

SYMPOSIUM ON USE OF POZZOLANIC MATERIALS IN
MORTARS AND CONCRETES

INTRODUCTION

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The use of pozzolanic materials is old in the art of concrete construction. It has long been recognized that suitable pozzolans used in appropriate amounts enhance certain properties of fresh and hardened concrete and, in general, portland-pozzolan cement concretes have exhibited satisfactory performance in field structures, particularly those of more massive character.

The discovery about ten years ago that certain finely ground siliceous materials when substituted for from 10 to 20 per cent of the cement in a reactive-aggregate high-alkali cement combination would nullify or inhibit the excessive expansion of such reactive combinations led to a renewed interest in the subject of pozzolanic or blended cements and a reactivation of the A.S.T.M. Sponsoring Committee on Blended Cements, with the result that probably more research has been conducted in this field during the past ten years than in all preceding years.

In view of the fact that the phenomena of the rôle of the alkalis in cement in forming or inducing adverse reactions with certain aggregates had first been disclosed in the western part of the Uni-

ted States and particularly on the Pacific Coast and that as a result most of the research in this, as well as other phases of the use of pozzolans, had been conducted during recent years by the Bureau of Reclamation at Denver and by the University of California and the California Division of Highways in the Far West, it appeared particularly appropriate that a symposium on the important and interesting topic of the use of pozzolanic materials in mortars and concretes should be included as a part of the Technical Session program at the First Pacific Area National meeting of A.S.T.M. in San Francisco, October 10-14, 1949.

Most of the papers in the symposium relate to work done in the West and Middle West, including the State of Kansas where there has, of recent years, been considerable research by the Kansas State College and the Kansas State Highway Department on the subject of pozzolanic additions, as well as other additions designed to avoid, or at least as one means of avoiding, the serious concrete failures observed in Kansas of which at least a portion, have been traced to an adverse cement-aggregate reaction.

The papers in the symposium present the most complete picture of the status of this important subject that has hitherto been assembled in one group;

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starting with a definition and historical review of the early use of pozzolans and continuing with discussions of the use of pozzolans in mass concrete; experience with Kansas aggregates and pozzolanic additions; the effect of calcination on natural pozzolans; the effect of the use of diatomite treated with air-entraining agents upon the properties of concrete;

summary of methods of determining pozzolanic activity; strength, volume change, and sulfate resistance of mortars containing portland-pozzolan cements; and concluding with two papers on the use of pozzolans for counteracting the excessive concrete expansion resulting from a reaction between certain aggregates and the alkalis in cement.