

REINFORCED CONCRETE STRUCTURAL REPAIRS

by

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INTRODUCTION

CONCRETE THE MAIN BUILDING MATERIAL - YESTERDAY TODAY, AND TOMORROW

Ever since Portland cement was invented in 1824, the use of concrete has expanded steadily. Today it is by far the most important building material of all, easy to produce, handle, and shape; concrete is also very durable if construction is carried out properly. The lime Ca(OH)_2 , given off during hydration of the cement helps protect the reinforcing against rust.

The sharp increase in the consumption of fossil fuels over the last few decades has produced a level of pollution that is damaging not only our irreplaceable forests, but our buildings as well. The amount of acidic pollutants, chiefly sulfur dioxide (SO_2), carbon dioxide (NO_x), released to the atmosphere by combustion has doubled in the past 20 years.

the carbonic and sulfuric acids produced when they come into contact with moisture in the air attack steel, stone, concrete, and many other materials even more intensively. CO_2 and SO_2 in the atmosphere react with the lime of the cement to form carbonates and gypsum, which steadily reduces the concrete's alkalinity. When the pH falls below 9.5 the passivation effect that keeps the steel from corroding is lost. The speed with which this carbonation takes place depends on two factors, the acid concentration and the quality of the concrete (cement content, density, strength) when the carbonation reaches the reinforcing steel, the steel starts to rust. The resulting increase in volume generates extreme pressure that eventually cracks and spalls the concrete.

Concrete damage can often be traced to other causes ,
however.

Some of the more common ones are faulty planning, errors in
production of the concrete, insufficient coverage of the
reinforcing steel, extreme weather conditions, and attack
by thawing salts.

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