

Preface

Concretes and reinforced concretes find wide application in the construction of industrial structures such as bridges, tunnels, large reservoirs, collectors, and docks, as well as residential buildings. During use, such structures are subject to degradation, damages and local fracturing. This causes loss of serviceability of the damaged structural elements and danger of fracture of the overall structure. In order for safe use of an impaired structure, it is necessary, on the one hand, to evaluate its residual serviceability, that is, the remaining safe service life, and on the other hand, to apply effective technologies for the renewal of serviceability by “healing” the impaired or damaged elements.

This book summarizes and analyses the most important achievements of science and engineering concerning the service factors that cause damage to concrete and reinforced concrete structures; methods for assessing their strength and life, especially those that are based on modern concepts of the fracture mechanics of materials, and basic approaches to predicting the residual life of structures of long-term operation.

Concrete injection technologies for the restoration of serviceability of impaired concrete and reinforced concrete structures by means of healing cavities, cracks, fissures, corrosion injuries, etc., were given special attention. Case studies of implementation of the above technologies for the restoration of integrity and extension of service life include concrete and reinforced concrete structures such as atomic power plants (APP), underground railway, bridges, seaports, historical relics and others.

The outlined principles of structural material strength assessment, injection technologies for the restoration of serviceability of impaired concrete structural elements and presented case studies will be useful for building specialists, lecturers, post-graduate students and students of high schools specializing in building.

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