

Problem # 1

$$\text{MAX DRY DENSITY} = \underline{1714 \text{ kg/m}^3}$$

$$\text{OPTIMUM MOISTURE} = \underline{14.6\%}$$

* SEE ATTACHED FOR GRAPH

Problem # 2

GIVEN:

$$\begin{aligned} \text{MAX DRY DENSITY} &= 1715 \text{ kg/m}^3 \\ \text{MOIST DENSITY} &= 1705 \text{ kg/m}^3 \\ \omega &= 10.5\% \end{aligned}$$

$$\gamma_d = \frac{1705}{1.105} = 1542.98 \text{ kg/m}^3$$

$$\Rightarrow \underline{\gamma_d = 1543 \text{ kg/m}^3}$$

$$R = \frac{1543}{1714} \times 100 = 90.02$$

$$\Rightarrow \underline{R = 90\%}$$

Problem # 3

GIVEN:

$$\begin{aligned} \gamma_{d(\text{max})} &= 1682 \text{ kg/m}^3 \\ \gamma_{d(\text{min})} &= 1510 \text{ kg/m}^3 \\ D_r &= 70\% \end{aligned}$$

FIND: RELATIVE COMPACTION

$$D_r = \left[\frac{\gamma_d(\text{find}) - \gamma_{d(\text{min})}}{\gamma_{d(\text{max})} - \gamma_{d(\text{min})}} \right] \left[\frac{\gamma_{d(\text{max})}}{\gamma_d(\text{find})} \right]$$

$$0.70 = \left[\frac{\gamma_d(\text{find}) - 1510}{1682 - 1510} \right] \left[\frac{1682}{\gamma_d(\text{find})} \right] = 1626.412$$

$$\Rightarrow \underline{\underline{\gamma_d(\text{find}) = 1626.4 \text{ kg/m}^3}}$$

Problem # 4

GIVEN:

$$\begin{aligned} D_{10} &= 0.11 \text{ mm} \\ D_{20} &= 0.19 \text{ mm} \\ D_{50} &= 1.3 \text{ mm} \end{aligned}$$

FIND: SUITABILITY NUMBER S_u FOR SOIL

$$S_u = 1.7 \sqrt{\frac{3}{(D_{50})^2} + \frac{1}{(D_{20})^2} + \frac{1}{(D_{10})^2}}$$

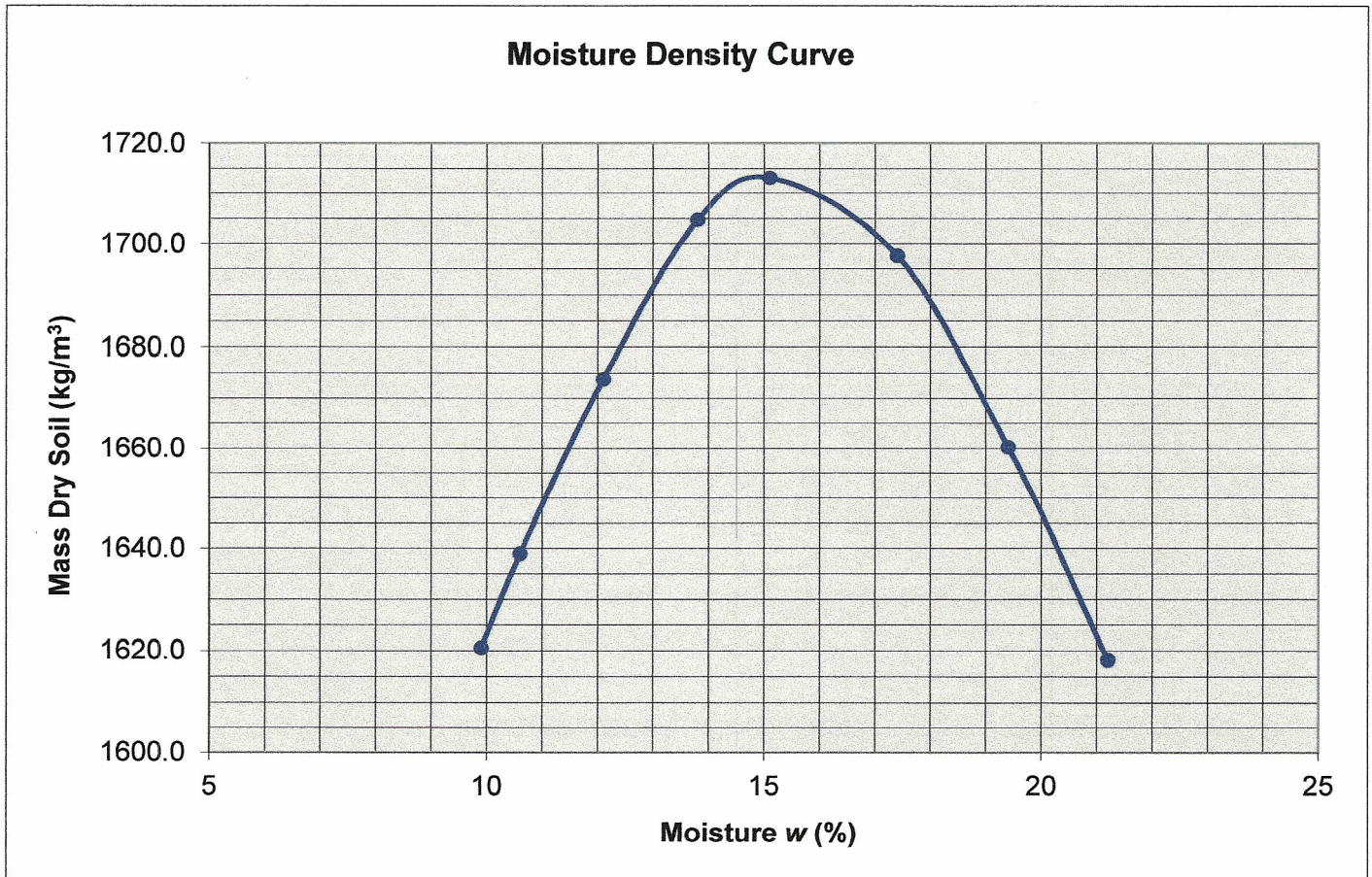
$$S_u = 1.7 \sqrt{\frac{3}{(1.3)^2} + \frac{1}{(0.19)^2} + \frac{1}{(0.11)^2}} = 18.00$$

$$\Rightarrow \underline{\underline{S_u = 18}}$$

RATING AS BACKFILL = GOOD

Homework # 3
Problem # 1

Volume of Proctor (cm ³)	Volume of Proctor (m ³)	Mass of wet soil in mold (kg)	Mass of wet soil in mold (kg)	Moisture Content (%)	Mass of Dry soil (kg/m ³)
943.3	0.0009433	1.68	1781.0	9.9	1620.5
943.3	0.0009433	1.71	1812.8	10.6	1639.0
943.3	0.0009433	1.77	1876.4	12.1	1673.9
943.3	0.0009433	1.83	1940.0	13.8	1704.7
943.3	0.0009433	1.86	1971.8	15.1	1713.1
943.3	0.0009433	1.88	1993.0	17.4	1697.6
943.3	0.0009433	1.87	1982.4	19.4	1660.3
943.3	0.0009433	1.85	1961.2	21.2	1618.2



Maximum Dry Density = 1714 kg/m³
Optimum Moisture = 14.6 %