



**US Army Corps
of Engineers**
Engineer Research and
Development Center

Analysis of Performance of Cements and Pozzolans

Description

The ERDC Geotechnical and Structures Laboratory (GSL) conducts analyses of the performance of cements and pozzolans to assist Corps of Engineers projects with concrete construction and compliance testing. Because standard specifications often do not cover the problems encountered with these materials (alone and in combination with other materials, such as admixtures), specialized knowledge is often necessary to ensure successful concrete construction.

Capabilities

GSL expertise includes state-of-the-art knowledge of cements and pozzolans and specialized laboratory investigations to analyze the causes of their poor performance in concrete. These investigations enable Corps project engineers to address concrete construction issues related to premature, false, and delayed setting; interactive reactions of additives; and heat of hydration.

Supporting Technology

In addition to equipment and methodology for testing cements and pozzolans for standard properties, calorimetric techniques and modified standard test methods have been developed for executing a detailed analysis of early-hydration reactions in cementitious materials. Cement hydration reactions in cements and pozzolans are sometimes affected by interactions among concrete materials in such a way as to result in unusual early behaviors that are not detectable by standard methods. These behaviors include loss of workability, as well as highly accelerated or highly retarded setting times.



Calorimetry instrumentation for analyzing cement reaction rates and effects of admixtures

Benefits

This expertise helps ensure the satisfactory long-term performance of cements and pozzolans by verifying compliance with standard specifications. Application of this expertise also prevents costly construction delays—by analyzing the cause of nonperformance problems not covered by standard specifications and developing case-specific solutions. In contrast, a lengthy work stoppage to resolve such problems could potentially result in multimillion-dollar claims against the project.

Points of Contact

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