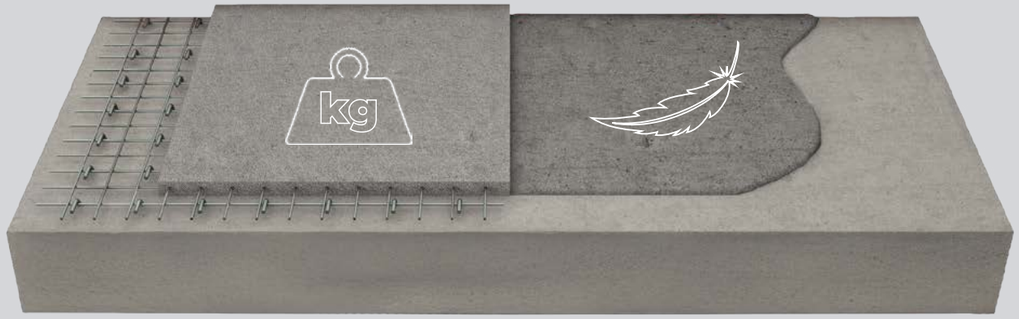
HIGH PERFORMANCE CONCRETE FOR STRUCTURAL STRENGTHENING



TRADITIONAL CONCRETE | PLANITOP HPC

Structural safety has become a widely debated topic in the construction industry, especially as existing structures face rising service demands, aging materials, and evolving regulatory standards.

The need for retrofitting with structural strengthening solutions has grown significantly over recent decades, driven by factors such as material deterioration, changes in structural usage, increased loading requirements, and damage from unforeseen natural disasters.

TRADITIONAL SYSTEMS

To address these challenges, a range of strengthening technologies has been introduced to the market. Traditional methods include section enlargement using reinforced concrete, steel plate bonding, and, more recently, fibre-reinforced polymer (FRP) systems.

Despite their effectiveness, these approaches present limitations: reinforced concrete jacketing increases dead load and geometric footprint; steel systems are susceptible to corrosion and can be difficult to install; and FRP solutions, although lightweight, often lack fire resistance and may rely heavily on the quality of the substrate.

MOVING TOWARDS LIGHTWEIGHT AND HIGHLY DURABLE SYSTEMS

Over the past two decades, innovations in materials science have led to the development of high-performance alternatives. One such advancement is High-Performance Concrete (HPC), a class of cementitious composites offering superior strength, ductility, and durability in thinner profiles.

Originally developed for use in new structural elements to achieve higher mechanical performance within reduced cross-sectional dimensions, HPC has more recently been adapted for the retrofitting of existing structures. These high-performance mortars are characterised by ultra-high compressive strength, excellent post-cracking behaviour, and exceptional bond performance to substrates.

Experimental studies have demonstrated HPC's capability to enhance structural capacity with minimal additional thickness. For example, tests on full-scale reinforced concrete columns jacketed with thin layers of HPC have shown significant increases in axial load capacity and ductility. Likewise, overlaying deteriorated floor systems with low-thickness HPC screeds has led to notable improvements in flexural stiffness and cracking resistance, even without the use of shear connectors.

ADVANTAGES

- Very high flexural and compressive strength
- Excellent adhesion
- Fibre reinforced
- High resistance to abrasion and impact
- High resistance to cyclical loads
- Impermeable to water

MAPEI SOLUTIONS FOR STRUCTURAL STRENGTHENING

Mapei's new range of high-performance cementitious mortars is designed for the structural repair and strengthening of reinforced concrete. These advanced solutions combine durability, strength and ease of application across vertical, horizontal and overhead applications. With formulations tailored for both fluid and thixotropic placement, the range ensures consistent performance while incorporating fibre and steel reinforcement for enhanced crack resistance and long-term stability. Suitable for use in infrastructure, industrial and civil construction projects.

Scan to read more about the Planitop HPC range.

For more information, reach out to us:

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