



geoquest

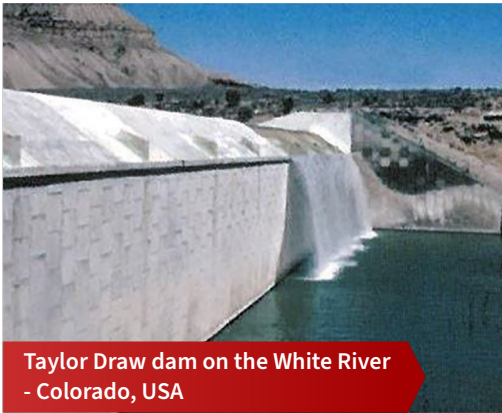
Dams & reservoirs

REINFORCED EARTH® APPLICATIONS FOR HYDRAULIC WORKS

Dams & reservoirs

Dams are often seen as the ultimate civil engineering structures. The enormous energy of the water they hold can be a vital source of electric power or have a devastating effect on populations and assets downstream. In areas where water is a scarce resource, dams and reservoirs provide storage means and are life supporting structures. Where water can be a hazard due to floods, dams used as water levees provide protection.

Drawing on their global expertise and track record, Geoquest can bring solutions and provide support at all stages of the projects for the construction or upgrading of these essential dam and reservoir structures.



Taylor Draw dam on the White River
- Colorado, USA

Dam restoration

Strengthening century old dams built for example of stone and cyclopic concrete masonry concrete or under designed dams can be achieved by improving their stability by means of Reinforced Earth® works. High-water spillways of Reinforced Earth® walls with sloped facings abutting the downstream face of the existing structures allow to provide the adequate overflow capacity.



Jamesville dam - New York, USA



Trekkopje reservoir - Namibia

Reinforced Earth® dams

The use of the Reinforced Earth® technique in the construction of earth dams allows the **reduction or elimination of the structures downstream slopes, resulting in considerable project savings.** The Reinforced Earth® method makes it possible to build a dam spillway with its sill at the very crest of the structure, eliminating costly gates and other flood control structures that would otherwise be required in addition to the dam. In the event of high water levels during construction, it is possible to allow a portion of the flow to spill over the unfinished dam. This provides added saving by minimizing the need for temporary diversion of the water course.

Water intake and outlet structures

Key intrinsic characteristics of the Reinforced Earth® technique such as **ease and predictability of construction, strength, draining capacity of the facing** allowing to accept rapid drawdown and, **proven resilience to seismic events in earthquake prone areas** are incentives to use this construction method for complex projects such as approach walls for intake structures or outlet works.



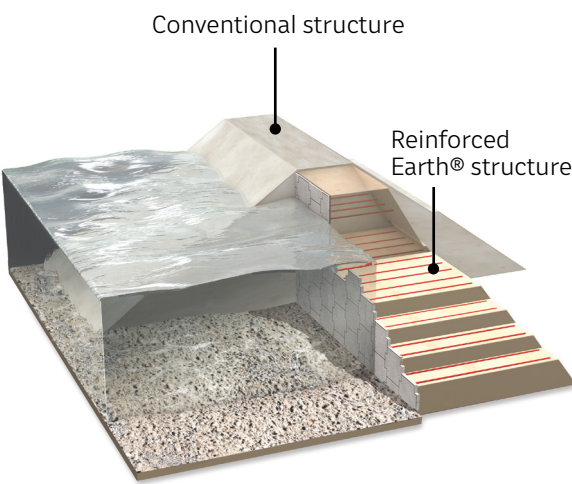
Manapouri second tailrace tunnel - New Zealand

Reservoirs

Demonstrating its versatility, the Reinforced Earth® technique has been used for the construction of reservoirs for potable water. Concrete segmental panels were combined with a UV resistant lining to provide water tightness. The GeoMega® system associating fully synthetic connections and reinforcements is well adapted to such structures, especially when chemically aggressive materials are sourced for the backfill. Enhanced durable water tightness can be obtained by fitting a waterproofing membrane on the GeoMega® sleeves at the back of the concrete facing.



Trekkopje reservoir - Namibia



Low impact water retaining structure

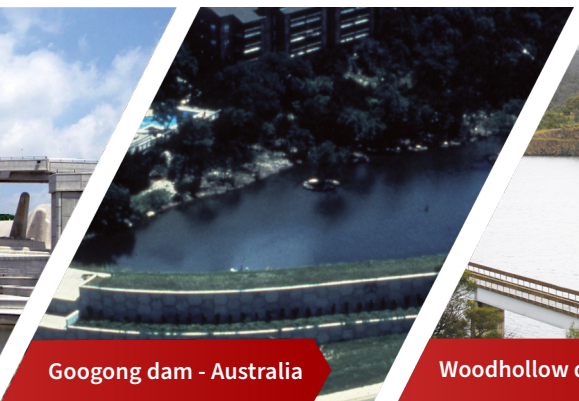
The Reinforced Earth® technique allows to **drastically reduce the quantity of backfilling materials** when compared to traditional sloped earth embankments. Combined with the use of water tightness systems, this makes the Reinforced Earth® method a technically and economically sound solution for water retaining structures such as dams, reservoirs and dykes. In addition vertical or sub vertical facings allow to **reduce the wave run up, damage to lining and evaporation.**

Raising of earth dams

The Reinforced Earth® technique can also be used to form a double-faced structure allowing to raise the height of an existing earth dam and thus to **increase the spillway capacity and eventually the holding capacity** of the reservoir it impounds. In addition to its cost efficiency, the uniform distribution of the loads throughout the Reinforced Earth® mass and the ability to **increase the stability of existing embankments** make the method well suited for construction on top of earthfill dams.



Kromellenboog dam
- South Africa



Googong dam - Australia



Woodhollow dam - Texas, USA



Lake Lenexa Dam - Kansas, USA

Blending into the local environment

The Reinforced Earth® method is well known to combine strong technical and operational benefits with aesthetic properties while providing substantial cost savings. When architectural considerations are an issue for the construction of dams in sensitive environments, **the Reinforced Earth® solution can provide the right answer to the requirements of the owner and local community.**

Reinforced Earth® applications for dams and reservoirs

- Economy of materials
- Compatibility with external and internal waterproofing geomembranes
- Structural flexibility on moderately compact or heterogeneous foundation soils
- Exceptional response to seismic events
- Lower land use and site impact during construction
- Lower CO2 impact than conventional techniques
- Use of natural or recycled materials
- Suitability of reinforcing materials to environmental and site conditions
- Durability
- Ease of inspection, maintenance and upgrading



The Reinforced Earth®, the value of experience

When it was invented 60 years ago, nobody could foresee the great success of the Reinforced Earth® technique. It is now recognized as a major innovation in the field of civil engineering. The Reinforced Earth® method has widened its scope of applications to beyond just roads in the last 50 years, demonstrating its advantages in other markets.

Choosing a Reinforced Earth® solution allows owners and engineers to benefit from:

- The longest experience in the field of mechanically stabilized earth structures
- A global network of innovative companies deeply rooted in their markets
- Tailored engineered solutions adapted to complex situations
- The widest range of reliable and sustainable materials
- A complete independence from manufacturers of reinforcing materials



About Us



1968

established since



293 M€

2023 revenue



80

countries



70 million

m² of Reinforced
Earth® walls



+100.000

structures around
the world



102,8 m

tallest structure

As global specialist we operate as **designer** and **supplier** of civil engineering solutions that **Retain, Cross, Protect and Strengthen**. As the **inventor of the Reinforced Earth® solution**, our strength is the result of an **unrivalled combination of expertise with over 60 years of experience** in the fields of **soil-structure interaction** and **engineered backfills**.

Geoquest delivers **its leading technologies** to serve clients' projects, from the simplest to the most extraordinary. Guided by our focus on **innovation** and our **culture of excellence in client care**, we offer **durable solutions**. We build on our **global expertise**, which is applied by our **local companies** to develop new applications to address challenges and ensure sustainability of our solutions.

Watch our Retain, Cross,
Protect, Strengthen
video.



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**Engineering expertise, innovation
and excellence in client care to
deliver sustainable solutions.**



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