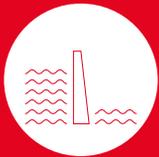




# Dams

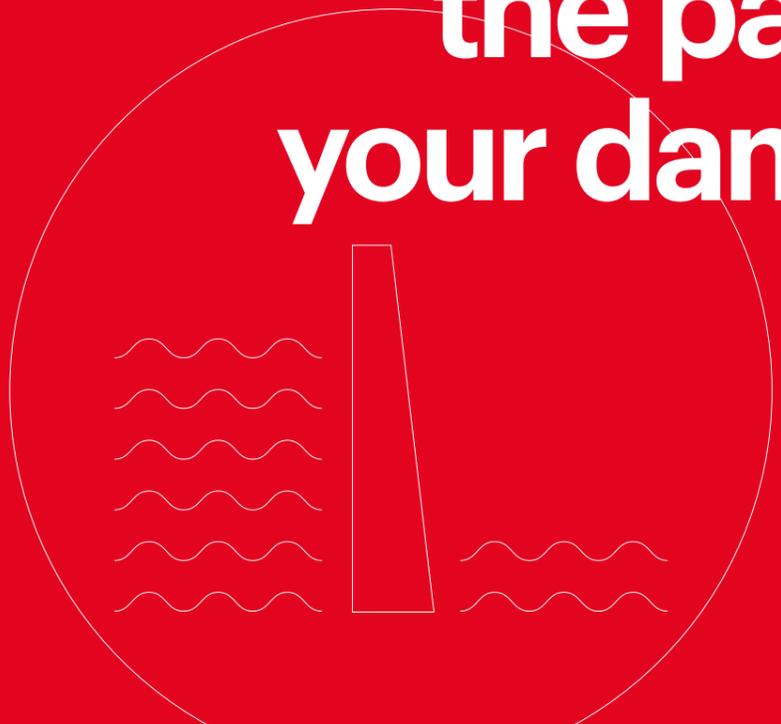


Our geotechnical solutions for commercially sustainable dams



As structures that are anchored in the ground, dams have formed part of the core activity of Soletanche Bachy for almost a century. We bring all our geotechnical solutions and engineering and design capabilities into play to deliver your hydraulic and hydroelectric dam projects, wherever you are in the world.

# Soletanche Bachy, the partner for your dam project



## Soletanche Bachy, soil expertise to control risks

The stability and safety of a dam's structure depends on the quality of its foundations and the correct handling of the hydro-geology of its bedrock. This is precisely Soletanche Bachy's area of expertise.

**As a global leader in foundations, we have longstanding expertise in soil technology and offer the widest range of geotechnical solutions on the market to control the risks of your dam project and ensure its maximal working lifespan.**



## Soletanche Bachy and dams, a 100-year common history

In its beginnings in the 1920s, the Group demonstrated its competence in building numerous dams in France and North Africa.

**Soletanche Bachy has since continued to construct, repair, improve safety, and maintain some of the world's largest hydraulic and hydroelectric installations.** This depth of experience allows us to propose the soil technologies that are best adapted to each of your dam projects.

Right: Yacretá Dam - Argentina  
Left: Cheurfas Dam - Algeria

We have solutions for each part of a dam



# Our geotechnical solutions to control risks

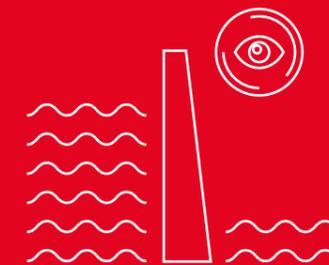
Through its expertise in design, soil technologies, and project management, Soletanche Bachy can act as a general contractor or specialist subcontractor to carry out all types of dam projects, regardless of scale. The objective is to ensure the durability and profitability of your hydraulic and hydroelectric infrastructure.



**New structures**



**Repair Dam safety**



**Maintenance Upgrade**

## Resources

A team dedicated to your project and bespoke equipment designed and manufactured by the Group, to meet your needs.

## Innovation

Cutting-edge innovation (digital, Big Data, robotisation, etc.).

## Engineering

30 design offices, 200 design engineers worldwide, experts in geotechnics and equipment, plus a materials laboratory.

## Safety and environment

A strong safety and environmental culture.

## Why work with Soletanche Bachy

✓ We have almost **100 years' experience** in the field of dams, and have hundreds of references worldwide.

✓ We are experienced in operating on **remote sites**, often with difficult access, typical of dam sites.

✓ We offer the widest range of **geotechnical methods** on the marketplace.

✓ We have a **local presence** in more than 60 countries, together with a **global expertise**.

✓ We can act as a **general contractor**, in order to complete your dam project from beginning to end.

✓ We are committed to **local employment and respectful working conditions** for our personnel (housing, healthcare...).

✓ We bring **specific expertise** (monitoring, diagnostics, etc.) through our partners withing the Soletanche Freyssinet group.



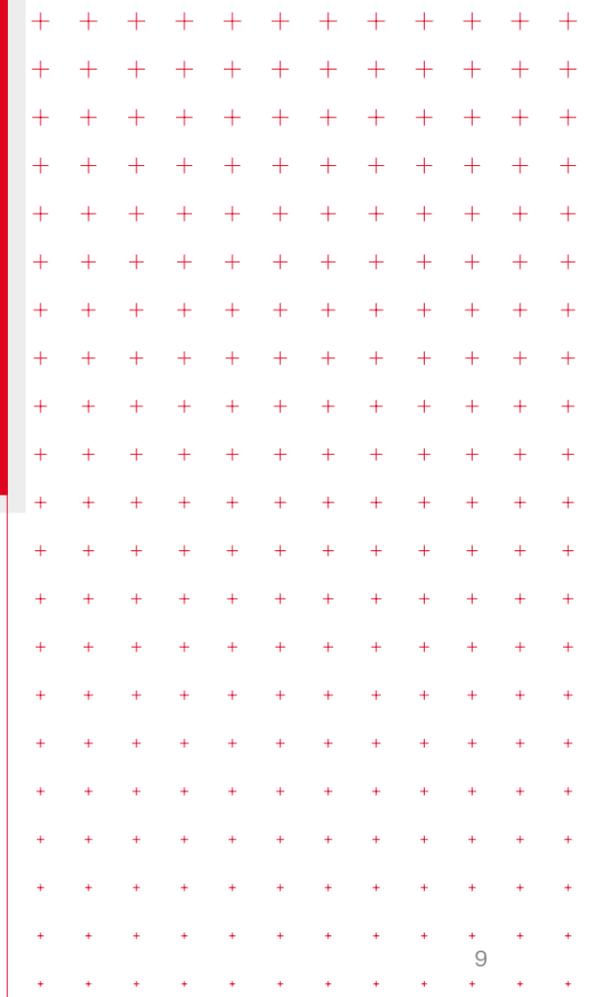
# New structures

The global population is continually growing, which has led to a rise in energy needs. It has also become mandatory to better manage resources for irrigation and improve flood control. To meet this new demand, it is essential to build new hydroelectric dams and reservoirs.

Thanks to its expertise in ground technologies, Soletanche Bachy can help you construct new dams on consolidated or improved ground, resulting in lasting, safe structures offering long-term performance.

## Our solutions

		Drainage and treatment of fissures
Ground improvement	Cut-off walls (diaphragm walls, jet grouting, injections, secant piles, Deep Soil Mixing, etc.)	Dissolution and cracks treatment
Water intake tunnel	Contact grouting	Upgrade of overfalls
Surveillance, analysis, monitoring	Project management	Help with financing



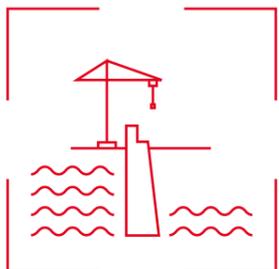
## Our strong points

**Geotechnical expertise**

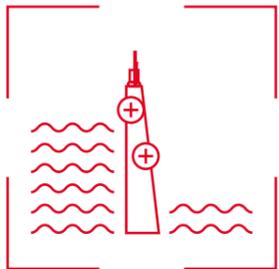
**Methods**

**Equipment**

**Design**



# Repair Dam safety



Many existing dams are now more than 50 years old. Their structure and the ground upon which they are built have undergone major stresses and are now exhibiting significant faults. As a result, their stability and safety are compromised, their performance is reduced, and their operating costs are increasing.

Soletanche Bachy applies its geotechnical expertise to repair, consolidate, and waterproof your dams with minimal impact on their daily operations, with the goal of enhancing safety and profitability.

## Our solutions

		Stabilisation using ground anchors	Water intake tunnel
Cut-off walls (diaphragm walls, jet grouting, injections, secant piles, etc.)	Dissolution and cracks treatment	Drainage and treatment of fissures in the structure	Contact grouting
Upgrade of overfills	Surveillance, analysis, monitoring	Project management	Help with financing

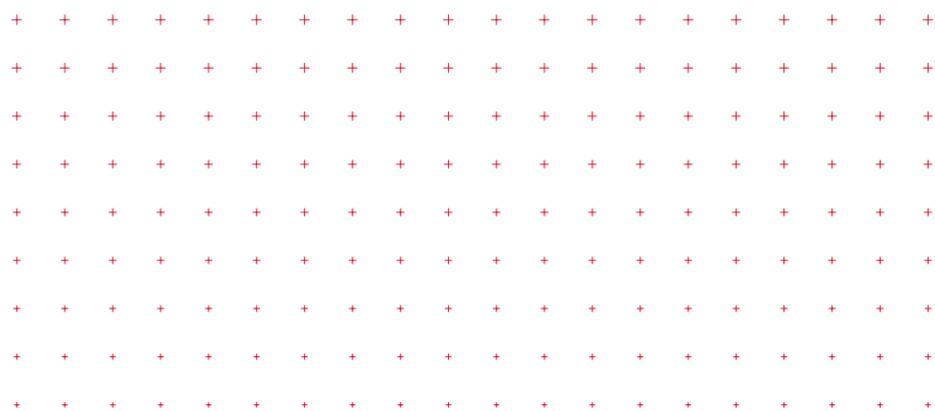
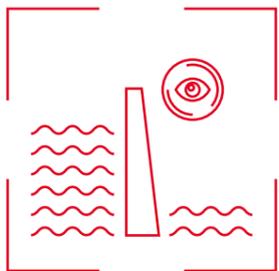
## Our strong points



# Maintenance Upgrade

With ageing structures, and increasing domestic demand for water and electricity, existing dams are reaching saturation and it is not always possible to construct new ones. The solution is to extend their operational lifespan by increasing their capacity whilst ensuring their maintenance.

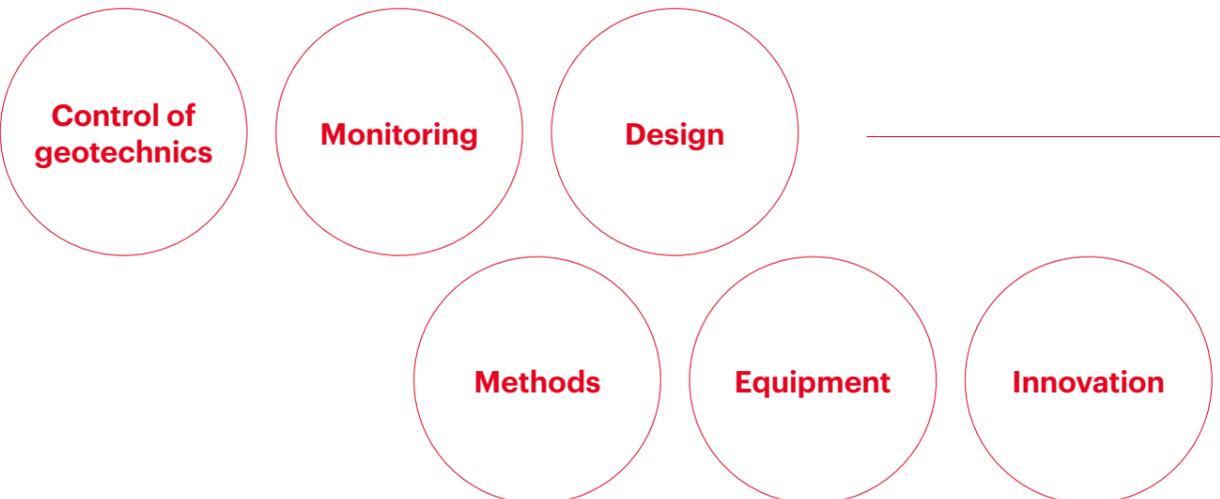
Soletanche Bachy draws on its expertise in the areas of soil technology and water management to maintain, upgrade, modernise, and increase the storage capacity of your hydroelectric dams. We can also watch over any changes in the structure through our monitoring service.



## Our solutions

		Increase in capacity	Increase in height	Surveillance, analysis, monitoring
Dissolution and cracks treatment	Treatment of fissures in the structure	Drainage	Cut-off walls (diaphragm walls, jet grouting, injections, secant piles, etc.)	Contact grouting
Upgrade of overfills	Project management	Help with financing	Stabilisation using ground anchors	

## Our strong points



# Our services

Angostura Dam - Chile

## Our offer

Dams | Soletanche Bachy

### Equipment designed and manufactured in-house, adapted for each project

We have a large fleet of Hydrofraise®, KS grabs, drilling machines, Cutter Soil Mixing rigs, tunnel boring machines and digital grouting systems **available at all times, anywhere in the world.**

Soletanche Bachy has its own equipment division which designs and manufactures most of our machines and operating software. This means **we have full control over the equipment we deploy for your dam projects.** And to better adapt to your needs, we produce tailored machines according to the specifics and constraints of your projects.

### Innovation for your projects

Soletanche Bachy was behind several major technical advances, such as the Hydrofraise®, and the “tube à manchettes”, and is **continually striving to improve its methods, techniques, and machines to face new challenges and anticipate those you will encounter tomorrow.**

We are exploring new digital and robotic technologies to enhance our performance. We recently developed a Big Data platform to collect, sort, and analyse data from our work sites to improve our performance.

### A worldwide network of specialist engineers

With Soletanche Bachy, you have the peace of mind of **working with the world’s largest network of specialist engineers in geotechnics.** Our experts can work on all aspects of your projects, from choice of method, through design, surveying, scheduling, and materials.

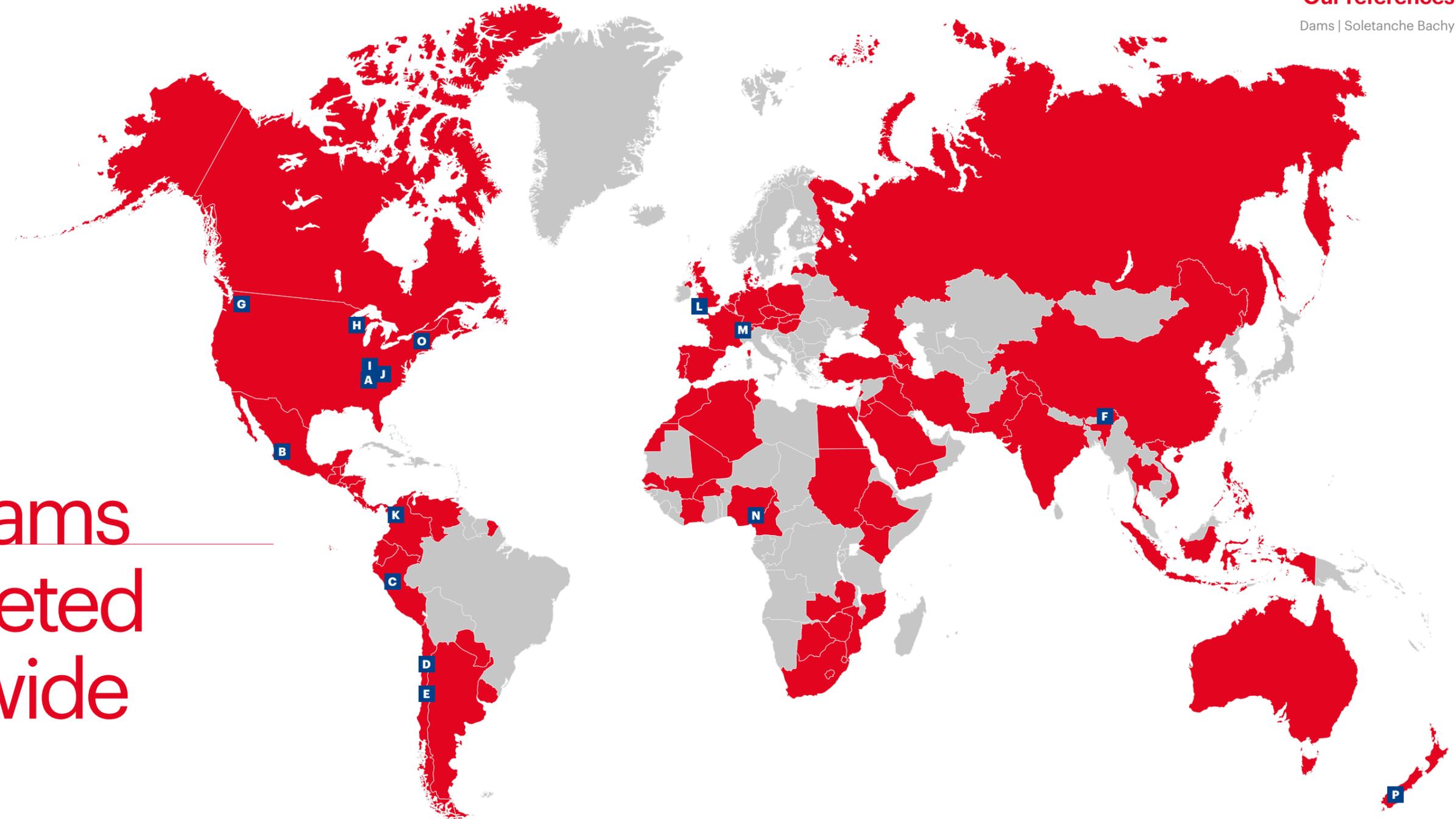
This cutting-edge expertise, in conjunction with our 30 in-house design offices, allows us to propose variants from the design phase of your projects.

### A strong safety and environmental culture

At Soletanche Bachy, safety is part of daily life on our work sites, offices, and on the road, covering organisation, equipment, methods, and techniques. **We observe strict health and safety rules at all times, and are continually working to improve our practices** to attain excellence.

Regarding the environment, we are focused on reducing our carbon footprint via a reduction in our consumption of fuel and cement, and through improved recycling of our waste.

Over  
500 dams  
completed  
worldwide



Selection of recent projects

News structures

- A** Richland Creek Reservoir, United States
- B** La Yesca Dam, Mexico
- C** Antamina mining complex dam, Peru
- D** Candelaria mine embankments, Chile
- E** Chacrillas Dam, Chile
- F** Subansiri Lower Dam, India

Repair / Dam safety

- G** Wanapum Dam, United States
- H** Prairie du Sac Dam, United States
- I** Wolf Creek Dam, United States
- J** Boone Dam, United States
- K** Ituango Dam, Colombia
- L** Wimbleball Dam, United Kingdom
- M** Illsee Dam, Switzerland
- N** Lake Nyos Dam, Cameroon

Maintenance / Upgrade

- O** Gilboa Dam, United States
- P** Waitaki Dam, New Zealand



# New structures



## Subansiri Lower Dam · India

- The largest hydroelectric project ever undertaken in India.
- 18,000-sq. metre cut-off wall built from galleries with restricted headroom.
- Use of a compact containerised Hydrofraise® specially designed for the project.

**Structure**

116-metre-high, 264-metre-long concrete gravity dam

**Owner**

National Hydroelectric Power Corporation

**Main contractor**

JV BGS-SGS-SOMA



## Richland Creek Reservoir · United States

- 640-metre grout curtain with a maximum depth of 42 metres.
- 381-metre plastic concrete cut-off wall with a maximum depth of 29 metres.

**Structure**

38-metre-high, 1,265-metre-long earthen gravity dam

**Owner**

Tarrant Regional Water District

**Main contractor**

Brad Cole Construction





**Chacrillas Dam** · Chile

- Grout curtain (39,800 lm of drilling and 3,120 cu. metres of grout and mortar).
- Development of special platforms to work on slopes of up to 40°.

**Structure**

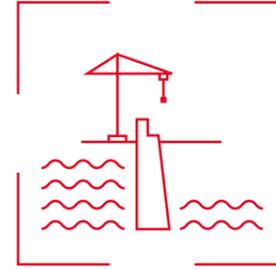
102-metre-high, 320-metre-long earthen gravity dam

**Owner**

Dirección de Obras Hidráulicas

**Main contractor**

Soletanche Bachy Chile



**La Yesca Dam** · Mexico

- The world's second-highest rockfill embankment dam.
- Soil improvement and sealing by jet grouting.
- 460 cu. metres of grout to seal seepage (5,650 lm of drilling).

**Structure**

208.5-metre-high rockfill gravity dam

**Owner**

Comisión Federal de Electricidad

**Main contractor**

ICA



**Candelaria mine embankments** · Chile

- Plastic concrete cut-off wall and drainage wall.
- Grout curtain built from the mountainside (40 km of drilled injections down to 70 metre depth).
- 358-metre micro-tunnel in partnership with Bessac (Soletanche Bachy's specialised subsidiary).

**Structure**

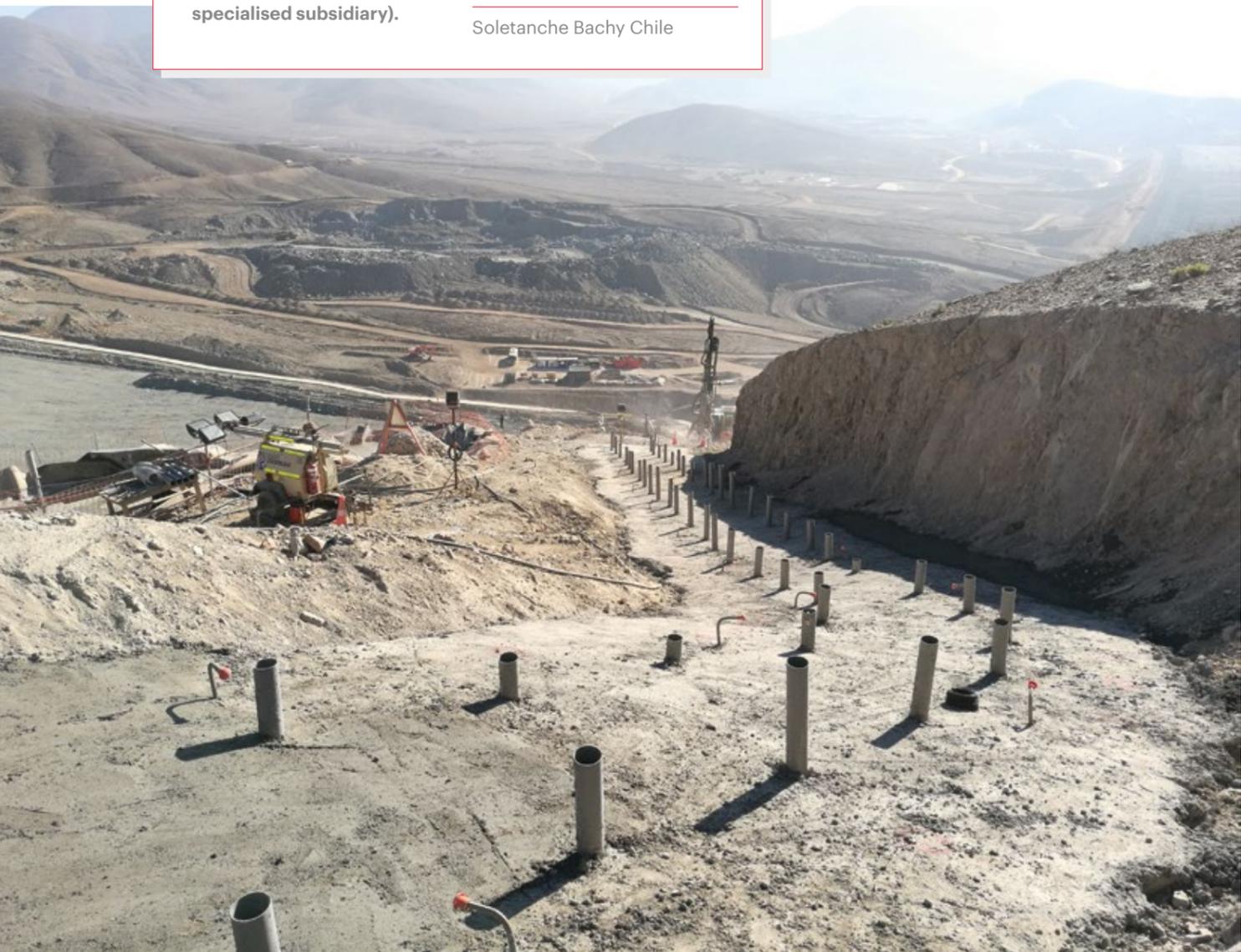
90-metre-high earthen gravity embankments with a 2-km crest

**Owner**

Lundin Mining

**Main contractor**

Soletanche Bachy Chile



**Antamina mining complex dam** · Peru

- 30-metre-deep plastic concrete diaphragm wall.
- 50-metre-deep grout curtain below and on either side of the dam.

**Structure**

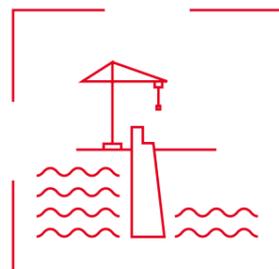
Retention dam

**Owner**

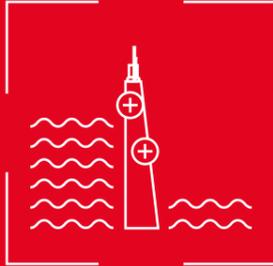
Compañía Minera Antamina

**Main contractor**

Soletanche Bachy Perú –  
Soletanche Bachy Chile



# Repair Dam safety



## Ituango Dam · Colombia

- Definitive consolidation of the emergency increase in height.
- 38-metre long and over 500-metre long cut-off wall (excavation of 20,000 cu. metres).
- 24/7 work to comply with emergency timescale.

**Structure**

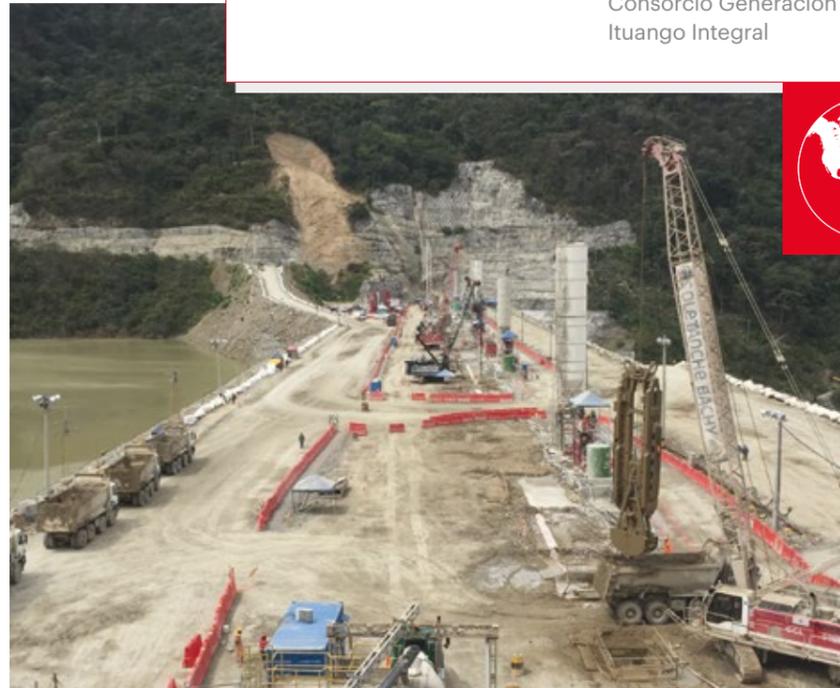
225-metre-high, 550-metre-long earthen gravity dam

**Owner**

EPM

**Main contractor**

Consorcio Generación Ituango Integral



## Wanapum Dam · United States

- Repair of cracks in the body of the dam.
- Installation of post-tension anchors, drains and cement grout injections.
- Drilling, grouting and anchor tensioning performed underwater by divers equipped with remote-controlled cameras.

**Structure**

56-metre-high, 2,500-metre-long concrete dam

**Owner**

Grant County Public Utility District

**Main contractor**

JV Kuney Construction – Robert B. Goebel

**Our references**

Dams | Soletanche Bachy



**Wolf Creek Dam** · United States

- 91,000-sq. metre cut-off wall, which combines secant piles and Hydrofraise® panels.
- 52,000-sq. metre, 1.8-metre thick, 85-metre deep diaphragm wall.
- 2013 Deep Foundation Institute Award.

**Structure**

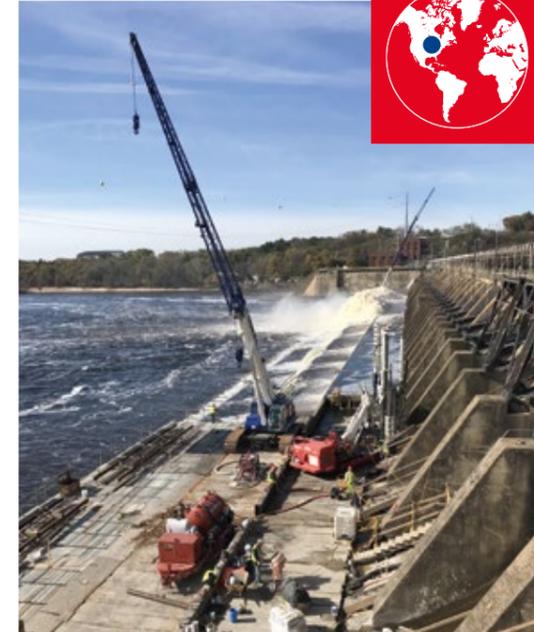
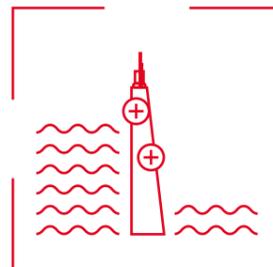
79-metre-high, 1,748-metre-long earthen gravity dam

**Owner**

U.S. Army Corps of Engineers (USACE)

**Main contractor**

JV Treviicos-Soletanche (TSJV)



**Prairie du Sac Dam** · United States

- Installation of 1,000 micropiles and 250 anchors.
- 1,165 cu. metres of excavation within a gallery.
- Construction of a 425-metre concrete transfer beam.

**Structure**

Concrete dam

**Owner**

Wisconsin Power & Light

**Main contractor**

Nicholson Construction



**Illsee Dam** · Switzerland

- Upgrade to seismic standards and anchoring reinforcement.
- 67 post-tensioned anchors (with an ultimate tensile strength of 725 tonnes) and 91 GEWI 50 mm nails.
- Personnel and supplies transport by cable car and installation of the anchors by helicopter (works conducted at an altitude of 2,300 metres).

**Structure**

25-metre-high, 270-metre-long concrete gravity dam

**Owner**

Argessa c/o ReLL Dienstleistung

**Main contractor**

PraderLosinger – Imboden – Evéquoz – Dénériaz joint-venture





**Lake Nyos Dam** · Cameroon



- Double jet grouting barrier (10,500 lm) to help stabilise the structure and prevent erosion.
- Project carried out in a particularly isolated area at a high altitude.

**Structure**

40-metre-high natural embankment

**Owner**

Cameroon Ministry of Economy, Planning and Regional Development

**Main contractor**

Soletanche Bachy – Razel joint-venture



**Boone Dam** · United States

- Cut-off wall using secant piles (255-metre length and 50 metre depth).
- Drilling in very hard rock (250 MPa).
- Reinforcing of the earth embankment using drilling and grouting.

**Structure**

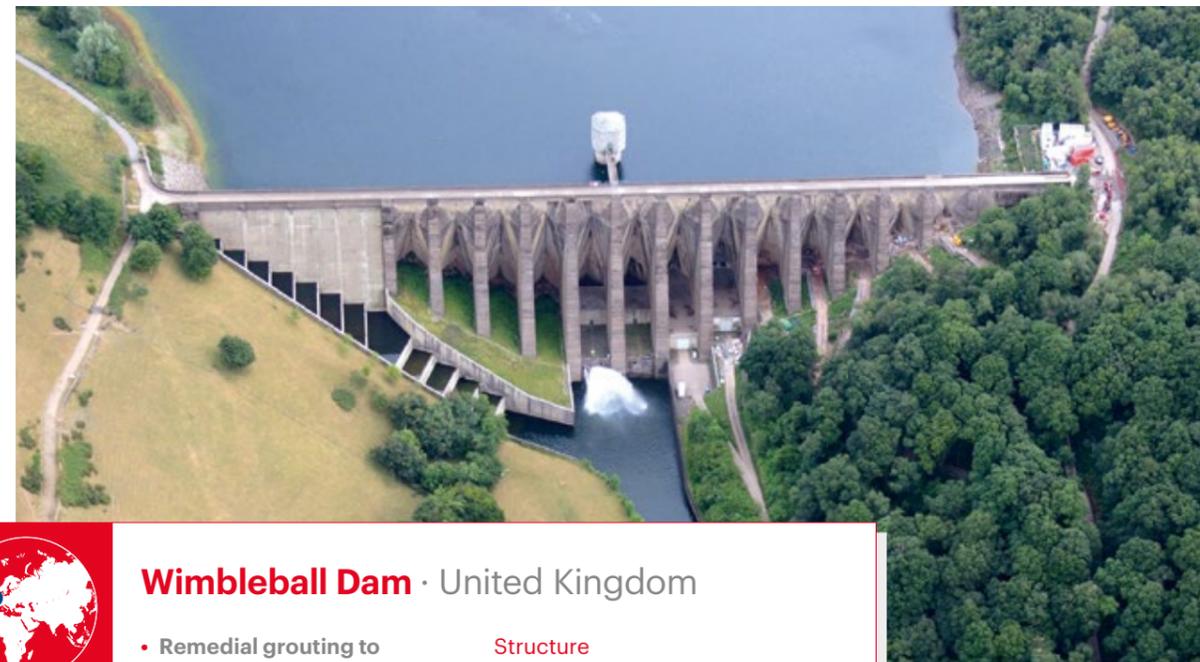
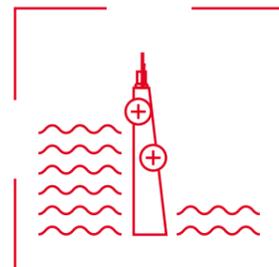
51-metre-high, 550-metre-long earthen gravity dam

**Owner**

Tennessee Valley Authority (TVA)

**Main contractor**

JV Treviicos-Nicholson Construction



**Wimbleball Dam** · United Kingdom

- Remedial grouting to address seepage through the dam foundations.
- Grout curtain, which involved more than 6,000 metres of drilling and the injection of 870 cu. metres of grout using GIN method (80 metre depth).

**Structure**

49-metre-high, 300-metre-long concrete buttress dam

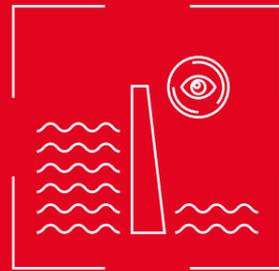
**Owner**

South West Water and Wessex Water

**Main contractor**

Bachy Soletanche

# Maintenance Upgrade



## Our references

Dams | Soletanche Bachy



### Gilboa Dam · United States

- Stabilisation of the dam.
- Installation of 79 post-tensioned multi-strand anchors (up to 1,000 tonnes) with lengths ranging from 30.5 to 73 metres.

#### Structure

55-metre-high, 213-metre-long earthen gravity dam

#### Owner

New York City Department of Environmental Protection

#### Main contractor

Nicholson Construction

### Waitaki Dam · New Zealand



- Improvement of drainage system.
- Refurbishment of groundwater drains and drilling to set up instrumentation.
- Work carried out from galleries with a maximum width of 1.2 metres and a maximum height of 1.9 metres.

#### Structure

48-metre-high, 542-metre-long concrete arch dam

#### Owner

Meridian Energy

#### Main contractor

March Construction



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Build on us



**SOLETANCHE BACHY**

Soletanche Bachy is a world leader in foundations and soil technologies, operating in 60 countries via a network of 80 subsidiaries and branches. The Group delivers the full range of geotechnical processes and provides innovative, effective solutions as either a lead or specialist contractor for turnkey projects with a geotechnical focus or specialist works.

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