METHODS OF SAMPLING AND TESTING
MT 119-04
MOISTURE CORRECTION FOR CONCRETE MIX DESIGNS
(*Montana Method*)

1 Scope

1.1 This method describes the procedure for making a correction in the moisture requirement of a concrete mix, due to absorbed moisture. Concrete mix designs furnished by the Materials Bureau are based on saturated surface dry aggregate and the moisture correction must be made when concrete is produced. Moisture may be figured on a one sack basis or on a one cubic meter (one cubic yard) basis. A typical Class "A" mix for one sack of cement would be shown as: 94 - 213 - 190 - 190.

2 Moisture Requirement

2.1 The example mix makes no mention of water as it is controlled by slump requirements, but for the purpose of mix designs it is assumed to be 22.7 liters (6 gallons) per sack of cement. 22.7 liters (6 gallons) is not a specified amount to be used, and in fact, a lesser amount will most generally obtain the required slump. 22.7 liters (6 gallons) per sack is the maximum net amount of water which may be used under Montana Specifications, and includes free water in excess of water absorbed by the aggregates, additives, air entraining agents, etc.

2.2 It is impossible for the Materials Bureau to know in advance what the moisture condition of the aggregate stockpiles will be when concrete is ultimately produced, so the following procedure is to be observed.

3 Absorption of Fine Aggregate

3.1 Fine aggregate will always require an adjustment for the moisture content. Moisture content will seldom be less than 3% or more than 7%. The moisture correction is made by multiplying the aggregate weight shown by 100 plus the percentage of moisture in the material. If a moisture determination shows that the sand has 5% total moisture, multiply the sand weight shown by 105%. This would make the new sand weight about 102 Kg (224 pounds), which would total about 5 Kg (11 pounds) of water (free and absorbed) or approximately 5.0 liters (1-1/3 gallons) per sack.

3.2 If the fine aggregate has an absorption of 1.0%, the amount of water that can be counted as free water (mix water) would be computed as follows:

3.2.1 5.0% (total moisture) minus 1.0% (absorption) equals 4.0% free water.

3.2.2 96.6 Kg (213 lbs.) x .04 (4% free water) equals approximately 3.9 Kg (8.5 lbs.) free water.

3.2.3 Therefore, only 3.9 Kg (8.5 lbs.) of water would be counted as mix water.

4 Absorption of Coarse Aggregate

4.1 Medium and coarse aggregate are open-graded and free draining and will not usually require a correction for moisture unless they are being used directly from a washing plant or are being heated with live steam.

4.2 If a correction is deemed necessary, the procedure shown for fine aggregate will be followed.

5 Corrected Mix

5.1 The corrected mix would be: 94 - 224 - 190 - 190.

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