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A Discussion of the Paper "EFFECTS OF SODIUM SULFATE CONCENTRATION ON THE SULFATE RESISTANCE OF MORTARS WITH AND WITHOUT SILICA FUME" by Fevziye Aköz, Fikret Türker, Sema Koral and Nabi Yüzer*

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In a recent paper by Aköz et al [1], a study on the sulfate resistance of mortars with and without silica fume was reported. This experimental study was carried out using Type I portland cement (C_3A = 10.7 %) and a replacement of 10 percent of silica fume by the cement mass.

The sulfate performance was examined using 40 × 40 × 160 mm specimens proportionating and casting according to RILEM guideline. After 28 days water-curing, the specimens were immersed in sodium sulfate solution with different concentrations (2.7, 18 and 72 g/l) during 300 days. The parameters used to evaluate the progress of sulfate attack were compressive strength, flexural strength, mass change, capillary and water absorption.

I appreciate the paper, but cannot agree with the statement in the Discussion that the flexural strength results obtained not confirm the prediction model based on this parameter which I reported many years ago [4].

For the PC-NK, PC-SF-NK and PC-SF-NL mortar-solution systems, all parameters exhibit a good behavior of specimens in sulfate solution. Then, it can assume that the cracking phase of sulfate attack was not developed up to 300 days of test. Thereafter, the flexural strength cannot appropriately evaluate the phases of attack.

The size of specimen is a very important factor in sulfate test [2] and the time required to develop a corrosion degree (ie. the critical time suggested by the authors) increase in exponential form with the specimen size [3]. For the specimens used, I believe that the test time was insufficient to evaluate the sulfate attack in mortar.

I have calculated the parameters for the PC-NL, PC-NM and PC-SF-NM systems and the crack-time (**Tc**) was approximately 60 (r = 0.78), 112 (r = 0.99) and 102 (r = 0.86) days, respectively. For the PC-NK and PC-SF-NL systems, ***Tc*** was greater than 160 days. However, these values are uncertain due to predict ***Tc*** two experimental points of the decreasing branch of the parabola are needed [4]. Slight differences in ***Tc***-values can be derived from the result presentation results in relative form by authors.

For mortar-solution systems (PC-NL, PC-NM and PC-SF-NM) and the evaluated parameters in this study, the progress of attack revels the presence of the "*critical time*" called by the authors in the Conclusions. As pointed above, the crack-time proposed (the critical time) in the flexural strength model have good sensitivity in this case, too.

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