Tests on Fresh Concrete:

Slump Test

Objective

To determine the relative consistency of freshly mixed concrete.

Standards : ASTM C 143 and BS 1881 : 103

Principles

- Slump test is the most commonly used method of measuring consistency of concrete which can be employed either in laboratory or at site of work.
- It is not a suitable method for very wet or very dry concrete.
- It does not measure all factors contributing to workability, nor is it always representative of the placability of the concrete.
- The slump test is used to ensure uniformity for different batches of similar concrete under field conditions and to ascertain the effects of plasticizers on their introduction.
- This test is very useful on site as a check on the day-to-day or hour- to-hour variation in the materials being fed into the mixer. An increase in slump may mean, for instance, that the moisture content of aggregate has unexpectedly increases.
- Other cause would be a change in the grading of the aggregate, such as a deficiency of sand.
- Too high or too low a slump gives immediate warning and enables the mixer operator to remedy the situation.

Apparatus :

- Slump cone (Figure 1) : metal cone with form with the base 200mm diameter and 300mm height with the top diameter 100mm. the top and base of cylindrical mould is open and parallel to each other. The mould is provided with foot pieces and handles.
- Temping rod (steel) with dimensions of 16mm diameter and 600 mm length.
- Balance.

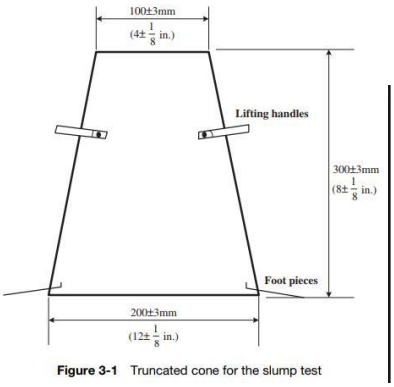

Figure 3-1 Truncated cone for the slump test

Figure (1)

Materials

Fresh concrete mix (cement, sand, gravel and water)

Test Procedure

Figure (2) illustrates the steps for slump test:

1. The base is placed on a smooth surface and the container is filled with concrete in three layers, whose workability is to be tested .
2. Each layer is temped 25 times with a standard 16 mm diameter steel rod, rounded at the end.
3. When the mold is completely filled with concrete, the top surface is struck off (leveled with mold top opening) by means of screening and rolling motion of the temping rod.
4. The mold must be firmly held against its base during the entire operation so that it could not move due to the pouring of concrete and this can be done by means of handles or foot – rests brazed to the mold.
5. Immediately after filling is completed and the concrete is leveled, the cone is slowly and carefully lifted vertically (Figure 3), an unsupported concrete will now slump.
6. The decrease in the height of the center of the slumped concrete is called slump (Figure 3-step6) .
7. The slump is measured by placing the cone just besides the slump concrete and the temping rod is placed over the cone so that it should also come over the area of slumped concrete.
8. The decrease in height of concrete to that of mould is noted with scale. (usually measured to the nearest 5 mm.

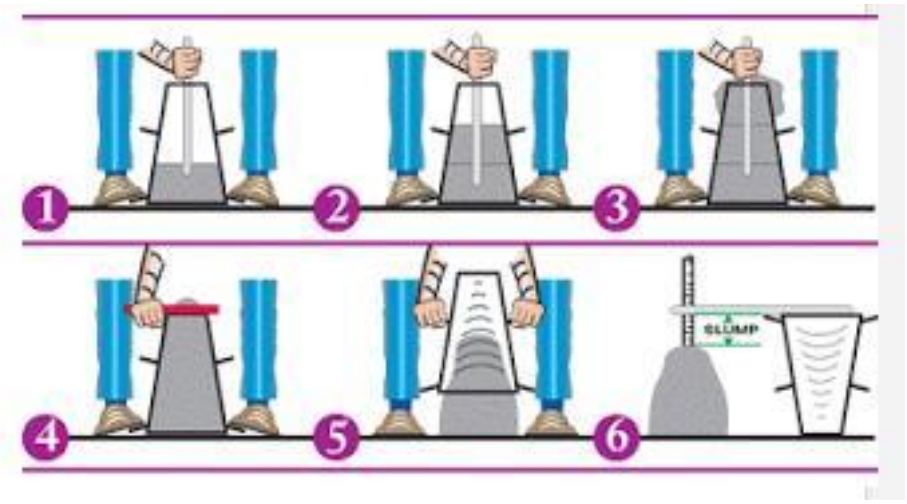

Figure (2)

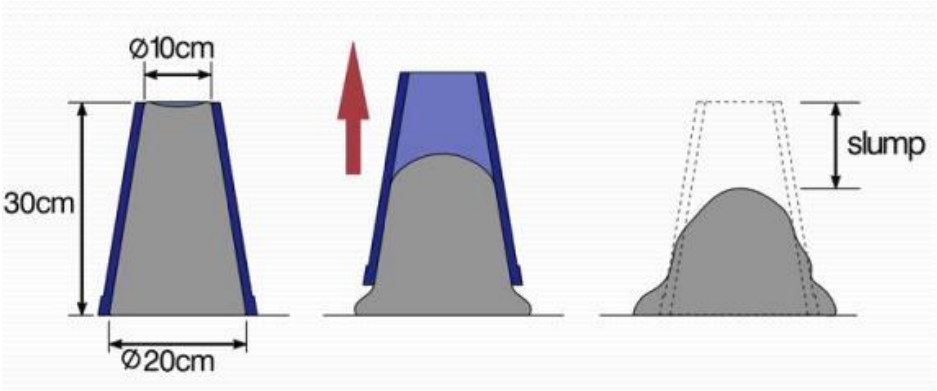

Figure (3)

Types of Slump:

The concrete slump can be classified according to the nature of concrete fall. There are 3 types of the slump (Figure 4). These are:

1. **True slump:** In a true slump concrete just subsides shortly and more or less maintain the mould shape. This type of slump is most desirable.
2. **Shear slump:** If one-half of the cone slides down in an inclined plane, it is called a shear slump. Shear slump indicates lack of cohesion in the concrete mix. Shear slump may occur in the case of a harsh mix.
3. **Collapse slump:** In this case, fresh concrete collapses completely.

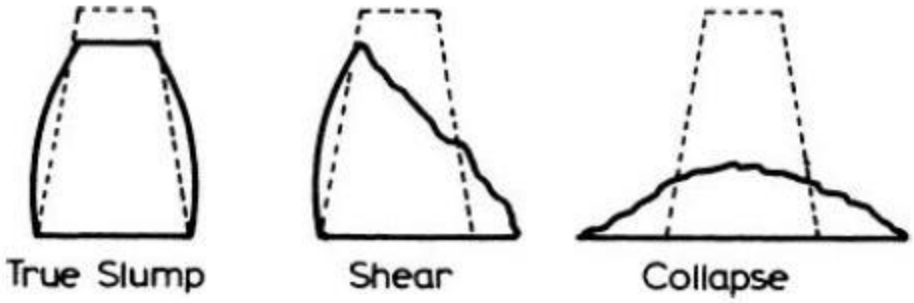

Figure (4)

Note :
Description of workability & magnitude of slump is shown in the table below:

Description of workability	*Slump*
	mm
No slump	0
Very low	5–10
Low	15–30
Medium	35–75
High	80–155
Very high	160 to collapse