ACI 363R-92
(Reapproved 1997)

State-of-the-Art Report on High-Strength Concrete

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Currently available information about high-strength concrete is summarized. Topics discussed include selection of materials, concrete mix proportioning, batching miring, transporting placing, control procedures, concrete properties, structural design, economics, and applications. A bibliography is included.

Keywords: bibliographies; bridges (structures); buildings; conveying; economics; **high-strength concretes;** mechanical properties; mixing; mix proportioning; placing; quality control; raw materials; **reviews;** structural design.

CONTENTS

CHAPTER 1-INTRODUCTION

1.1-Historical background

Although high-strength concrete is often considered a relatively new material, its development has been gradual over many years. As the development has continued, the definition of high-strength concrete has changed. In the 1950s, concrete with a compressive strength of 5000 psi (34 MPa) was considered high strength. In the 1960s, concrete with 6000 and 7500 psi (41 and 52 MPa) compressive strengths were used commercially. In the early 1970s, 9000 psi (62 MPa) concrete was being produced. More recently, compressive strengths approaching 20,000 psi (138 MPa) have been used in cast-in-place buildings.

For many years, concrete with compressive strength in excess of 6000 psi (41 MPa) was available at only a few locations. However, in recent years, the applications of high-strength concrete have increased, and high-strength concrete has now been used in many parts of the world. The growth has been possible as a result of recent developments in material technology and a demand for higher-strength concrete. The construction of Chicago's Water Tower Place and 311 South Wacker Drive concrete buildings would not have been possible without the development of high-strength concrete. The use of concrete superstructures in long span cable-stayed bridges such as East Huntington, W.V., bridge over the Ohio River would not have taken place without the availability of high-strength concrete.

1.2-Committee objectives

Since the definition of high-strength concrete has changed over the years, the committee needed to define an applicable range of concrete strengths for its activities. The following working definition was adopted: "The immediate concern of Committee 363 shall be concretes