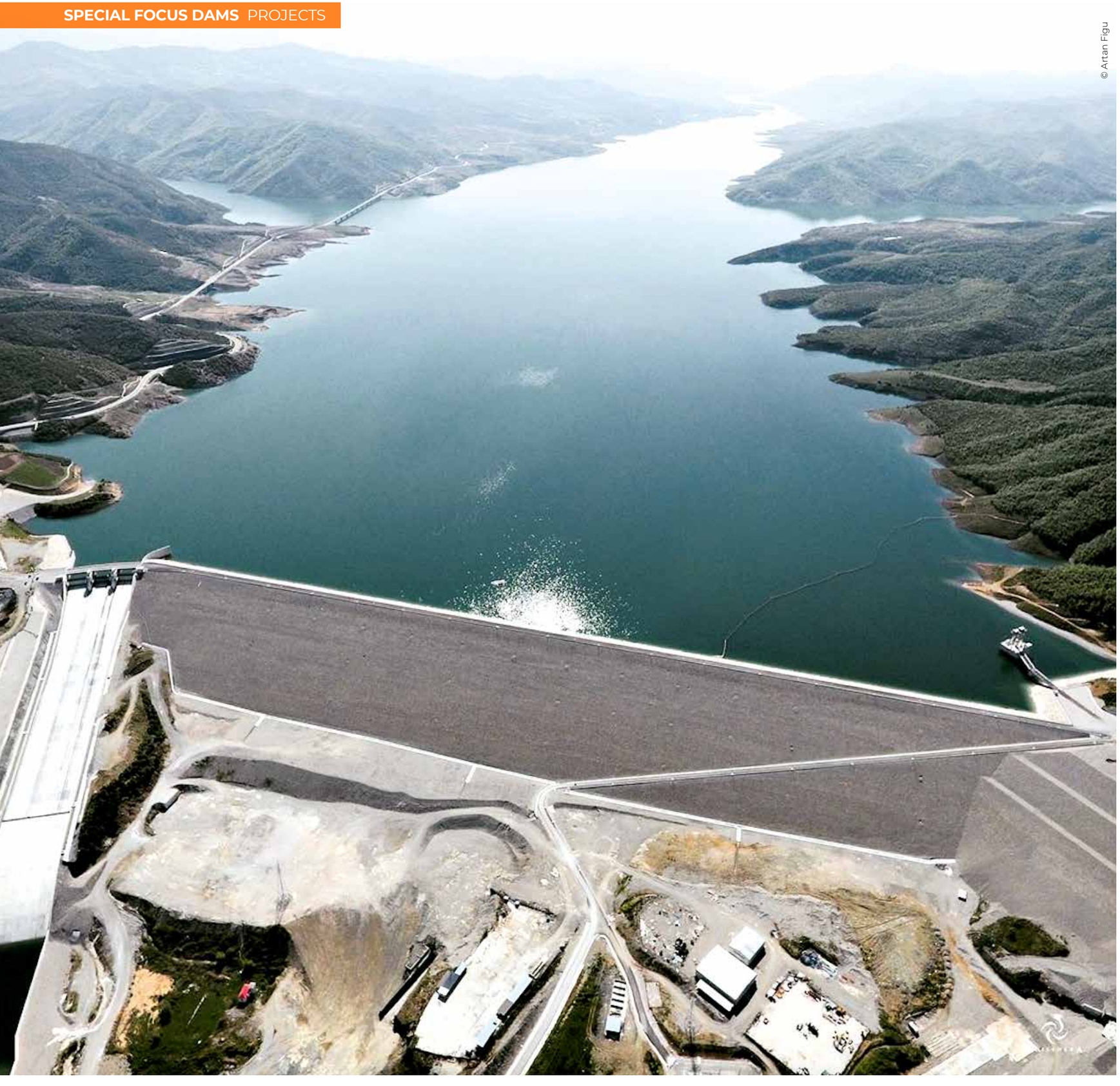

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Banjë (Albania)

BANJA HYDROPOWER PLANT

CONCRETE ADMIXTURES AND PRODUCTS FOR CONCRETE REPAIR AND WATERPROOFING FOR A BIG HYDROPOWER PROJECT IN ALBANIA

The Banja hydropower plant is located in a valley along the River Devoll in Albania, around 70 km south-east of Tirana. It is part of the Devoll Hydropower Project which includes the development, planning, construction and operation of the Banja and Moglicë power plants, with a total installed capacity of approximately 269 MW and a planned annual production of approximately 700 GWh.

The plants were commissioned and are run by the Albanian energy company, Devoll Hydropower Sh.A., which is owned and operated by the Norwegian energy group Statkraft AS.

The Banja hydropower plant plant started operations in autumn 2016 and has an installed capacity of 72 MW and an annual production capacity of around 255 GWh, the equivalent of 5% of the total amount of energy generated in Albania.

The plant consists of an embankment dam with an approximately 80 m high clay core. It is equipped with two large Francis turbine units and one small Francis turbine unit.

The plant utilises a head between 175 and 95 m above sea level. At its highest regulated water level of 175 m above sea level, the reservoir has a surface area of approximately 14 km^2 and a storage capacity of 400 million m^3 of water.

The dam also had a significant impact on the inhabitants of the area where it was constructed, near the municipality of Gramsh, one of the poorest parts of Albania. Statkraft

Problems and solutions

Mapei supplied various concrete admixtures during construction of the Banja dam: super-plasticisers, set-retarders and accelerators to help work progress more smoothly and more quickly during both hot and cold weather.

BANJA DAM

2016
Entered into operation

72 MW
Installed capacity

255 GWh
Annual production

2000 workers
contributed to its construction

also built new roads and bridges to improve access to the most important towns and cities.
According to the Norwegian company, a workforce of around 2,000 took part in the construction of the dam, considered by the Albanian Prime Minister, Edi Rama, to be "Of enormous importance for the Albanian energy system".

Admixtures for high-performance concrete
During construction of the dam, Mapei supplied admixtures for the self-compacting concrete used for the penstock that drives the turbines, the concrete used to build the spillway, the concrete used to make components and elements in the hydropower plant and the water tower.

Going into detail, the following concrete admixtures were supplied:
- DYNAMON SR3 and DYNAMON SP1 superplasticizers based on acrylic polymers, characterised by their low water/cement ratio and very high initial and final mechanical properties. DYNAMON SR3 also extends the workability of concrete;
- MAPETARD set-retarding admixtures, to extend the workability of concrete in hot weather;
- MAPEFAST CF/L chloride-free hardening accelerator, to speed up formwork stripping operations in cold weather;
- MAPEPLAST SF, a mineral addition based on densified silica-fume used to improve the resistance to erosion and cavitation in the concrete of the spillway.

ABOVE. MAPEFLEX PU65 was used to seal joints in the concrete elements used for the spillway.
IN THE FACING PAGE. Concrete was placed after being admixed with Mapei admixtures such as DYNAMON SR3, DYNAMON SP1, MAPETARD, MAPEPLAST SF, and MAPEFAST CF/L.

Mapei solutions for repairing concrete and sealing joints
Mapei also supplied a number of products from its Building Line to repair the concrete along the walls of the spillway, to seal cracks in the concrete elements, to seal joints in the slabs for the spillway and to waterproof leaks in the penstock. The products used for these works were:
- MAPEGROUT T60 sulphate-resistant, fibre-reinforced, shrinkage-compensated thixotropic mortar for repairing the concrete of the penstock;
- EPOJET LV two-component, low-viscosity epoxy resin to form monolithic seals in various concrete structures;
- EPORIP two-component epoxy resin for the construction joints in various concrete structures;
- ADESILEX PG1 two-component, thixotropic epoxy adhesive for structural bonding;
- MAPEFLEX PU65 polyurethane sealant for the joints in the concrete elements of the spillway;
- RESFOAM T polyurethane waterproofing resin, which was applied by injection to waterproof the concrete used for the penstock.

TECHNICAL DATA
Banja hydropower plant, Banjë (Albania)
Period of construction: 2013-2016
Period of the Mapei intervention: 2014-2016
Intervention by Mapei: supplying admixtures for concrete and products for waterproofing and repairing concrete
Client: Devoll Hydropower Sh.A, Statkraft AS
Contractor: Limak
Mapei coordinators: Roberto Saccone and Pasquale Zaffaroni, Mapei SpA (Italy)
Photos: Statkraft AS

MAPEI PRODUCTS
Admixtures for concrete: Dynamon SR3, Dynamon SP1, Mapetard, Mapeplast SF, Mapefast CF/L
Concrete repair: Mapegrout T60
Sealing joints and structural bonding: Epojet LV, Eporip, Mapeflex PU65
Waterproofing: Resfoam T
Sealing joints in concrete elements: Mapeflex PU65

For further information on products see mapei.com