HINDERED SETTLING

MECHANICAL OPERATIONS

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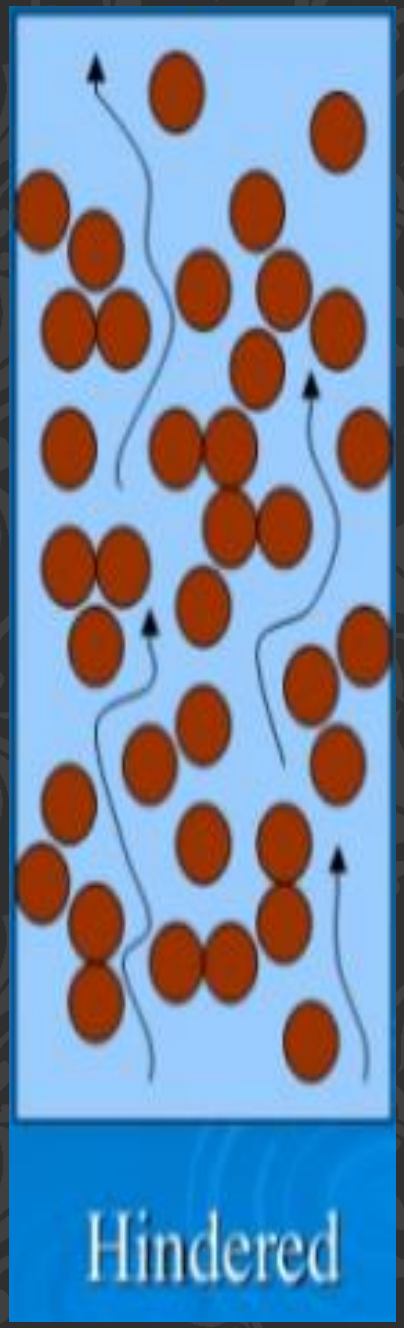
INTRODUCTION

Hindered settling is the settling of the particles impeded/affected by the other particles and the wall of the container.

• It refers to the process where in the fall of the particle in the gravitational field through a stationery fluid is affected by the other particles in the wall of the container.

- In this process the particle collide with the other particles and with the wall of the container.
- This require that the particles be close to each other and this in turn demand the concentration of solids in a suspension to be high.
- Hindered settling is encounterd when the concentration of the solids in a suspension is large.
- For hindered settling ,the settling velocity is considerably less than the falling velocity under free settling condition.



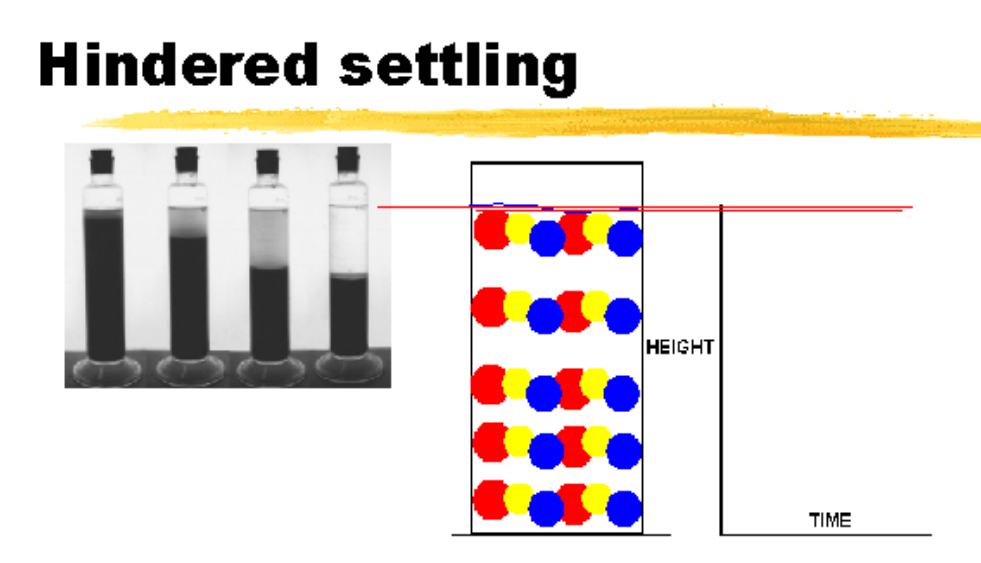
PHENOMENA OF HINDERED SETTLING

- As the concentration of particles in a suspension is increased , a point is reached where particles are so close together that they no longer settle independently of one another and the velocity fields of the fluid displaced by adjacent particles, overlap.
- There is also a net upward flow of liquid displaced by the settling particles. This results in a reduced particle settling velocity and the affect is known as hindered settling.

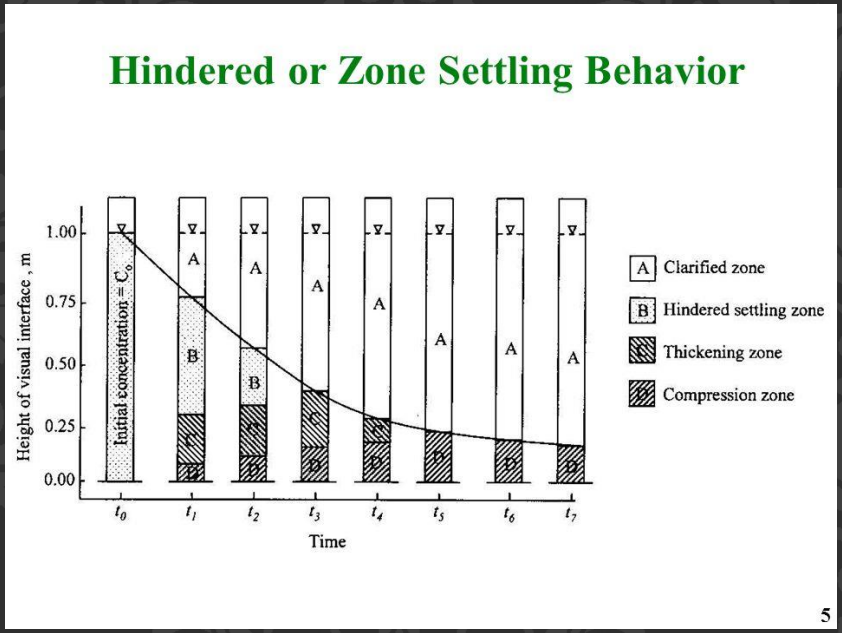
• The whole suspension tends to settle as a blanket due to its high particle concentration.

• Hindered settling is also known as zone settling , because it is easy to make a distinction between several different zones which separated by concentration discontinuities.

•As the suspension settles ,the interface formed will move down at the same speed.



- At the same time ,there is an interface near the bottom between that settled suspension and suspended blanket.
- After settling of suspension is complete ,the bottom interface would move upwards and meet the top interface which moves downwards.



APPLICATIONS

1) WASTE WATER TREATMENT PLANT :

•Biological floc removal in secondary settling basins of waste water treatment plant

2) SUSPENSION:

Suspensions of very fine sand in water are used in separating coal from heavy minerals ,and the density of the suspension is adjusted to a value slightly greater than that of coal to make the coal particles rise to the surface ,while the mineral particles sink to the bottom.

3) FOOD PROCESSING:

The vegetables are crushed and placed inside a settling tank with water. The oil floats the top of the water then is collected.

SIGNIFICANCE OF LEARNING HINDERED SETTLING

- Settling behaviour of concentrated dispersions and some volcanological applications

- Depending on the grain size distribution particle segregation was suppressed ,and the dispersion settled to form a hindered settling is intrinsic to all pyroclastic flows as they spread out and deflate across the experimental investigations into the settling behaviour of dispersion.


TOOLBOX
THANK
YOU