the extra concrete then click on next button	Display remove extra concrete with the trowel and tamping rod	To level the top surface of the cone
9.	Click on the connecting pin, then click on the slump cone to remove it then click on next button	Display remove the mould from the concrete immediately by raising it slowly in vertical direction	To observe the slump value
10.	Click on the tamping rod then click on the measuring scale to note down the slump value, click on next button	Display note down the slump by keeping slump cone mould as reference	To make students calculate the data

11.	Fill the table according to the observation obtained	Display observation	To check for the calculated data whether it is correct or not
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