ACI 546.3R-14

Guide to Materials Selection for Concrete Repair

Reported by ACI Committee 546

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First Printing
June 2014
ISBN: 978-0-87031-895-5

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This document provides guidance on the selection of materials for concrete repair. An overview of the important properties of repair materials is presented as a guide for making an informed selection of the appropriate repair materials for specific applications and service conditions.

Keywords: cementitious; cracks; epoxy; materials; methacrylate; polymer; polyurethane; repair; surface sealer; silica fume; test methods; waterproofing.

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ACI 546.3R-14 supersedes 546.3R-06 and was adopted and published June 2014.

CHAPTER 1—INTRODUCTION AND SCOPE

1.1—Introduction

Concrete is inherently a durable material, but its durability under any given set of exposure conditions varies with concrete mixture proportions; the presence and positioning of reinforcement; and the detailing, placing, finishing, curing, and protection it receives. In service, it may be exposed to conditions of abrasion, moisture cycles, cycles of freezing and thawing, temperature fluctuations, reinforcement corrosion, and chemical attack, resulting in deterioration and potential reduction of its service life.

As the concrete industry develops and grows, concrete repair is frequently required; however, with the increasing number and age of concrete structures, frequent deferral of maintenance, and increased public awareness of deterioration and maintenance needs, repair is becoming a major focus of design and construction activities. Although concrete repair is traditionally as much an art as a science, engineers and contractors typically do not receive much formal training in techniques for repair and the performance of repair materials applied to concrete. Personal experience is beneficial, but takes time to accumulate and can be costly in terms of failed repairs. Although this is changing, there is still too little information available to reliably predict the serviceability and durability of repairs. Concrete repairs that fail prematurely result in economic loss and usually require additional repairs.

Due to a greatly expanded repair market, new materials and repair methods are being introduced at an increasing rate to the construction market. At the same time, due to changing environmental and building codes and other regu-