FACULTY OF ENGINEERIN & TECHNOLOGY

TOPIC : AGGREGATES-CHARACTERISTICS (L-10)

Today , it will be discussed :

- ❖ Various Characteristics of Aggregates
- ❖ Bulking of Sand
- ❑ Bulking of Sand - Definition
- ❑ Laboratory Test
- ❑ Significance

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The various characteristics of aggregates are

- **Bulking of Sand**
- **Specific Gravity**
- **Water Absorption**
- **Surface Moisture.**
- **Particle size and shape,**
- **Surface Texture,**
- **Bulk Density,**
- **Deleterious Materials,**
- **Soundness**

Definition

Bulking of fine aggregate or sand is the phenomenon of increase in sand volume due to the increase of moisture content.. Bulking test on fine aggregates has to be performed before using it in construction.

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Causes of Bulking of Sand:

The moisture content in the sand makes thin films around sand particles. Hence, each particle exerts pressure. Thus they move away from each other causing increasing in volume. The bulking of the aggregates is dependent on two factors:

- The fineness of the aggregates
- Percentage moisture content

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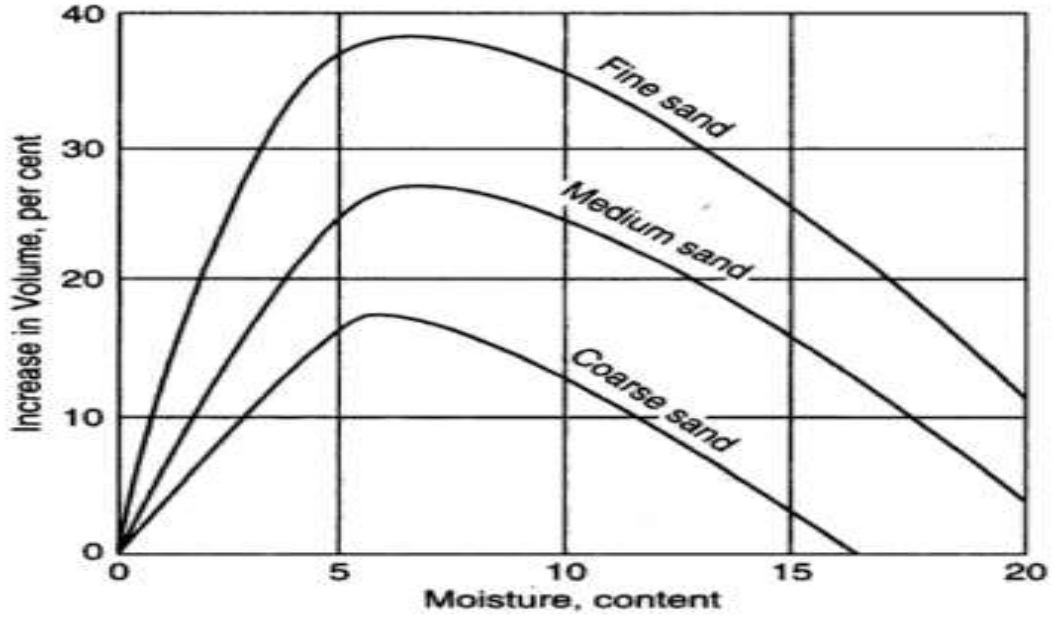
As shown in figure-1 below, the bulking of the sand increases with the increase in moisture content. This happens up to a limit beyond which any moisture addition will decrease the volume



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A fully saturated fine aggregate does not show any bulking. The rate of bulking is inversely proportional to the size of the aggregates. Hence, fine aggregates bulk more compared to coarse aggregates.

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Laboratory Test for Bulking of Sand :
(please visit https://youtu.be/H5pp6qHh07w)
Apparatus :

1. 250ml measuring cylinder
2. Weighing balance
3. Fine aggregate

Procedure :

1. Take 500 grams of fine aggregate over dried at a temperature of 100 to 110 degree Celsius for 24 ± 0.5 hours. This weight is measured as W_1
2. The cooled sand is taken in an airtight container. This weight is measured as W_2.

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3.Take the reading at the sand surface (Y ml)

Calculations

Percentage Bulking of Sand = [(200/Y)- 1] x100

Result

Percentage bulking of field sample=

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Significance of Determining Percentage Bulking :

Unrealistic volume is shown by fine aggregate due to bulking. When concrete proportioning is to be performed, the sand bulking issues is a concern. If the effect of bulking is not studied properly, the concrete designed will have an insufficient amount of sand resulting in a harsh mix and segregation. Bulking of sand will affect the yield of concrete for a given cement content.

THANK YOU