

1

Introduction

Joseph F. Lamond¹ and James H. Pielert²

ASTM STP 169C, SIGNIFICANCE OF TESTS AND Properties of Concrete and Concrete-Making Materials, was published in 1994. ASTM Committee C9 on Concrete and Concrete Aggregates has once again decided the time was appropriate to update and revise this useful publication to reflect changes in the technology of concrete and concrete-making materials that have taken place since that time. New materials have appeared on the scene, along with a greater appreciation of the capabilities of concrete as a basic construction material. Committee C9 and its subcommittees have made significant changes in many of its specifications and test methods to reflect these changes. New specifications and testing techniques have been developed to provide for informed use of new materials and new uses for concrete.

Hydraulic cement concrete is a product composed of many materials and produced in many forms. The quality of concrete is dependent on the quality of the constituent materials and related manufacturing, testing, and installation processes. Since 1914, ASTM Committee C9 has played a vital role in promoting the quality of concrete by developing specifications, testing methods, and practices for concrete and concrete-making materials. This has been possible through the dedication and commitment of its volunteer members over the years.

Committee C9 first published *Report on Significance of Tests of Concrete and Concrete Aggregates*, *ASTM STP 22*, in 1935, with an updated report published in 1943. *ASTM STP 169* was published in 1956, followed by *ASTM STP 169A* in 1966, *ASTM STP 169B* in 1978, and *ASTM STP 169C* in 1994.

Following this brief introduction, this special publication is organized into six parts: General, Freshly Mixed Concrete, Hardened Concrete, Concrete Aggregates, Concrete-Making Materials Other than Aggregates, and Specialized Concretes, with revised and new chapters.

In Part I, the chapters consist of general subjects on the nature of concrete, sampling, variability, and testing laboratories. A new chapter deals with modeling cement and concrete properties.

Part II deals with the properties of freshly mixed concrete.

Part III concerns itself with the properties of hardened concrete.

Part IV deals with concrete aggregates. The order of the chapters has been revised. They are now presented in the order that most concerns concrete users: grading, density, soundness, degradation resistance, petrographic examination, reactivity, and thermal properties. Some of the chapter titles have changed and the previous chapter on pore systems has been included in the chapter on density.

Part V includes materials other than aggregates. The title of the chapter on curing materials was changed to reflect current technology of materials applied to new concrete surfaces. The chapter on mineral admixtures has been separated into two chapters, one on supplementary cementitious materials and the other on ground slag.

Part VI, on specialized concretes, contains one new chapter on self-consolidating concrete. The subcommittee structure of Committee C9 has been modified to accommodate this need.

The editors, along with ASTM Committee C9 on Concrete and Concrete Aggregates, believe this new edition will serve the concrete industry well. The editors selected authors and their chapters were reviewed in accordance with ASTM's peer review procedures. C9 subcommittees having jurisdiction over the subjects for pertinent chapters participated informally in the review process. The editors appreciate the help and guidance of these people and the cooperation of ASTM Committee C1 on Cement in providing authors for the two chapters on cement. Some of the authors in *ASTM 169C* are no longer active in Committee C9. The co-editors and Committee C9 members wish to dedicate this edition to those authors who have died since *ASTM STP 169C* was published. They are Paul Klieger, Ed Abdur-Nur, Bill Dolch, Jack Scanlon, Bob Philleo, Bill DePuy, Bryant Mather, Ron Mills, and Owen Brown.

¹ Consulting engineer, Jeffersonton, VA 22724.

² Manager, Cement and Concrete Reference Laboratory, Gaithersburg, MD 20899.