

2 ABSTRACT

The method of testing flat prisms in Germany is well accepted to evaluate the sulfate resistance of binders within short time. It is established by the Deutsches Institut für Bautechnik (DIBt) as a test method for the approval of new binder systems with high sulfate resistance.

The expert group „concrete technology“ of the DIBt (SVA-A) wanted to prove the evidence of this test method. After its establishment in the sixties, there had been some amendments in the composition of the tested mortar (water-binder-ratio, kind of standard aggregate). These amendments should show effects on the test results. The aim of this research project is to analyse the effect of several test conditions on the results of the flat prism method, especially with regard to binders containing pulverised coal fly ash. Modifications for optimizing the test method should be proposed to enhance the selectivity.

The cements used were an OPC with a C_3A -content of about 8 wt.-% and a CEM I with high sulfate resistance according to DIN 1164. Further on, the OPC was mixed with an coal fly ash according to DIN EN 450. 20 or 40 wt.-% of the cement were substituted with the fly ash in the same weight proportion. The fly ash was calculated with a k-value of $k = 1$ in the $w/(c + k \cdot f)$ -ratio, as given in the description of the test method.

The variable test conditions were the water-binder-ratio, the hydration time before sulfate exposure and the content and type of standard aggregate. The sulfate attack was measured by the differences in expansion between sulfate and $Ca(OH)_2$ -stored prisms and by the measurement of frequency of resonance.