

## Valdaone (Trento, Italy)

## MALGA BISSINA DAM

## REPAIR AND WATERPROOFING WORK ON THE VALLEY SIDE OF THE WALL OF ONE OF THE THREE LARGE DAMS ON THE RIVER CHIESE

The landscape of the Daone Valley, in the south-west of the Trentino-Alto Adige Region in Northern Italy, was radically transformed in the 1950's with the construction of a number of large dams and hydroelectric power stations fed by the waters of the River Chiese.

In this period two big hydroelectric plants were built at the foot of the mountain, as well as three dams: in Morandin, Malga Boazzo and Malga Bissina, 1788 m above sea level.

The dam in Malga Bissina was built between 1955 and 1957 by a company called Idroelettrica Alto Chiese (part of Edison Group) according to a design by Claudio Marcello. Final

testing was carried out in 1962.

The dam, which is owned by Hydro Dolomiti Energia srl, is a so-called "Marcello type" (lightweight gravity dam with hollow buttresses), made up of 22 hollow elements, each one measuring 22 m in width (with vertical joints among them), and two regular gravity sections. The dam wall is 82.5 m high and the crest of the wall is 3 m wide with a total walkable length of 563.4 m. The reservoir formed behind the dam wall has a total capacity of 61 million m<sup>3</sup>. Because of its height above sea level, to prevent the internal sections being exposed to the effect of the changing atmospheric conditions and to

The render on the insulated walls on the valley side of the dam was repaired with MAPEGROUT EASY FLOW. The walls were then waterproofed with MAPELASTIC GUARD.



the formation of ice and snow drifts, the structures of the compartments between the sections were insulated.

## Cutting-edge materials for a long-lasting infrastructure

The first time Mapei was asked to participate in work on the Malga Bissina dam was at the beginning of the 2000's when the protective beams for the joints needed to be rebuilt.

Then, in 2019, restoration and waterproofing work started on all the insulated walls on the valley side of the dam. The work, which is scheduled to be completed in 2022, includes the use of various Mapei solutions. MAPEGROUT EASY FLOW one-component sulphate-resistant, fibre-reinforced, shrinkage-compensated, thixotropic mortar was used to repair the render. In this case it was admixed with MAPECURE SRA curing admixture to reduce hydraulic shrinkage and the formation of micro-cracks. This mix was then used to integrate areas up to 8 cm thick with a strengthening mesh embedded in it.

The expansion joints were waterproofed with MAPEBAND TPE tape, bonded with ADESILEX PG4 two-component, low viscosity, thixotropic epoxy adhesive, before sealing them with MAPEFLEX PU30 epoxy-



polyurethane sealant and MAPEFLEX MS45 flexible, thixotropic, quick-hardening silicated polymer-based hybrid sealant.

The insulated walls on the valley side of the dam were waterproofed with MAPELASTIC GUARD, a two-component, flexible cementitious mortar for protecting large concrete structures subjected to high stress. Due to its high content of quality synthetic resins, its hardened layer maintains its flexibility under all environmental conditions.

To reinforce and strengthen the mortar, alkali-resistant MAPENET 150 glass fibre mesh was embedded in the first layer of MAPELASTIC GUARD.

## MAPEGROUT EASY FLOW

One-component sulphate-resistant, fibre-reinforced, shrinkage-compensated, thixotropic mortar especially suitable for repairing concrete

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## TECHNICAL DATA

## Malga Bissina dam,

Valdaone (Province of Trento, Northern Italy)

**Period of construction:** 1955-1957

**Original design:** Claudio Marcello

**Period of the intervention:** 2019-ongoing

**Intervention by Mapei:**

supplying products for concrete repair and waterproofing

**Owner:** Hydro Dolomiti Energia Srl

**Works director:** Michele Buratti

**Head of Civil Engineering**

**Hydraulic Department:**

Enrico Dalla Villa

**Main contractor:**

Co.ge.dit Srl, Fausto Ditomasso

**Mapei coordinators:**

Stefano Barachetti and Paolo Banfo, Mapei SpA (Italy)

## MAPEI PRODUCTS

**Concrete repair:**

Mapegrout Easy Flow, Mapecure SRA

**Waterproofing:** Mapelastic Guard, Mapeband TPE,

Adesilex PG4, Mapenet 150

**Sealing joints:** Mapeflex MS 45, Mapeflex PU30

For further information on products see [mapei.com](http://mapei.com)