Chapter # 2 Part # 1

1) What is your evaluation of the validity of the frequently used 50 working minutes per hour as average job performance?

Solution:

Job efficiency of 50 minute per hour = $\frac{50\ min\ /hour}{60\ min\ /hour} \times 100 = 83.3\%$

From table 2 – 1, Excellent job conditions and Good management

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2) A sample of gravel from a stockpile weighs 15 lb. after oven drying, the sample weighs 14.2 lb. calculate the moisture content of the sample.

Solution:

Moisture content $= \frac{moistu\ re\ weig\ ht - dry\ \ weig\ ht}{dry\ \ weig\ ht} \times 100$

$= \frac{15\ lb - 14.2}{14.2} \times 100 = 5.6\ \%$

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3) Calculate the size of a conical spoil pile resulting from excavation of 500 BCY of dry common earth.

Solution:

From table 2-5, load factor = 0.8

From table 2-6, R = 32°

Volume = 500 BCY = $\frac{500\ BCY}{0.8} = 625$ LCY

D = $\left(\frac{7.64 \times V}{\tan\ R}\right)^{1/3} = \left(\frac{7.64 \times 625\ LCY}{\tan\ 32}\right)^{1/3} = 19.7$ ft

H = $\frac{D}{2} \times \tan R = \frac{19.7}{2} \times \tan 32 = 6.15$ ft

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4) A soil weighs 2500 lb/cu yd loose, 3100 lb/cu yd in its natural state, and 3650 lb/cu yd compacted. Find this soil's load factor and shrinkage factor.

Solution:

Swell $= \left(\frac{weight\ "bank\ \ volume\ "}{weight\ "loose\ \ volume\ "} - 1\right) \times 100$

$= \left(\frac{3100\ lb\ "BCY"}{2500\ "LCY"} - 1\right) \times 100 = 24\ \%$

Load factor $= \frac{weight\ "loose\ \ volume\ "}{weight\ "bank\ \ volume\ "} \times 100$

$= \frac{2500\ "LCY"}{3100\ lb\ "BCY"} \times 100 = 80.6\ \%$

Or

Load factor $= \frac{1}{1+swell} \times 100 = \frac{1}{1+0.24} \times 100 = 80.6\ \%$

Shrinkage $= \left(1 - \frac{weight\ "bank\ \ volume\ "}{weight\ "compact\ \ volume\ "}\right) \times 100$

$= \left(1 - \frac{3100\ lb\ "BCY"}{3650\ lb\ "CCY"}\right) \times 100 = 15.06\ \%$

Shrinkage factor $= 1 - \text{Shrinkage} = 1 - 0.1506 = 84.9\%$

Or

Shrinkage factor $= \left(\frac{weight\ "bank\ \ volume\ "}{weight\ "compact\ \ volume\ "}\right) \times 100$

$= \left(\frac{3100\ lb\ "BYC"}{3650\ "CCY"}\right) \times 100 = 84.9\ \%$

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