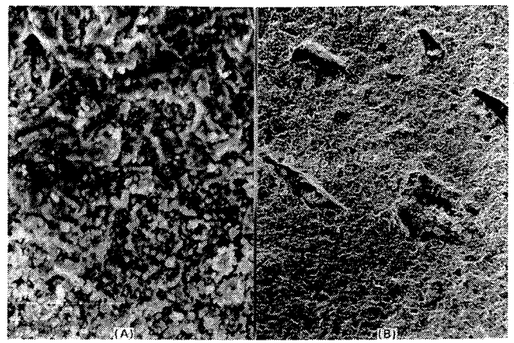

(A) SEMx1000 (B) SEMx50

Fig.I The characteristics of particles of opal in (A) mortar bar made from cement with 30% tuff, (B) mortar bar made from cement with 70% finely ground quartz sand

4. CONCLUSION

The rapid method which was suggested by us for determining the preventive effect of mineral admixtures on alkali-silica reaction in two days, can be used for the primary selection and comparison of the effectveness of admixmitures.

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CHAIRMAN'S REPORT, Session 4

Udo Ludwig

There are in general enough standard and additional methods for the testing of the reactivity of aggregates and the reactivity of cement aggregate combinations.

With respect to ASTM C 289 - 81 some practical alterations should be made in the determination of the dissolved silica (Sc) and of the alkalinity (Rc). On the other hand the criteria for the non reactive, potentially reactive and reactive aggregates must be adjusted to the special deposits.

The German test methods discribed in the directive "Vorbeugende Maßnahmen gegen schädigende Alkalireaktionen im Beton" 1973 is valid.

D. Stark is developing an osmotic cell test for the testing of the reactivity of aggregates and gave first promising results.

With respect to the ASTM - mortar bar method (C 227 - 81) the long time needed for a statement was partly complained. Thaulow and Olafson found good correspondence with the accelerated Danish mortar test in saturated NaCl-solution at $50^{o}C$.

Nixon and Bollinghaus concluded from their results that the ASTM mortar bar test does not predict reactivity of aggregate from the UK known to have reacted in the field. They get better results with an increased alkali content of 2.4 % (m/m) Na_2O-equiv. already after 3 month storage.

In the Aachen testing method prisms in size and composition according to DIN 1164 are used. Changes in mass, expansion and resonance frequency are measured and give a better view on destruction than the measure of the expansion only. Lenzner found differences to ASTM in the course and in the intensity of the reaction.

In the Canadian concrete prisms test developed for the testing of reactive dolomitic limestone (CSA A 23.2 - 141) deleterious expansions of reactive silica are > 0.03 %. Nixon found an acceleration by curing at 38 instead of $23^{o}C$ and raising the cement content from 560 to 740 kp/m^3 of concrete. Cracking was watched at > 0.05 % expansion. - In the German concrete cube test cracking is the criterion. The test is accelerated by storage in a fog room at $40^{o}C$.

The internal pressure was firstly measured by Hubbard and Pike and later calculated by Sideris. Lenzner again measured the one axial pressure on mortar bars and found a maximum value of 2.3 N/mm^2 and an extrapolated one of ~ 2.7 N/mm^2.

The rock cylinder test (ASTM C 586 - 69) is developed for potential reactivity of alkali reactive carbonates. Sims and Sotiropoulos found with dolomite, limestone and dolomitic limestone first a contraction and afterwards an expansion with corresponding initial weight gain and following weight loss. Kasimir created an accelerated test by autoclaving at $215^{o}C$ in NaOH solution.

In the gel pat test a sawn mortar surface is immersed face down in alkali solution for three days. It shows the reactive aggregate.

Other additional methodsare for example petrographic, x-ray, chemical and inner and outer surface analysis and scanning e ectron microscopy.

Only one test seldom can cover the broad field of different acting alkali reaction aggregates. - The proposed accelerated tests can lead to a wrong conclusion about the soundness of an aggregate. It would be the best to follow Vivian: "Correct assessments of all the tests are essential and should be made only by an experienced assessor".

Session 5

"EFFECTS IN PRACTICE OF ALKALIS IN CONCRETE"

Chairman: Dr. Bryant Mather

Co-Chairman: Mr. Svend E. Petersen

Introduction: Paul Poitevin:
"Effects in Practice of Alkalis in Concrete"