



Officially inaugurated in February 2002, the old "château d'eau" of Palavas – Les – Flots, in France, known as Le Phare (the Light House) nowadays hosts a conference building and on its top, a rotating restaurant. Mapei cooperated in this complex restoration operation. This is how ...

# LE PHARE

**T**he words "château d'eau" (literally – "water castle", but in reality water tank) is used by French people to define those monolithic structures which are used in the water system. These are often characterized by an impressive architecture which is provided with halls, openings and connections and once they are no longer used for their main purpose, they can easily be transformed for other purposes.

This is exactly the case of the "château d'eau" of Palavas-Les-Flots, a small town situated in the south of France near Montpellier, in the Camargue region. This imposing structure had been left in a condition of considerable deterioration, and required a radical architectural operation and functional restoration.

The shaft, in reinforced concrete, was covered by three layers of traditional coating, applied with a trowel, having a very irregular superficial consistency. The company in charge of restoration consequently used mechanical means to remove all the layers from the structure until its level of cleanliness was judged suitable for installing the new coating.

Photo 1. Le Phare of Palavas-Les-Flots.

Photo 2. Processing one of the new openings carried out on the building shaft.



Photo 3. Application of the coating layer on the deteriorated areas with NIVOPLAN F\*.

Photo 4. Application of the smoothing compound.

Photo 5. An image of the structure during works, for the execution of which an imposing scaffolding was built.

Photo 6. A detail of the building surface after the application of the final coating.

Photo 7. Le Phare renewed.



#### Preliminary operations

First of all a new cortex layer was applied in order to give the building back a uniform look. To reach this objective a highly specialized Mapei product was chosen: NIVOPLAN F\* (special formula

produced by Mapei France in the plants of Montgru and Toulouse). The product was applied on the whole structure, with a thickness varying from 3 to 12 mm. NIVOPLAN F\* is a wall levelling mortar, specifically used to solve "out of plumb" situations, to level disconnected or damaged renders, both inside and outside. This is a powder material made of cement, selected aggregate and special synthetic resins. When mixed with water, it produces a mixture that is easy to apply on vertical surfaces using a flat trowel or a screed board. After setting, it becomes a compact render, water and frost resistant and, consequently, is particularly suitable for these types of operations. Because of the nature of the building, the status of the substrate, the static and mechanical conditions and the environmental temperature, the additive considered most suitable was a synthetic rubber latex for cementitious mixtures. A very valuable Mapei product was also chosen this time: PLANICRETE\*. This was added to NIVOPLAN F\* at a quantity of one litre per bag (25 litres). As a matter of fact PLANICRETE\* improved the mechanical characteristics of NIVOPLAN F\*, its adhesion to the substrate and mainly it generally improved its plasticity and workability. PLANICRETE\* also improves the mixture performances, increases the level of resistance to abrasion, impermeability and reactions to freeze/thaw cycles. All these factors must not be underestimated, since it was used in a structure which is particularly exposed to environmental factors. On those parts requiring a thicker and more consistent intervention, the company added sand to NIVOPLAN F\*, up to 30%, in order to carry out layers up to 35 mm thick. All the surfaces involved were carried out in the traditional way, by manual application. Special and continuous care was put into these operations during the executive phase by Cabantous: a wrong application could have annulled all the efforts made during the designing phase to find highly technological solutions. The designing efforts were entrusted to Cabinet Barnéoud, which found the most convincing answers to the highlighted problems in Mapei products. This choice was mainly conditioned by two factors. First of all the necessity to solve the problems relating to environmental conditions: strong temperature variations and permanent wind cause the water to



evaporate from the cement. If the mixture shrinks too quickly, this could form micro leakages. Furthermore, due to the structural movements of the reinforced concrete shaft caused by its considerable dimensions, it was necessary to absorb the deriving mechanical deformations.

**A “quick” intervention.**

In order to reduce the costs caused by the scaffolding of considerable dimension and volume, the company carried out the works from the top to the bottom of the building. The smoothing and the following finishing painting were carried out according to the drying times, from 10 to 12 days, before applying the final coating.

Furthermore, in some points it was necessary to carry out also a deeper intervention on the structure. In those parts where the cement was damaged, it was systematically removed. The reintegration phase involved two different tasks: the preventive treatment of the re-bars and the following application of repair mortar. The passivating treatment of the re-bars was carried out using MAPEFER\*, a cementitious mortar that is able to prevent steel corrosion and to improve its performances over time.

On the other hand, for the mass integration, the company used MAPEGROUT FAST-SET\*, which was applied on the deteriorated parts in order to give the structure back its original mechanical characteristics. MAPEGROUT FAST-SET\* is a shrinkage-compensated,



fibre-reinforced mortar, especially designed for the repair of concrete. It was chosen for its excellent physical and mechanical characteristics. The product proved itself suitable for this particular type of use since the MAPEGROUT FAST-SET\* mixture is an easily workable mortar and its thixotropic characteristics make it possible to apply it vertically, with a thickness from 2 to 2.5 cm, without sagging.

**The twenty-five “holes”**

To restore the building it was necessary to create some halls inside the shaft and, consequently, to make 25 new openings. These were made using a device





equipped with a diamond disc. This technology gave very good results, enabling the achievement of very precise holes without chipping and consequently without requiring further work.

A light granulation gave the cement the level of porosity necessary for the following processing with finishing products.

The insertion of new re-bars in the frame of the openings gave a higher level of cohesion to the whole structure.

Nowadays Le Phare of Palavas-Les-Flots is a modern and original building, to whom Mapei supplied added value through reliable and economically convenient solutions. 

*The photos published on these pages were kindly given by OC COM (France), which we thank.*

*\*The technical sheets of the products mentioned in his article can be found in Mapei binder n. 3 "Building Products". The technical data sheets are contained in the "Mapei Global Infonet" CD, and at the "www.mapei.com" website.*



**Mapefer:** anti-rust cementitious mortar for reinforcing rods.

**Mapegrout Fast-Set:** controlled-shrinkage, fibre-reinforced mortar, with rapid setting and hardening for the repair of concrete.

**Nivoplan F:** leveling mortar for walls for smoothing concrete and cementitious renders on interiors and exteriors.

**Planicrete:** synthetic rubber latex for improving adhesion and mechanical strength of cementitious mortars.

## TECHNICAL DATA

**Le Phare,** Palavas-Les-Flots (France)

**Year of construction:** 1942-43

**Type of intervention:** structural repair

**Year of construction:** 1997-99

**Customer:** Palavas-Les-Flots Town Hall

**Project:** Cabinet Barnéoud Pédoussaud of Montpellier

**Works supervision:** Véritas of Montpellier

**Building company:** Cabantous of Rodez

**Mapei products:** NIVOPLAN F, PLANICRETE,

MAPEFER, MAPEGROUT FAST-SET

**Mapei reseller:** Le Décor, Montpellier

**Mapei coordinator:** Renaud Canuyt