

## CHAPTER V.

### CALCULATING IN DECIMALS

#### One of the Many Short Cuts in Figures for the Busy Workman

A cubic foot of water is generally assumed to weigh 62.5 pounds. At 39° Fahrenheit, the point of its greatest density, a cubic foot weighs 62.425 pounds, and at 70° Fahrenheit it weighs 62.32 pound. For general calculations it is more accurate to assume the weight of a cubic foot of water to be 62.3 pounds than 62.5 as generally used.

There are 7.48 gallons to the cubic foot, so that the weight of one gallon of water is 8.33 pounds.

Suppose a tank is wanted to be three feet in diameter to hold 250 gallons. How high must it be?

Divide capacity in gallons by 7.48 to obtain equivalent contents in cubic feet.

$$250 \text{ gal.} \div 7.48 = 33.42 \text{ cubic feet.}$$

The area of the bottom of an upright cylindrical tank three feet in diameter is found by multiplying the square of the diameter by 0.7854.

$$3^2 \times 0.7854 = 9 \times 0.7854 = 7.0686 \text{ square feet.}$$

To find required height of tank divide the cubic capacity which has been found to be 33.42 cubic feet by area of bottom which was just figured to be 7.0686 sq. ft., but which for brevity in calculation will be simplified to 7.07 sq. ft. We have then,

$$33.42 \div 7.07 = 4.73 \text{ feet.}$$

Thus an upright cylindrical tank of 3 feet diameter to contain 250 gallons must be 4.73 feet high.

The man in the shop might puzzle over the meaning of 4.73 feet, so reduce it to feet and inches and proceed as follows: Multiply the decimal of the foot by 12 to obtain the inches, thus:

$$0.73 \times 12 = 8.76 \text{ inches.}$$

This is practically  $8\frac{3}{4}$  inches, or to be exact, it is  $1/100$  of an inch over  $8\frac{3}{4}$  inches. If it is desired to reduce the decimal of an inch to a fraction of an inch, multiply it by the fraction whose denominator is wanted. Thus to reduce 0.76 inches to sixteenths, multiply the decimal by 16.

$$0.76 \times 16 = 12.16 \text{ sixteenths.}$$

Thus we have secured a result giving the height of the tank reduced to feet, inches and sixteenths of an inch, which we have found to be  $4' 8 \frac{12}{16}''$  + or to reduce it, and omitting the decimal of the fraction, we have  $4' 8\frac{3}{4}''$ .

Many people in calculating the size of a tank required to hold a given number of gallons, multiply the required number of gallons by 2.31, the number

of cubic inches in a gallon and calculate the size in inches, which is later reduced to feet. This method requires many more figures than when calculating in feet, and decimals of a foot. Most scientists and practically all surveyors have dropped the inch from their figuring and use the feet and decimals of the foot. The ordinary surveyor's steel tape of today is marked off in feet and tenths of a foot. This obviates entirely the use of fractions, and the reducing of feet to inches, and inches to feet, and enables the use of decimals, which when one becomes familiar with is much more rapid and accurate, besides minimizing the chance of error. The short and accurate method is the one that counts in this period of close competition.

Rulers, tapes and scales can be secured without difficulty on the basis of the foot and decimal of the foot, and in all shops where much calculation is done will be found to be time and trouble savers. A result obtained in decimals can always be quickly reduced to inches when desired for the shop, but the calculations in the drafting room will be more rapidly done by the approved scientific decimal system. Think it over.

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