



SERIES 2, ISSUE 1 – MATH FOR PRESTRESSED CONCRETE: PERCENTAGES

The word “percent” (%) means “per 100.” For instance, if 98% of all plant employees wear proper personal protective equipment, then 98 employees out of 100 wear their safety equipment. A lab technician who scored 78% on an ACI exam answered 78 out of each 100 questions correctly.

Percentages and decimal numbers can both be used to express the same mathematical proportions. To convert a decimal number to a percentage, the decimal is moved two places to the right. This is the same as multiplying by 100. To convert a percentage to a decimal, move the decimal point two places to the left, which is the same as dividing by 100.

Percentages and decimal equivalents

$$0.3\% = 0.003$$

$$1\% = 0.01$$

$$5\% = 0.05$$

$$10\% = 0.10$$

$$33.3\% = 0.333$$

$$100\% = 1.00$$

$$125\% = 1.25$$

The general equation is as follows:

$$\text{Percentage} = \frac{\textit{Part}}{\textit{Whole}} \times 100$$

Example 1:

- A production crew incorrectly located the weld plates in 10 precast concrete pieces out of a total of 65 pieces cast for a project. What percentage of the panels should be reported as nonconformances?
- The total number of panels cast is the *Whole* and the number of panels with weld plate issues is the *Part*.

$$\% = \frac{10 \text{ nonconformances}}{65 \text{ panels cast}} \times 100$$

$$\% = 0.15 \times 100 = 15\%$$

Example 2:

- Fine aggregate was sampled and dried to determine the amount of moisture present. The weight of the wet sample is 1400 g and the weight of the dry sample is 1350 g. What is the moisture content of the sand?
- ASTM C566 states that moisture content of aggregate should be based on its dry weight; therefore, the *Whole* is the dry weight. The *Part* is the amount of water removed during drying, which is the difference between the wet weight and the dry weight.

$$1400 \text{ g} - 1350 \text{ g} = 50 \text{ g of water removed}$$

$$\% = \frac{50 \text{ g}}{1350 \text{ g}} \times 100 = 3.7\% \text{ moisture}$$

Example 3:

- A concrete mixture is designed to achieve 7000 psi. What percentage of the design strength does a cylinder that tests at 7350 psi represent?
- Because we are asking for a percentage of the design strength, the design strength is the *Whole*, even though 7350 is the larger number. In this example the percentage is larger than 100.

$$\% = \frac{7350 \text{ psi}}{7000 \text{ psi}} \times 100 = 105\%$$

PCI Plant Quality Talk Quality Enhancement Committee



Reference

ASTM C566, *Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying.*

Note: Please complete this form and return to the Quality Control Manager. All crew members should be observant and report to their foreman anything out of the ordinary on a project. *See something, say something.*

NOTES	ATTENDEE SIGNATURES
DATE	
PRESENTER	