



# DAMS

Construction technology  
for large hydropower projects





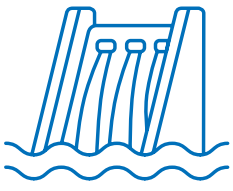
**DESIGN, CONSTRUCTION, MAINTENANCE.  
MAPEI SUPPORTS LARGE HYDROPOWER  
PROJECTS AT EVERY STAGE.**

# DAMS

## Construction technology for large hydropower projects

Large <b>hydropower projects</b> .....	2
<b>Sustainability</b> for Mapei .....	5
<b>Research</b> and <b>development</b> .....	6
<b>Mapei technology</b> for large projects.....	8
<b>Construction</b> work.....	11
<b>Repair</b> work.....	12
Technical <b>services</b> .....	15
Case <b>history</b> .....	16





# Large hydropower projects

## Mapei solutions in the construction of dams: specific products and technical services

**Mapei** follows and supports **large hydropower projects** from the design to every stage of their lives. The same care and attention required for the construction of a dam is also necessary when carrying out maintenance operations by adopting appropriate repair procedures. The dam needs constant monitoring throughout its entire life cycle to identify potential defects.

Thanks to targeted research work, **Mapei** has developed **dedicated systems and technologies** for both **construction** and **maintenance** work and is constantly alongside design engineers and building companies providing **technical support of the highest quality**.

### Why building dams

A dam is a fundamental element in establishing a **new balance between man and the environment**, as well as **determining strong growth in social and economic conditions**.

An increase in the world's population and the natural ambition for a better standard of living still make the **design, construction and management of dams** an important subject. Dams allow water to be controlled and managed for irrigation purposes, thereby encouraging the cultivation of vast areas of land. They also create a permanent barrier along a natural water way allowing **hydro-electric energy** to be generated, which is the main source of renewable energy.

A dam may also be used to **control the level of a water course** to prevent hydro-geological disasters and to promote new ways of transporting goods.







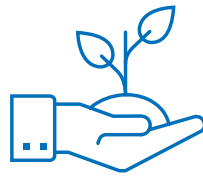
*GIBE III Hydropower Project  
Omo river - South-West Ethiopia*





*GIBE III Hydropower Project  
Omo river - South-West Ethiopia*





# Sustainability for Mapei

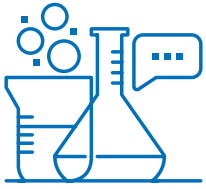
**Mapei** is fully committed to being constantly present **in the front line in the challenge** to achieve a more sustainable building industry, dedicating an increasing amount of resources to create **innovative products** that help play an important part in **increasing the sustainability** of the buildings and structures where they are employed, while **minimising their impact on the environment**.

The resources are used in a sustainable way, reducing the amount of waste, limiting the consumption of virgin raw materials, using **renewable energy** and developing **products which are safe** for both those who apply them and for those who use them.

**Mapei's** fundamental commitment is to offer the best and most innovative solutions to help **design and construct in a sustainable way**, backed up by clear, transparent information and communication.







# Research and development

Design, construction, maintenance. Mapei supports each stage of large hydropower projects.

**Mapei** has always been highly committed to **Research and Development**, continuously and significantly investing in the sector. **Mapei products** are the result of our commitment to **excellence in research**, with the goal of developing **innovative formulas that may be integrated into complete application systems** that are very effective in terms of results.

Particular attention is paid to the use of substances that are fully compatible with the health and safety of all those working on site.

## Durability

Over the years, we have made the **reliability** of our products a key focus point: ensuring increased durability means preventing or at least delaying further maintenance interventions.

A further, concrete commitment to **sustainable development**, minimising the waste of resources and time.





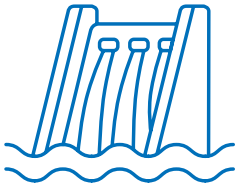


**Chiotas dam**  
Entraque (Cuneo) – Italy



**Saint Clair hydropower plants**  
Outlet and penstock tunnels  
Chatillon (Aosta) – Italy

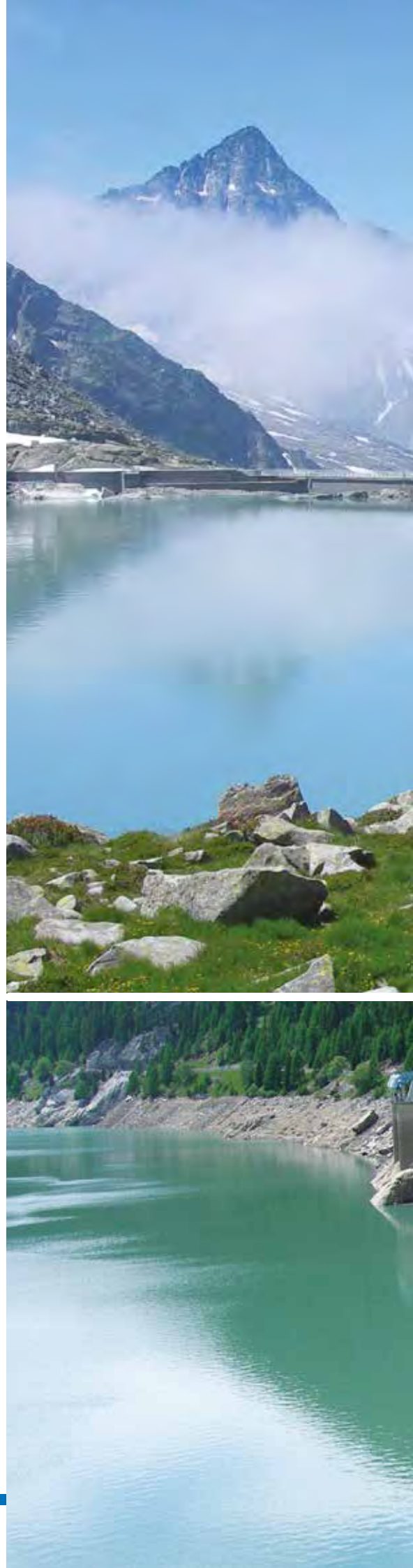




# Mapei technology for large projects

All around the world, day in day out, **construction sites can count on Mapei**. For more than 80 years we have been supplying solutions of excellence for the building industry, thanks to our unrivalled know-how.

- **Admixtures** for **conventional concrete**
- **Admixtures** for **RCC**
- **Admixtures** for **high-strength concrete**
- **Admixtures** for **injection slurries**
- **Accelerating products** for **shotcrete**
- **Mineral admixtures**
- **Structural sythetic fibres**
- **Joints and Waterstop**
- **Sealants**
- **Anchoring mortars and resins**
- **Concrete repair systems**
- **Structural strengthening**
- **Crack injection systems**
- **TBM systems**
- **Systems for traditional excavation**  
(drill & blast)
- **Consolidating systems**
- **Waterproofing systems**
- **Surface protection systems**
- **Resin and cementitious flooring systems**





*Venerocolo dam  
Alta Valle Camonica - Italy*



*Gioveretto dam  
Val Martello (Bolzano) - Italy*

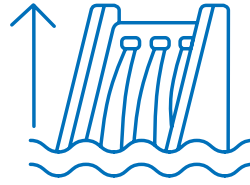








*Xilubdu hydropower plant  
Shaotong City - China*



# Construction work

**Mapei** develops and supplies products and solutions for building and construction work and has a complete range of products available for building dams, canals and hydraulic tunnels.

## Mapei products for construction

- **Admixtures** for **conventional concrete** and **RCC**
- **Admixtures** and **fibres** for **shotcrete**
- **Admixtures** for **high-strength concrete**
- **Admixtures** for **injection slurries**
- **Products** for **mechanical excavation** and **conditioning**
- **Waterproofing**
- **Treatment** for **facing walls**
- **Joints**
- **Mortars**

## Types of dam

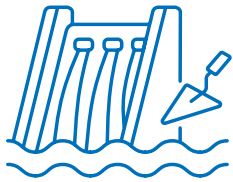
Dams may be constructed using rocks and earth (Embankment Dams) or concrete.

**Concrete dams** may be divided into two categories: **Gravity Dams**, made from RCC, and **Arch Dams**, made from normal concrete.



*GIBE III Hydropower Project  
Omo river - South-West Ethiopia*





# Repair work

The long life span of a **large hydropower project** often imposes **repair work** to be carried out in order to **maintain** and guarantee the overall **efficiency** of the structure. Sometimes upgrading is required to withstand a variation in working conditions.

Over the years, **Mapei** has developed a **specific range of products that offer a valid solution to each problem** that may arise. The experience gained makes us a **reliable partner** in this sector.

## Mapei products for repair

- Repair mortars
- Structural strengthening
- Admixtures for concrete and shotcrete
- Waterproofing
- Treatment for facing walls
- Joints







*Trona dam  
Sondrio - Italy*



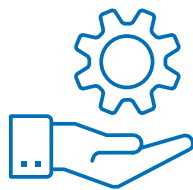
*Malga Bissinia dam  
Val Daone (Trento) - Italy*





*New Panama Canal*  
*Panama City and Colon - Panama*





## Technical services

**Mapei** has always been a favoured **partner for designers and specialists** from this sector. Through our network of technicians, we provide solutions to problems around the world. This approach has fuelled the company's growth. Operating in terms of problem solving means incorporating stimuli from external sources and making them our own, listening to customers and turning their problems into effective solutions. This means being able to constantly **innovate, research and experiment**.

### Support for design work

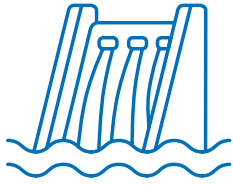
In every corner of the world, starting from the initial design stages of a project, **Mapei** has teams of **highly specialised technical staff** available, supplying **consultancy on the products used** and **technical support to help solve every type of problem**. For an end result which always lives up to expectations.

### Site support

We have made **Technical Services** one of our strong points. Each day, we are present with qualified technicians on sites in more than 128 different countries around the world. By working alongside teams from large contracting companies, we are able to demonstrate our **experience of correct system installation methods** and provide our expertise with new solutions.







# Case history

## MALGA BISSINIA DAM

Val Daone (Trento) - Italy



Repairing of upstream side body dam.

### PRODUCTS

MapegROUT Thixotropic, Mapefinish.

## GIBE III HYDRO POWER PROJECT

Omo river - South-West Ethiopia



Body dam construction, spillways construction, protective system of upstream surface, waterstop joints.

### PRODUCTS

Mapetard CBSI, Dynamon SR3, Mapeplast SF, Triblock PB, Biblock, Purtop 1000, Mapeband Flex Roll.

## GERDP - GRAND ETHIOPIAN RENAISSANCE DAM PROJECT

Blue Nile river - North-West Ethiopia



Construction of the body dam and conventional concrete structures.

### PRODUCTS

Mapetard P, Mapefluid N 100 KSA, Biblok, Planigrout 300.

## ALTO MORA DAM

Averara (Bergamo) - Italy



Repairing works of downstream side and crest joints.

### PRODUCTS

Mapecure SRA, Mapegrout Easy Flow, Mapegrout LM 2K, Mapefinish, Mapeflex PU45.

## CHIOTAS DAM

Entraque (Cuneo) - Italy



Surface repairing and waterproofing protection of upstream side.

### PRODUCTS

Mapecure SRA, Mapegrout Easy Flow GF, Mapeband+Adesilex PG4, Mapelast.

## PANTANO DAM

Alta Valle Camonica - Italy



Repairing of upstream side dam

### PRODUCTS

Mapecure SRA, Mapegrout Easy Flow, Mapeflex PB27, Mapeflex PB25, Mapeflex PU40, Mapecure S, Mapegrid G120.

## SAINT CLAIR HYDROPOWER PLANT

Chatillon (Aosta) - Italy



Repairing and strengthening of bottom walls, joints repairing, outlet and penstock tunnels

### PRODUCTS

Mapegrout Easy Flow, Stabilmcem, Primer AS, Mapeflex PU45.

## NEW PANAMA CANAL

Panama City and Colon - Panama



Construction of the new set of lock chambers, repairing of existing locks, waterproofing of the recycled water basins.

### PRODUCTS

Dynamon XP2, Dynamon XP2 Evolution 1, Mapecure SRA, Planitop 15, Sibelon PVC Membrane\*.

## XILUODU HYDROPOWER PLANT

Shaotong City - China



Construction of body dam.

### PRODUCTS

Dynamon X404.

\* Sibelon PVC geomembrane is a CARPI TECH brand.



### PONT VENTOUX HYDROPOWER PLANT

Susa (Turin) - Italy



Construction of the body dam, canals and diversion tunnels.

#### PRODUCTS

Dynamon SR3, Epojet LV, Mapegrout BM, Mapegrout Gunitite, Mapegrout Rapido, Stabilcem T, Planitop T1, Mapequick AF1000, Mapequick AF2000.

### THREE GORGES DAM

Sichuan - China



Spillways construction.

#### PRODUCTS

Mapecfluid X404.

### TRONA DAM

Sondrio - Italy



Upstream side repairing.

#### PRODUCTS

Mapegrout T60, Planitop HDM.

### PIODA FEEDING AND COMPENSATION BASIN

Val Masino (Sondrio) - Italy



Repairing of concrete structures.

#### PRODUCTS

Mapegrout 60, Mapelastec, Mapenet 150, Mapeband TPE.

### SAN GIACOMO DAM

Valdidentro (Sondrio) - Italy



Repairing and strengthening of the toe and downstream side dam, strengthening of captioning structures, construction of the bottom outlet.

#### PRODUCTS

Mapequick AF1000, Dynamon SX, Mapegrout BM, Mapegrout FMR, Mapegrout T60, Mapegrout Hi-Flow, Mapelastec.

### SAN VALENTINO DAM

Passo Resia - Italy



Repairing and strengthening of concrete structures.

#### PRODUCTS

Mapegrout Easy Flow, Mapegrout Easy Flow GF, Mapewrap, Epojet, Mapefer 1K, Mapelastec Guard.

### VENEROCOLO DAM

Alta Valle Camonica - Italy



Joints repairing, waterproofing of upstream side, joints and cracks sealing of downstream side, waterproofing of the new crest slabs.

#### PRODUCTS

Mapegrout Easy Flow, Mapeflex PU45, Mapelastec, Mapegrout Hi-Flow, Idrosilex Pronto, Topcem Pronto.

### GIOVERETTO DAM

Val Martello (Bolzano) - Italy



Upstream side surface repairing, protective system of downstream side and crest joints repairing.

#### PRODUCTS

Mapegrout Easy Flow, Mapegrout Easy Flow GF, Mapelastec Guard, Mapeband, Adesilex PG4, Antipluvio S, Mapeflex PU45, Mape-Asphalt Repair 0/8, Idrosilex Pronto, Triblock Finish.

### CARESER DAM

Pejo (Trento) - Italy



Repair of a damaged downstream facing wall: application of new render, sealing of joints and refurbishment of the asphalt surfacing on the crest.

#### PRODUCTS

Mapegrout MS, Mapegrout 430, Mapeflex PU40, Mape-Asphalt Repair 0-8, Mapeflex PU65.



# EVERYTHING'S OK WITH MAPEI

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