



Milan (Italy)

STRENGTHENING IN AN APARTMENT

A SPECIALLY DEVELOPED MORTAR FOR STRENGTHENING THE FLOOR SLABS WAS USED FOR THIS INTERVENTION

To upgrade this apartment in Milan, apart from remaking the substrates, soundproofing the floors and installing wooden floors in the various rooms, the structure of the wooden floor slab itself also had to be strengthened.

The main aim of the work was to strengthen the floor slab to improve its capacity to distribute the loads and stresses acting on it, as well as to increase its stiffness by adding a structural screed as compact as possible to achieve the overall objective. The system recommended by Mapei Technical Services was particularly effective due to the limited increase in weight of the overall structure

and because there was no need to use any electro-welded reinforcing mesh. The strengthening system was made up of a structural screed to strengthen the extrados of the floor slab structure made from PLANITOP HPC FLOOR T ultra-high performance, high ductility, fibre-reinforced, shrinkage-compensated, semi-fluid cementitious mortar. The product is part of the HPFRCC (High Performance Fibre Reinforced Cement Composites) family of cementitious composites.

This micro-concrete combines high compressive and flexural strength with excellent levels of ductility and tensile strength, which is achieved

by the steel fibres contained in the product. Thanks to its semifluid consistency, PLANITOP HPC FLOOR T is used to maintain the existing slope on deformed floor slabs.

Work phases

The first step was to prepare the substrate (a surface of around 70 m²) by removing the layers already present on the wooden floor slab down to the planks. After cleaning the substrate, sheets of polyethylene thick enough for this job were laid over the entire surface and the sheets were overlapped to stop any drips or runs. The next step was to position the shear connectors by placing lengths

Problems and solutions

The refurbishment work involved completely renovating this apartment with a system that would strengthen the floor slab with a layer of product applied in the minimum thickness possible while achieving the mechanical properties required.

PLANITOP HPC FLOOR T high ductility, fibre-reinforced, shrinkage-compensated, semi-fluid cementitious mortar was chosen to meet this requirement.





1. Sheets of polyethylene were laid over the surface of the floor slab before placing the MAPEI STEEL DRY 316 bars.

2. The upper part of MAPEI STEEL DRY 316 bars were bent at 90° on the extrados of the floor slab.

3. Steel bars were also inserted into the beams around the edges and then sealed with MAPEFIX VE SF.

of MAPEI STEEL DRY 316 ultra-high-strength, dry-applied, helical AISI 316 stainless steel bars. The bars were installed inside smaller holes that had been previously drilled to a depth of half the height of the joists and the ends sticking out from the joists were bent at 90° so they would become embedded in the structural screed. Steel bars were inserted in holes drilled in the perimeter beams and were sealed in place with MAPEFIX

VE SF. This adhesive is specifically formulated to anchor zinc-plated threaded and deformed steel bars which transmit structural loads in solid and perforated substrates, as well as metal bars in tension and compression zones in cracked and non-cracked concrete, including in areas at risk of seismic activity. Once the floor beam had been prepared, a 2.5 cm thick structural screed made from PLANITOP HPC



4. The structural screed was made by pouring a 2.5 cm thick layer of PLANITOP HPC FLOOR T mixed with MAPECURE SRA curing and anti-shrinkage admixture.

5. The floor slab was soundproofed by applying the MAPESONIC CR system bonded in place with ULTRABOND ECO V4 SP adhesive.

6. The wooden flooring was installed in the various rooms using ULTRABOND ECO S955 1K adhesive.

then created made from TOPCEM PRONTO, ready-to-use, normal setting, quick-drying mortar with high thermal conductivity. To create a perfectly flat surface, the substrates were treated with PRIMER G adhesion promoter and then skimmed with ULTRAPLAN ultra-fast drying self-levelling compound.

The client also asked for the floor slab to be soundproofed and, for this part of the job, before installing the wooden flooring, the MAPESONIC CR system was applied, which is manufactured using recomposed cork and rubber bound together with high-quality polyurethane composite. It was bonded in place with ULTRABOND ECO V4 SP universal adhesive with very low emission of volatile organic compounds (VOC). Before applying the rolls, MAPESONIC STRIP adhesive tape was applied around the outside of the rooms to form a continuous length without gaps or interruptions. The new flooring was then installed after 24 hours. The wooden floor was bonded with ULTRABOND ECO S955 1K one-component, solvent-free, sililated polymer-based adhesive with very low emission of level of VOC.

FLOOR T was poured on the extrados side. The particular characteristics of the product meant that the cast material would follow the slope of the floor slab without it building up into layers too thick around the more deformed areas. PLANITOP HPC FLOOR T was mixed with MAPECURE SRA, a special curing admixture with the ability to reduce hydraulic shrinkage and the formation of micro-cracks. This stopped the water in the mortar from evaporating off too quickly and encouraged the development of hydration reactions. A new solid, compact screed was

PLANITOP HPC FLOOR T

One-component, fibre-reinforced, shrinkage-compensated, ultra-high strength, high-ductility, semifluid cementitious mortar for strengthening the extrados of floor beams.

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TECHNICAL DATA

Private apartment, Milan (Italy)
Year of construction: 1910
Year of the intervention: 2019
Intervention by Mapei: supplying products for strengthening the floor beams, soundproofing and

installing wooden floors
Design: Sara Invernizzi
Main contractor: Gruppo LMB
Installation company: Milleun Parquet Srl
Mapei distributor: Gini & C
Photos: Gianni Dal Magro
Mapei coordinators: Massimiliano Nicastro,

Paolo Baldon, and Alessandro Sacchi, Mapei SpA (Italy)

MAPEI PRODUCTS

Structural strengthening: Mapecure SRA, Mapefix VE SF, Mapei Steel Dry 316,
Preparing substrates: Planitop HPC Floor T

Topcem Pronto, Ultraplan
Soundproofing: Mapesonic CR, Mapesonic Strip, Ultrabond ECO V4 SP
Installing wooden floors: Ultrabond Eco S955 1K

For further information on products see www.mapei.com