ity because masonry walls can actually be weaker if the mortar is too strong and inflexible. Stronger mortars do not transfer loads uniformly, causing the load to be distributed unevenly on the masonry units. Walls made with more flexible mortar can often bear greater loads than walls with stiff mortar, even though the mortar may be stronger.

Both masonry cement mortars and portland/lime mortars have excellent track records, but their properties differ. The right choice depends on the requirements of the job and the preference of the mason.

For a free copy of the report on mortar research, write or call Don Marsh, Media Services Representative, PCA, 5420 Old Orchard Road, Skokie, IL 60077-1083; phone 708/966-6200.

FOR MORE INFORMATION

For more information on masonry cements and masonry cement mortars, read these publications available for purchase in the United States from the Portland Cement Association, Order Processing, 5420 Old Orchard Road, Skokie, IL 60077-1083; phone 708/966-9559. In Canada, direct your request to the nearest regional office of the Canadian Portland Cement Association (Halifax, Montreal, Toronto, or Vancouver).

Masonry Cement Mortars (IS181M) describes the desirable properties of mortar, specifications, mixing procedures, and cold weather construction.

Mortars for Masonry Walls (IS040M) discusses mortar specifications and types, components and materials, white and colored mortars, mixing, retempering, and ready mixed mortars.

Permeability Tests of Masonry Walls (IS219M) reports on laboratory research and field investigations to resolve the problem of water penetration through masonry walls.

Building Weather-Resistant Masonry Walls (IS220M) describes ways to prevent leaks with proper design, selection of materials, workmanship, and maintenance.

Measuring the Air Content of Low-Slump Concrete

Low-slump, dense concretes are commonly used in overlays of pavements, bridge decks, and industrial floors. With such concretes, the question often arises as to whether air contents measured by the pressure test (ASTM C 231) are the same as those measured by the volumetric test (ASTM C 173).

Several methods of air content measurement of freshly mixed concretes, based on different physical principles, have been adopted by the American Society for Testing and Materials (ASTM). Among these methods ASTM Designation C 231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method, has long been considered the most dependable and practical. However, in some instances, such as with low-slump concrete mixes, the dependability of this method has been questioned because the results it provided did not always correlate well with data provided by other methods.

A limited test series was carried out at PCA's Construction Technology Laboratories, Inc. to establish the validity of the air pressure method when used for low-slump concretes. It was also intended to establish the effect of various types of consolidation on the rate of air loss in low-slump concretes.

Six low-slump, air-entrained concrete mixes were prepared with cement contents of 423 and 658 lb per cubic yard (251 and 390 kg/m^3) and slumps not exceeding ½ in. (13 mm). All batches were prepared in a Lancaster 1.5-cu ft (0.04-m^3) open-pan mixer using a Type I cement, ¾-in. (19-mm) maximum size Eau Claire gravel, Elgin sand, and 2.2% aqueous solution of neutralized Vinsol resin as the air-entraining admixture. Freshly mixed concrete air contents were measured at 5, 15, 30, 60, and 90 minutes after an initial 8 minute mixing period. Air contents were measured first using a Type A air pressure meter, and then checked by using ASTM C 173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method. Effects of consolidation were also considered. Concretes were consolidated using either external vibration, internal vibration, or hand rodding.

As indicated in Fig. 1, air contents by the pressure method are practically the same as those by the volumetric method. The good correlation shown was obtained with concrete mixes of both the above cement contents.

Measurements of rate of air loss with continued agitation up to 90 minutes indicated approximately equal losses for equal cement contents, regardless of the type of consolidation. However, cement rich mixes lost air at a slower rate than lean mixes.

Results of these tests have demonstrated that the air pressure method, ASTM C 231, can be used effectively for measuring the air content of low-slump concretes.

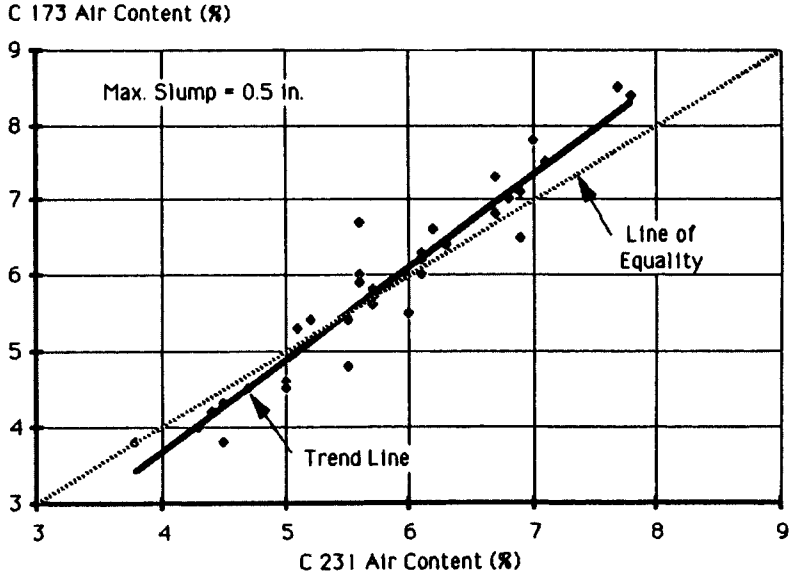

Fig. 1. Tests for air content of low-slump air-entrained concrete mixes using the pressure method (ASTM C 231) are practically the same as those obtained by using the volumetric method (ASTM C 173).

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