

REPAIR AND REHABILITATION OF CONCRETE STRUCTURES

1.5-0-0-0-5

Deterioration in Concrete Structures: Causes of deterioration, construction defects (formwork-related, placement-related, consolidation-related, etc.); materials defects (improper mix design, poor materials, etc.); design defects; over-loading; foundation problems; loading-related failures; fire-damaged concrete; Types of cracks and properties, crack depth, crack width, crack diagnosis.

Non-destructive testing (NDT): Load testing on structures, buildings, bridges, and towers, rebound hammer, acoustic emission, ultrasonic testing principles and application, holography, advanced NDT methods, ultrasonic pulse echo, impact echo, impulse radar techniques, GECOR, ground penetrating radar (GPR).

Methods for Repair and Rehabilitation: General principles - design for rehabilitation, relieving loads, strengthening superstructures, plating, post-stressing, jacketing, bonded overlays, reinforcement addition, strengthening sub-structures, under-pinning, increasing the load capacity of footing, seismic retrofitting, strengthening of beams, columns, slab, masonry walls, protection methods of structures, mud-jacking and grouting for foundation, micro-piling, sub-grade water proofing, soil stabilization techniques, epoxy injection, repairing of concrete floors and pavements, case studies.