

**Project:**

Waterproofing and repair of a dam

**Location:**

Hervás - Cáceres (Spain)

**Project completed:**

2017

**Owner/s:**

Confederación Hidrográfica del Tajo

**Applicator/Contractor:**

IMTEX, S.L.

**Market sector:**

Civil engineering –  
Water management

**Products used & amounts:**

MasterEmaco S 5300 (150tn)

MasterSeal 6100 FX (6tn)

MasterSeal 930 (75ml)

MasterSeal 933

MasterSeal NP 474

## PRESA DE HORCAJO (CÁCERES)

### Upstream waterproofing and repair



Concrete refurbishment on the upstream face of the dam. Presa de Horcajo in Hervás-Cáceres (Spain)

#### The background

Horcajo dam is located in Hervás in the province of Cáceres in Spain, and is owned by the “Confederación Hidrográfica del Tajo”, the river basin authority.

This is a gravity dam used for water supply.

The dam was constructed with concrete poured in different stages. For this reason, several vertical movement joints were created. The surface of the concrete is porous and highly absorbent, allowing water infiltration.

The geographical situation of the dam also generates concrete damages due to freeze-thaw.

#### The challenge

The project owner required the prevention of water infiltration as well as a higher degree of cohesion and resistance and more effective surface waterproofing.

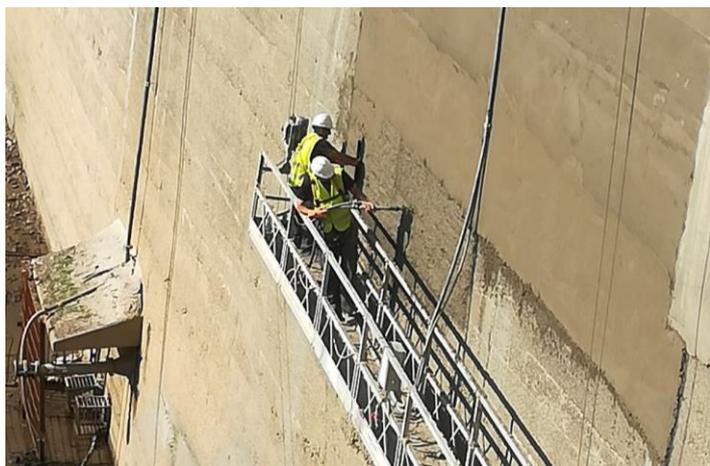
As this was a medium-low compressive strength concrete, it was important to select the right resurfacing mortar in order to avoid further cracking and loss of adhesion as a result of the difference between the elasticity modulus of the concrete and the repair mortar.

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# PRESA DE HORCAJO (CÁCERES)

## Upstream waterproofing and repair



Application of MasterEmaco S 5300 medium modulus repair mortar and finishing with MasterSeal 6100 FX cementitious waterproofing membrane.

### Our solution

The first step was to refurbish the surface using MasterEmaco S 5300 medium modulus (15 GPa) repair mortar, which is also sulphate resistant. The average thickness was 2.5-3 cm.

All vertical joints were sealed MasterSeal 930 using elastic tape, bonded with MasterSeal 933 adhesive. The joints were sealed using MasterSeal NP 474 single-component polyurethane sealant before this system was applied.

Finally, MasterSeal 6100 FX elastic waterproofing membrane was applied. The features of MasterSeal 6100 FX include low consumption, high crack bridging capacity and UV resistance.

### Benefits to the customer

A medium-low modulus mortar (15 GPa) such as MasterEmaco S 5300 is more compatible with the concrete to be repaired in this case than conventional repair mortars.

Normally, concrete repair mortars have a very high compressive strength and a very high elasticity modulus which make them very rigid and increase the risk of brittle fracture and loss of adhesion to the substrate.

MasterEmaco S 5300 also has a low density and 20 to 25% lower consumption than other repair mortars.

For joint sealing, a two-step system was selected: the first stage was to apply MasterSeal NP 474 polyurethane sealant. MasterSeal 930 elastic tape, (with more than 400% elongation) then bonded to the surface using MasterSeal 933 adhesive.

Integral waterproofing was provided with MasterSeal 6100 FX cementitious membrane. This is an elastic, crack-bridging membrane which ensures the continuity of the membrane even when exposed to substrate movements, but the main benefit of this membrane in this case was its low consumption (up to 50% lower compared with conventional membranes) and the fact that it is a single-component product, which reduced transport and handling costs. This was critical for this project in view of the remote situation of the dam.

### Project facts at a glance

- High compatibility of the system with the quality of concrete of the dam.
- Complete system including repair, waterproofing and joint sealing.
- Sustainable solution with consumption reduction of about 20 – 50% compared to traditional solutions.
- Approx. 3000 m<sup>2</sup> of treated surface.

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