Proctor test

Eng: Mohammad Hamdan

Proctor test

In proctor test dry density and moisture content is calculated at different ratio of water for a sample of soil. In proctor test we calculate the dry density for a sample of soil by adding a various water content of 2%, 4%, 6%, 8% and 10% to the soil sample and determine the dry density corresponding each water content. the purpose of conducting proctor test is to determine the optimum moisture content that will result in maximum dry density (MDD).

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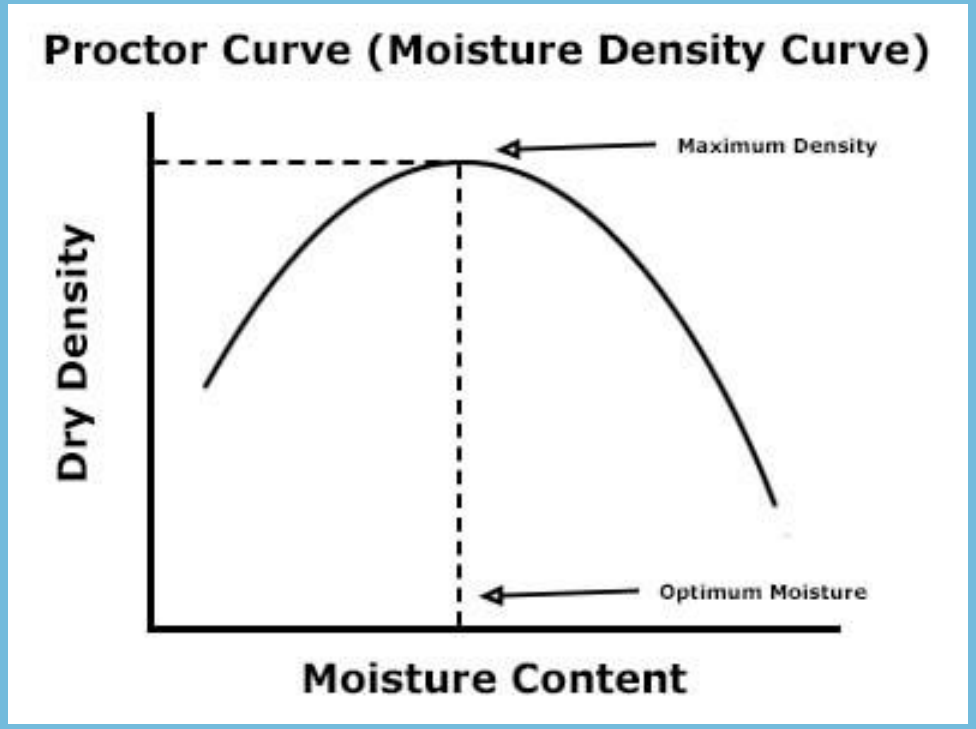
After determining the dry density for each moisture content, we draw a graph for Moisture content vs dry density, and from this curve we determine the optimum moisture content and the maximum dry density



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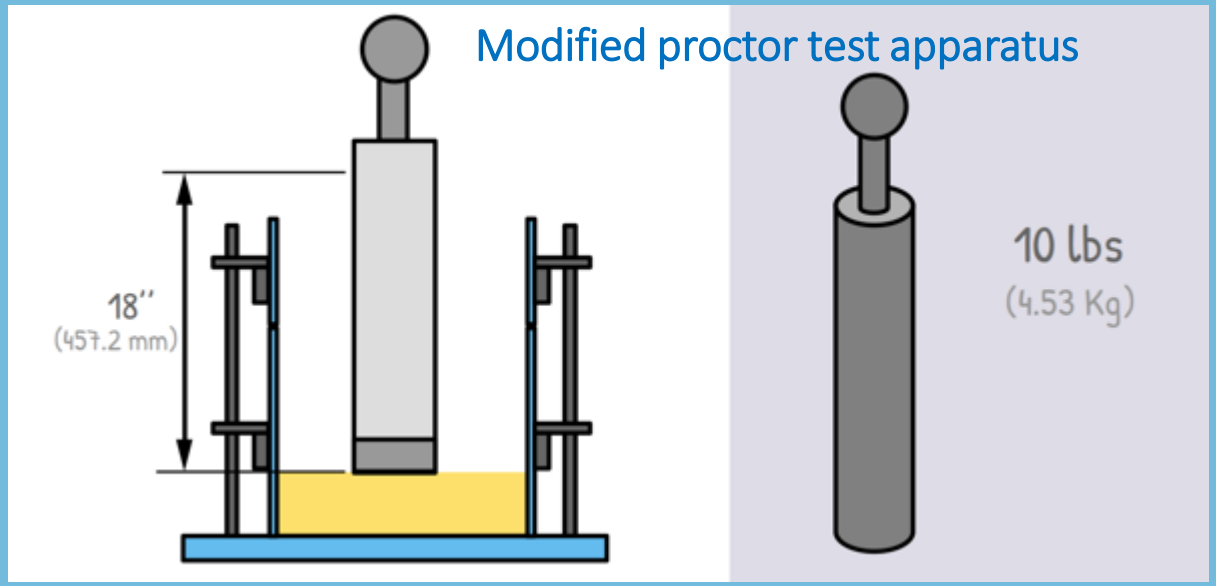
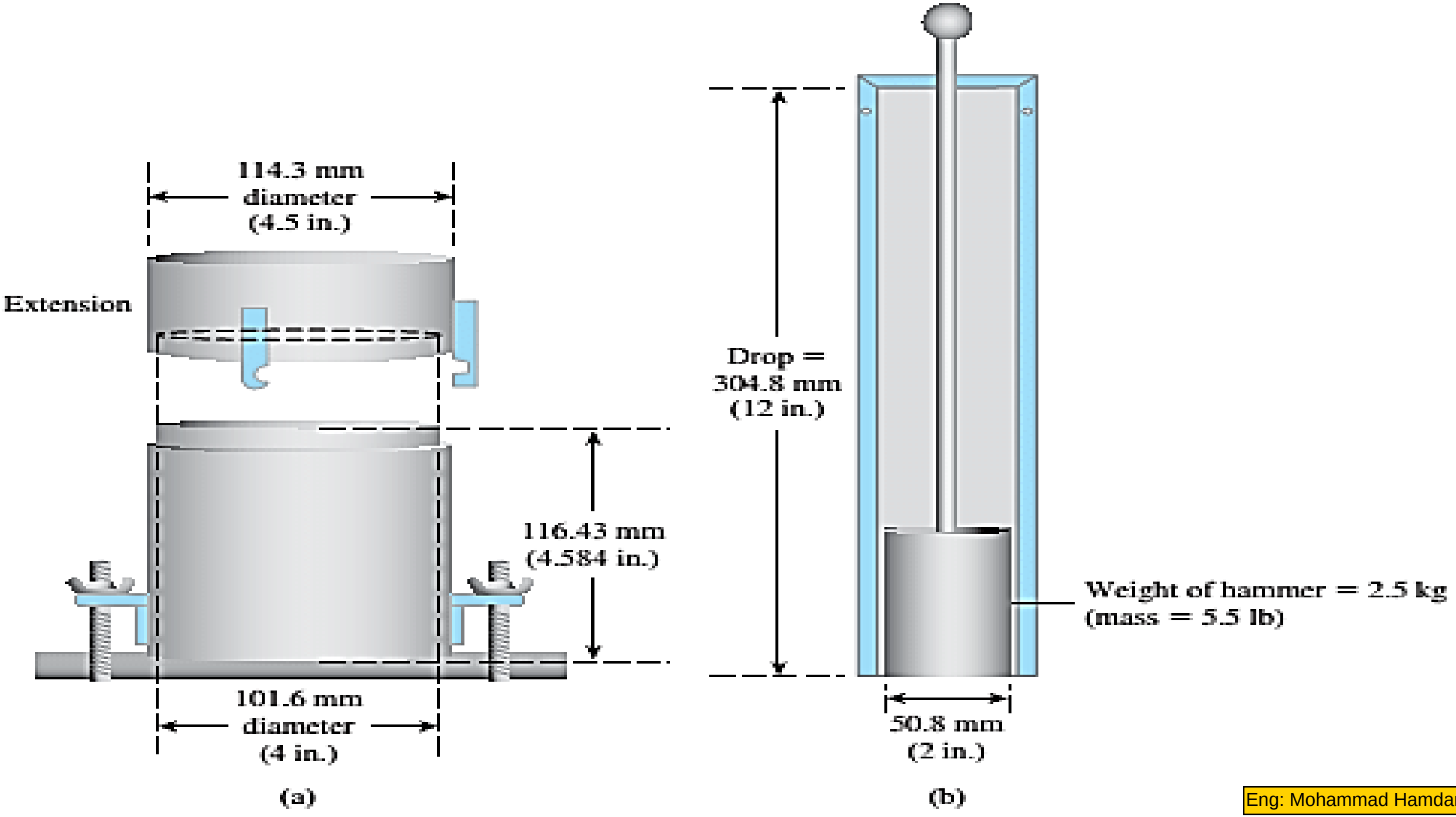
In standard proctor test, for each water content (2%, 4%, etc), the mold is filled with soil at three layers and each layer receive 25 blows by hammer (2.50 kg, fall height of 300 mm). For modified proctor test, the mold is filled in 5 layers and each layer receive 56 blows by hammer (4.5 kg, fall height of 457 mm).





Proctor test

The dry density will be determined for each water content after compaction by the use of following equations:

$$Water\ content(W.C) = \frac{weight\ of\ weight\ soil\ with\ container - weight\ of\ dry\ soil\ with\ container}{weight\ of\ dry\ soil}$$

$$Dry\ density = \frac{(bulk\ density\ of\ soil = \left(\frac{weight\ of\ soil}{volume\ of\ molud}\right)) * 100}{100 + w.c}$$

Proctor test

Example: Calculate the optimum water content and MDD for the following data obtained from modified proctor test?

- Volume of mold=944 cm3

Test no	1	2	3	4	5
% of water added	No water added	2%	4%	6%	8%
Weight of soil + mold (A)- (gram)	10425	10575	10705	10815	10810
Weight of mold (B)	6550 gm				

Proctor test

Example: Calculate the optimum water content and MDD for the following data obtained from modified proctor test?

- Determination of WC & dry density

Test no	1	2	3	4	5
% of water added	No water added	2%	4%	6%	8%
Weight of soil + mold (A)- (gram)	8273	8340	8398	8447	8445
Weight of mold (B)	6550 gm				
Weight of soil C=(A-B)-(gram)	1723	1790	1848	1897	1895
Bulk density (C/mold volume) Volume of mold=944 cm3	1.825	1.896	1.957	2009	2007

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Bulk density D=(C/mold volume) Volume of mold=944 cm3	1.825	1.896	1.957	2009	2007

- Determination of bulk density

Container no	1	2	3	4	5
Weight of container (E)	88.3	107.8	109.6	109.9	110.6
Weight of wet soil + container (F)	510.4	515.8	515.4	520.3	510.2
Weight of dry soil + container (G)	488	487.6	480.8	478.9	464.2
Weight of dry soil (H=G-E)	399.7	379.8	371.2	369.0	353.6
Weight of water soil (I=F-G)	22.40	28.20	34.60	41.40	46.00
W.C J=(I*100)/H	5.60%	7.40%	9.30%	11.20%	13.00%
Dry Density (K=(D*100)/(J+100))	1.728	1.765	1.791	1.807	1.776

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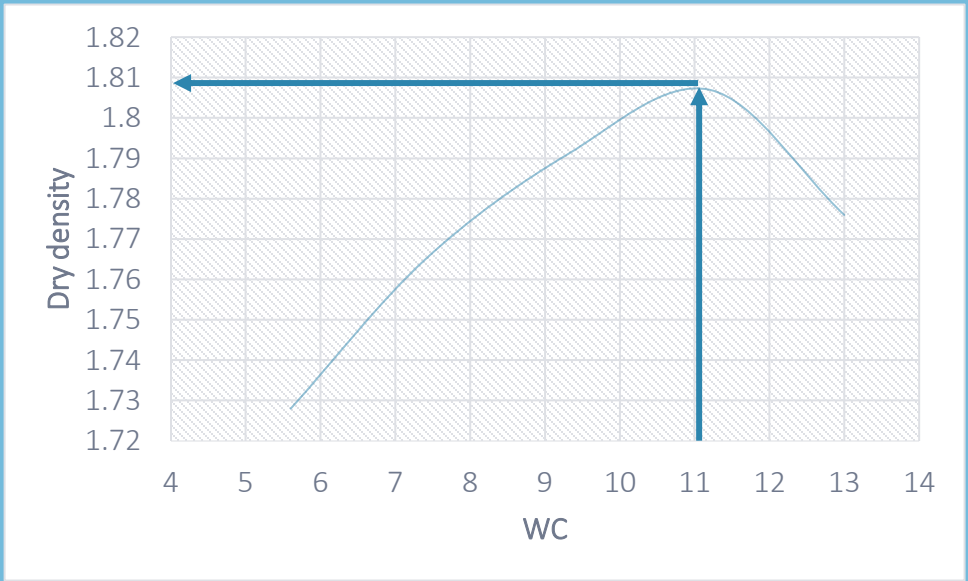
- Draw DD VS WC curve



From the curve:

- Optimum moisture content=11.1%
- MDD=1.809 gm/cm3