

MILANO WATER TREATMENT PLANT

DESCRIPTION:

In 1972, the Milan municipality committee approved the construction of a series of purification plants to treat water of rivers on the outskirts of Milano. But the first one carried out was the plant of Nosedo more than 30 years later.

Today, the most important plant, to be finished in the autumn of 2004, and will complete this purification of the water supply process. This plant will drain the water of Southern Lambro with a catchment area of 1,000,000 inhabitants.

The Lambro River flows through the city of Milano and is considered by the municipality of the Riviera Romagnola region to be the main cause of pollution into the Po River, of the Adriatic Sea and the Romagna region.

Milano will not be therefore, the sole European capital without water treatment plant and its citizen's quality of life has now improved.

The contract work was awarded to CMB of Carpi, one of the more prominent Italian construction companies, who started the works early 2002.

DITRON s.r.l. was contacted in the summer of that year to solve the impermeability problem in the delivery and suction tunnels of the Lambro water. Upon completion of this first part treated with the Penetron system, the managing engineers considered its performance excellent and decide to use the Penetron system for the treatment of all purifying basins as well. The total area of these was about 120,000 m².

Alltogether, the total surface covered with Penetron was about 150,000 m² with a product consumption of about 250,000 kg.



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WHY USE PENETRON?

Penetron is a surface applied, permanent, in-depth concrete waterproofing material, which consists of common cement, quartz sand and multiple activating chemicals.

The activating chemicals enter the concrete through diffusion, and react with the various chemicals and moisture in the concrete to form insoluble needle-like crystals that seal the capillaries and cracks. This process is effective with or against water pressure.

In this project, Penetron was used as a substitute for the traditional epoxy-bitumen materials (specified in the contract) to waterproof and protect concrete against sewage, because Penetron convinced the technical management of Milano municipality and the contractor CMB with the following arguments:

- ◆ **PERMANENT:** Penetron becomes an integral part of the concrete, forming a complete body of strength and durability
- ◆ **STRENGTHENS:** Penetrates and seals concrete's capillary tracts and shrinkage cracks, and seals cracks of up to 0,4 mm
- ◆ **DURABILITY:** The total waterproofing and chemical-resistance properties remain intact even if the surface is damaged
- ◆ **WATERPROOFS:** Completely effective against high hydrostatic head pressure
- ◆ **PROTECTS:** Resists chemical attack (PH3-11 constant contact, PH2-12 period contact), and protects reinforcing steel
- ◆ **BREATHES:** Permits concrete to breathe, eliminating water vapor buildup and leaving the concrete completely dry
- ◆ **NON-TOXIC:** Safe for use on potable water tanks
- ◆ **APPLICATION:** Ease of application, labor-cost effective

The Penetron system was applied in three different ways on this project: spraying (on vertical surface), by brush and by dry shake (on horizontal surface) on different part of the water treatment plant.

In addition, Penecrete mortar has been used together with Penetron for waterproofing of concrete "bug-holes", repairing of spalled and damaged areas, patching some tie holes, filling of routed out cracks.

C A S E H I S T O R Y

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SPRAY APPLICATION

In this project, Penetron was applied by spray on the vertical and top surface of the abduction canal and on the vertical surface of the tanks, and on the surface of different small canals between tanks.

- ♦ The extremely dense concrete (45-50 N/sq.mm) specified with an extremely smooth surface required a sandblast treatment to make sure it had an open capillary system.
- ♦ Due to extremely hot weather, and very low humidity of the concrete surface because of its density, many wetting cycles were necessary before application of the Penetron system.
- ♦ For the same reasons, curing began as soon as the Penetron coating had hardened sufficiently so as not to be damaged, using a light water misting, for the first day.

Spray Application on the Surface of the Adduction Canal



before application

spray application

spray on top

spray on wall

Spray Application on the Vertical Surface of the Different Tanks



sandblast

cycle of watering

spraying

after spray

C A S E H I S T O R Y

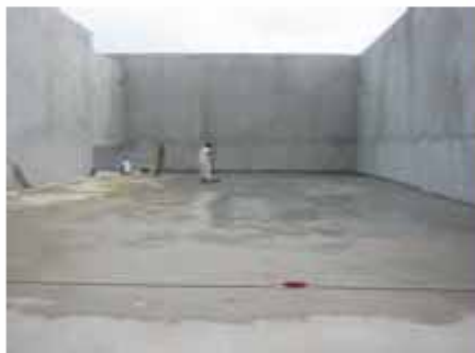
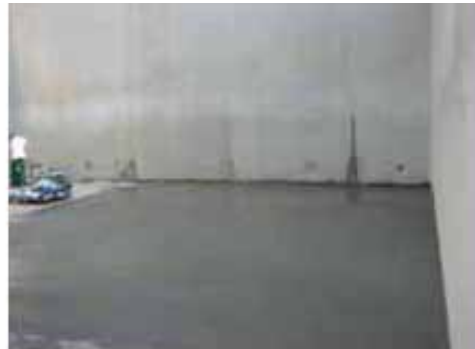
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BRUSH APPLICATION

Penetron was applied by brush on the hardened concrete floor of the tanks.

- ◆ The extremely dense concrete (45-50 N/sq.mm) specified with an extremely smooth surface required a sandblast treatment to make sure it had an open capillary system.
- ◆ Due to extremely hot weather, and very low humidity of the concrete surface because of its density many wetting cycles were necessary before the application of the Penetron system.
- ◆ For the same conditions, curing began as soon as the Penetron coating had hardened sufficiently so as not to be damaged, using a light water misting, for the first day.

Brush Application on the Hardened Concrete Floor of the Tanks



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DRY-SHAKE APPLICATION

Penetron was applied by dry shake on the fresh concrete floor of the tanks prior to finishing.

Dry-shake Application on the Fresh Concrete Floor of the Tanks



pouring concrete



mixing Penetron with quartz sand



dry shake with quart sand



finishing



finishing



dry shake 1 day after

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REPAIRING CONCRETE

Penecrete mortar has been used together with Penetron for waterproofing of concrete “bugholes”, repairing of spalled and damaged areas, patching some tie holes, filling of routed out cracks.

Repairing Concrete with Penecrete

