SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

COIMBATORE-35

DEPARTMENT OF CIVIL ENGINEERING

19CET307 – FOUNDATION ENGINEERING

III YEAR / VI SEMESTER

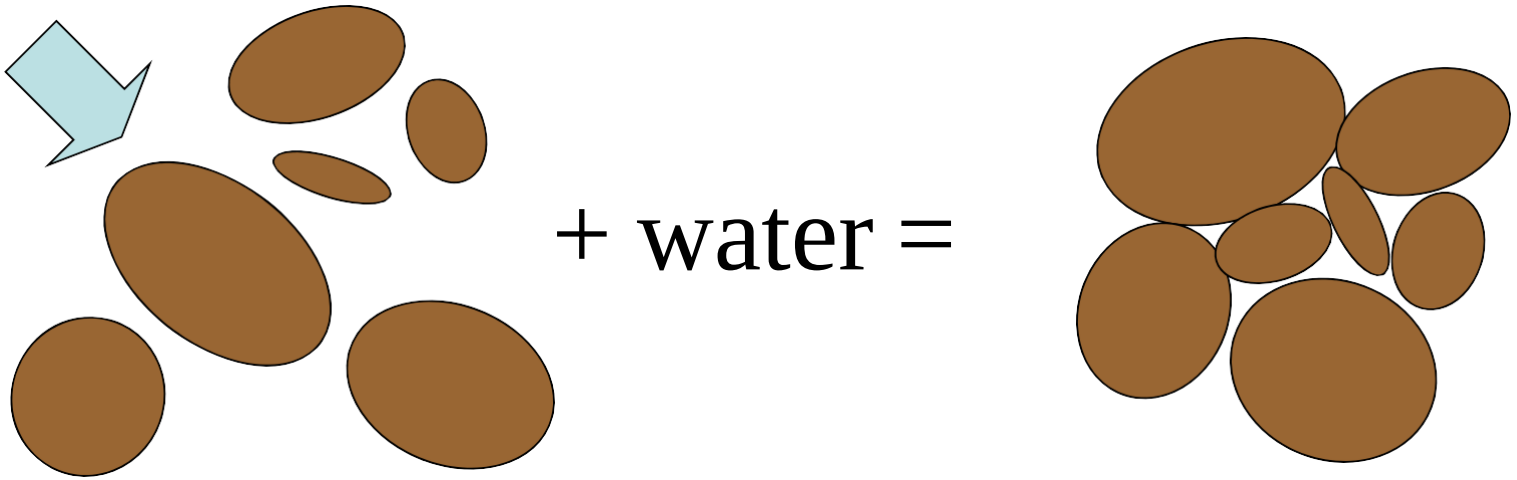
Unit 5- GROUND IMPROVEMENT TECHNIQUES

Topic : MECHANICAL COMPACTION

Mechanical Compaction

- A simple ground improvement technique, where the soil is densified through external compactive effort.

Compactive effort



Mechanical Compaction

Compaction of Soil:

- Expulsion of air from the voids
- Reduce Settlement
- Increase stability of slopes

Applications:

- Highway railway embankments, earthen dams etc…

Advantages of Compaction

•1.Increases shear strength
2.Reduces compressibility
3.Reduces permeability
4.Reduces liquefaction potential
5.Controls swelling and shrinking
6.Prolongs durability

- **Strategies for compaction process are**
- In the case of constructed fills, specify placement conditions
- (water content, density,depth of layers, etc.)
- Select appropriate equipment (roller compactor, tamping) and method of operation (number of passes, patterns of tamping,etc.).
- Set up adequate control procedures (type and number of tests, statistical evaluation,etc.).

Compaction Process

- to obtain the compaction curve and define the optimum water content and maximum dry density for a specific compactive effort.

Proctor:

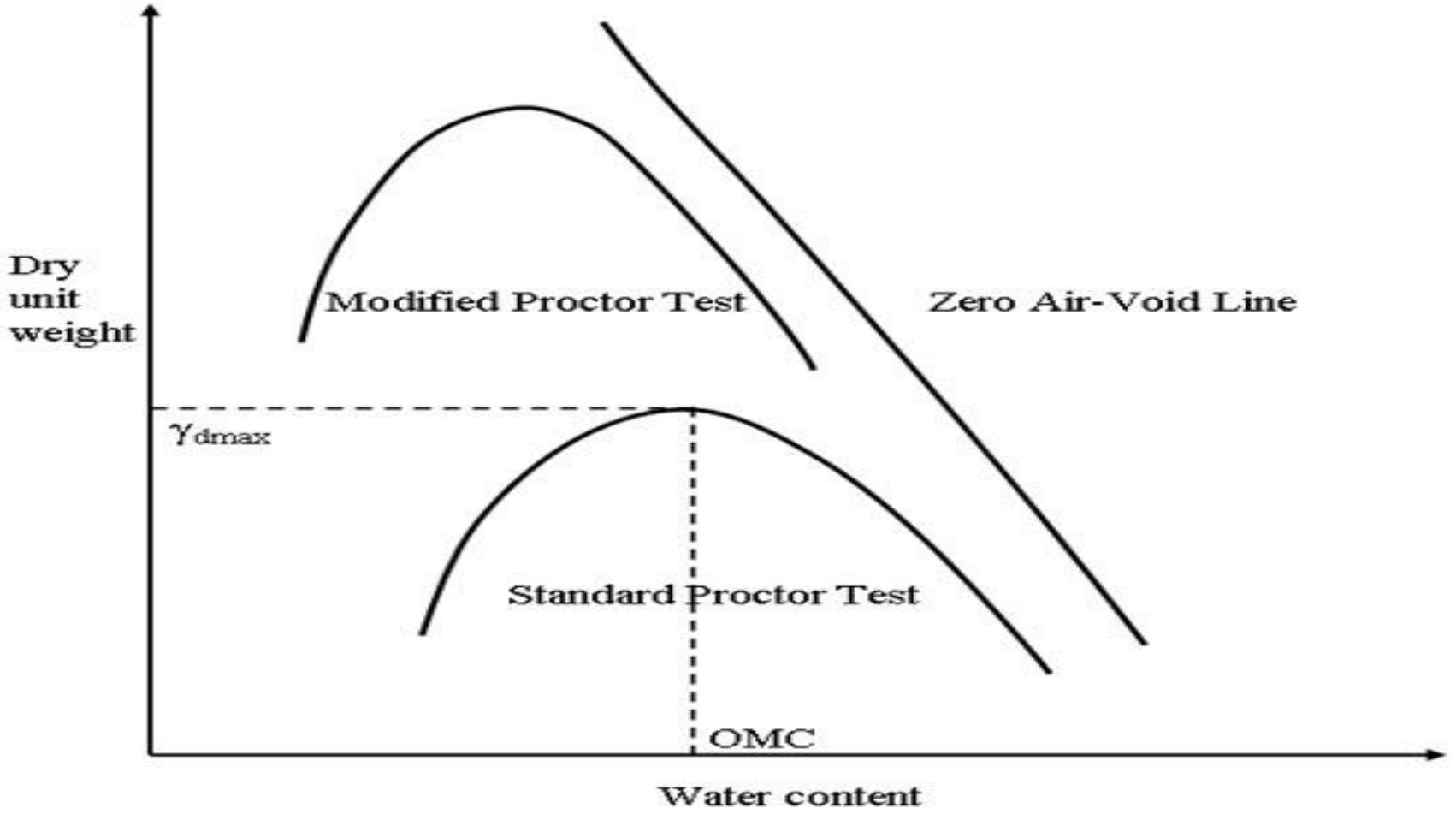
- 3 layers
- 25 blows per layer
- 2.7 kg hammer
- 300 mm drop

1000 ml compaction mould

Modified Proctor:

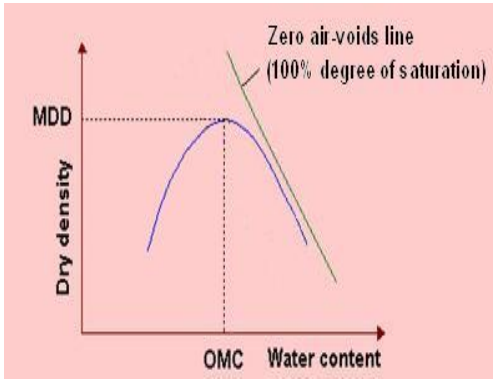
- 5 layers
- 25 blows per layer
- 4.9 kg hammer
- 450 mm drop

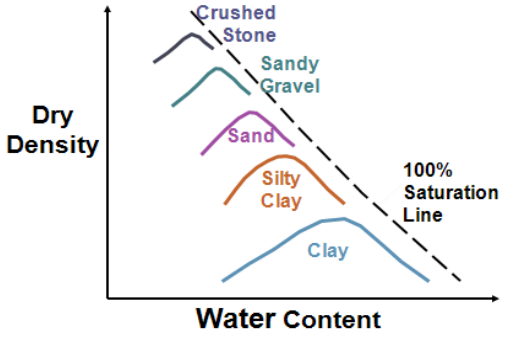
Compaction Curve



$$\text{Compaction Energy} = \frac{\text{(No of blows X No of layers X Wt of hammer X Ht of fall)}}{\text{Volume of mould}}$$

Method	Proctor	Modified Proctor
Compactive Energy	563kN/m^2	2530 kN/m^2





Machine Compaction

i) Sheet Foot Rollers

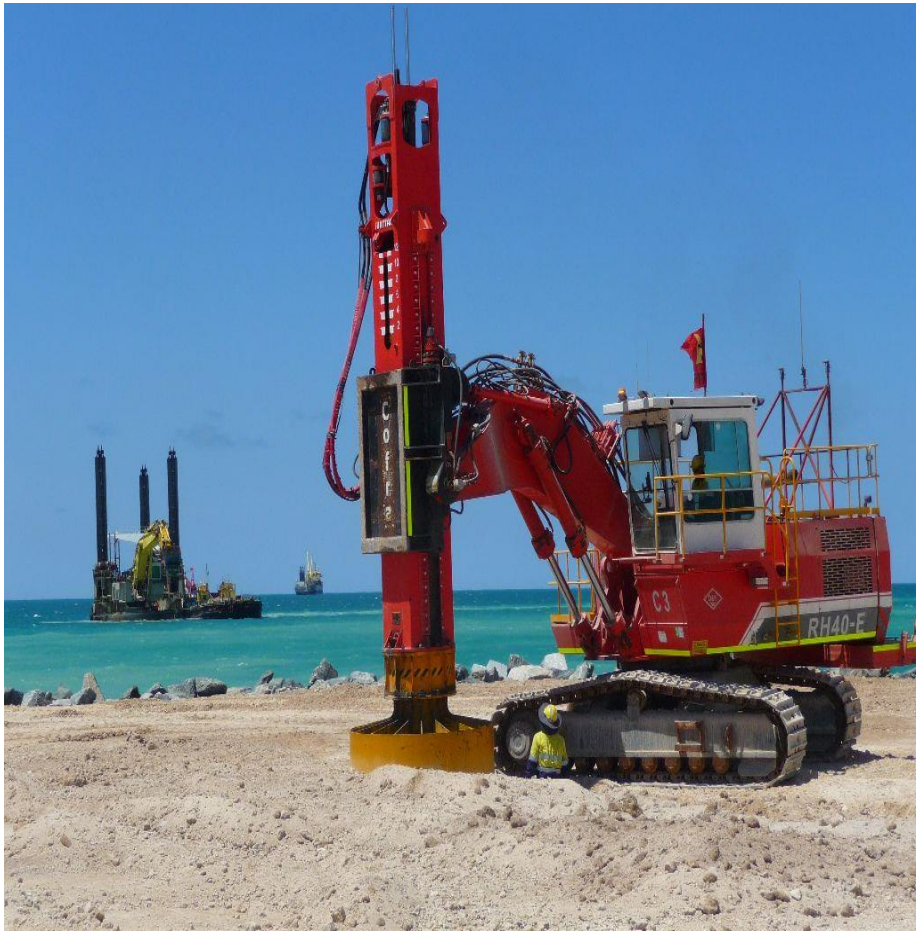
ii) Roller Compaction

iii) Rubber Tyred Roller

iv) Dynamic Roller Compaction:

v) Dynamic Compaction:

vii) Rapid Dynamic Compaction:



Relative Compaction:

$$R(\%) = (\gamma_d \text{ field} / \gamma_{d\,max} \text{ lab }) \times 100$$

Factors affecting Compaction:

- Type of soil
- Moisture Content
- Compactive effort
- Method of compaction
- Degree of Saturation
- Presence of Organic matter