DISCUSSION


Question (J. H. Matthys, University of Texas at Arlington):

In the Introduction the authors indicate contractors and producers have accumulated volumes of test data verifying the technical excellence of this mortar. I suggest that the authors provide appropriate references to this data so that evaluation of its significance can be made by one having an interest.

In Test Procedures the authors indicate adoption of a guideline that provided the much needed standard of the techniques used to fabricate, cure, store and test the specimens. This document as referenced is dated 1988. Is all the data presented in this paper based on these guidelines - or only some of the data. If only some - how does data development differ?

Under Properties of Plastic Mortar authors state that a very important characteristic of ready mix mortar is its ability to retain the entrained air over the expected life. Please furnish the readers a reference to substantiate this.

You state most of this work generated from field production mortar rather than laboratory batched mortar. Please clarify the difference between these two categories for ready mix mortar. Also indicate specifically which data in the paper is field mortar and lab mortar.

Under Materials you indicate data presented comes from many different sources. References for the individual data needs to be given so if desired, others can obtain the appropriate details of the data needed to make an evaluation. Why did you accept data on oversanded mixes? For such mixes which strength requirement was satisfied: compression or bond?

You refer to low, medium or high IRA range of brick used. What is the specific range for each of these classifications? Were the IRA values based on as laid condition or oven dried?

For the reported compressive strength in Series A of ready mix mortar specimens and prisms (36 hour & 60 hour mortars), were the specimens made immediately after initial mixing or after certain suspension times, i.e., six hours, 12 hours, etc.? This question on suspension
times really applies to all the ready mix mortar data mentioned in this paper. Others that have conducted tests in the ready mix mortar area (Matthys, etc., ASTM STP 992) have shown potentially significant changes in properties depending on suspension times. What were the specific curing conditions and construction conditions for the prisms?

For the water permeance test of walls in Series A, how many walls were tested for each mortar type?

In Series B you state all data generated in the laboratory under generally standard lab conditions. Please indicate which presented data did not meet standard lab conditions and what deviations existed for each.

For specimens in Series C, how were specimens constructed, cured, and tested?

For reference mortars in Series D, were the mortars proportioned based on C-270 and then mixed to a flow for lab mortar or field mortar? Is the only difference in quantity of materials between the test mortars and the reference mortar the ready mix admixture used?

For Series D the mortar compression strength for the Ref. Type N mortar was less than that of the corresponding strength for Type N Ready Mix. For Type S mortar the opposite was true. Why?

The presented water penetration results on walls of Series D is an average of how many wall tests? Were the walls single wythe brick/block or multiwythe brick/block? What are the properties of the units used?

The first sentence of the conclusion should probably read, "The results of the test programs demonstrate that for the products tested, ready mix mortar compares favorably to conventional mortars." The statement that higher bond strengths and lower water penetration for masonry made with ready mix mortar is not substantiated by Type S mortar in Table 2 and 3 of Series D.
Answer (Robert E. Gates) Your questions have been answered as follows:

1. There has been much data accumulated by the producers and users of ready mixed mortar. Many have indicated that they prefer not to publish the data. For those who have indicated a willingness, the authors will try to provide assistance to get this information published on a timely basis.

2. The test procedure had not been published formally until 1988. Prior to that time similar procedures were followed.

3. There is no reference to substantiate this. These are the author's opinions of general field testing and observations. Hopefully as more of the data referenced in Item 1 becomes available, this item will be provided.

4. Field produced mortar refers to mortar which was commercially produced in volumes exceeding 1 cu.yd. (in most cases a minimum of 2 cubic yards) while lab batched mortar might be about a 1 cu.ft. volume.

5. References have been provided within the revised text of the paper as to where to obtain individual material data.

6. The IRA values were based on ovdendried condition. Specifics of this testing performed by H. H. Holmes Testing Laboratories, Inc. in Wheeling, IL for W. R. Grace & Co., 62 Whitemore Ave., Cambridge, MA 02140-1692 are available on request.

7. Prisms were made within 1 hour after mixing. Prisms were covered in plastic (bagged) after fabrication until time of test, excepting a short period for capping.

8. One wall section for each condition was fabricated and tested by the National Concrete Masonry Association.

9. The non-standard lab condition refers to ambient temperatures of 17°C and 18°C (62.6°F and 64.4°F) which is lower than the standard 23°C ± 1.7°C (73.4°F ± 3°F) laboratory control temperature.

10. Specimens in Series C were fabricated from commercially produced ready mixed mortar sampled at a job site, then taken to the mortar producer's laboratory where the specimens were fabricated. Curing for compressive strength specimens was done in lime saturated water. Prisms were cured in plastic bags.

11. The mason who produced the mortar in a portable mixer visually and physically adjudged the mortar to be satisfactory for his intended use. The physical properties of the mortar were then determined by ASTM standard methods.
12. The Type S data set and the Type N data set were made on different days, from different cements at different laboratories. The combined data should not be viewed, only the individual data sets.

13. Multiwythe walls were used employing brick and block.