a TREVIGroup Company

TREVI

World class geotechnical & foundation contractor

Trevi

History, know-how and innovation
... that lead to great project experiences

Trevi is a company specialised in the field of special foundation and soil consolidation works and is part of the Trevi Group, a worldwide leader in underground engineering and in the design and manufacturing of specialised rigs and equipment for this industry.

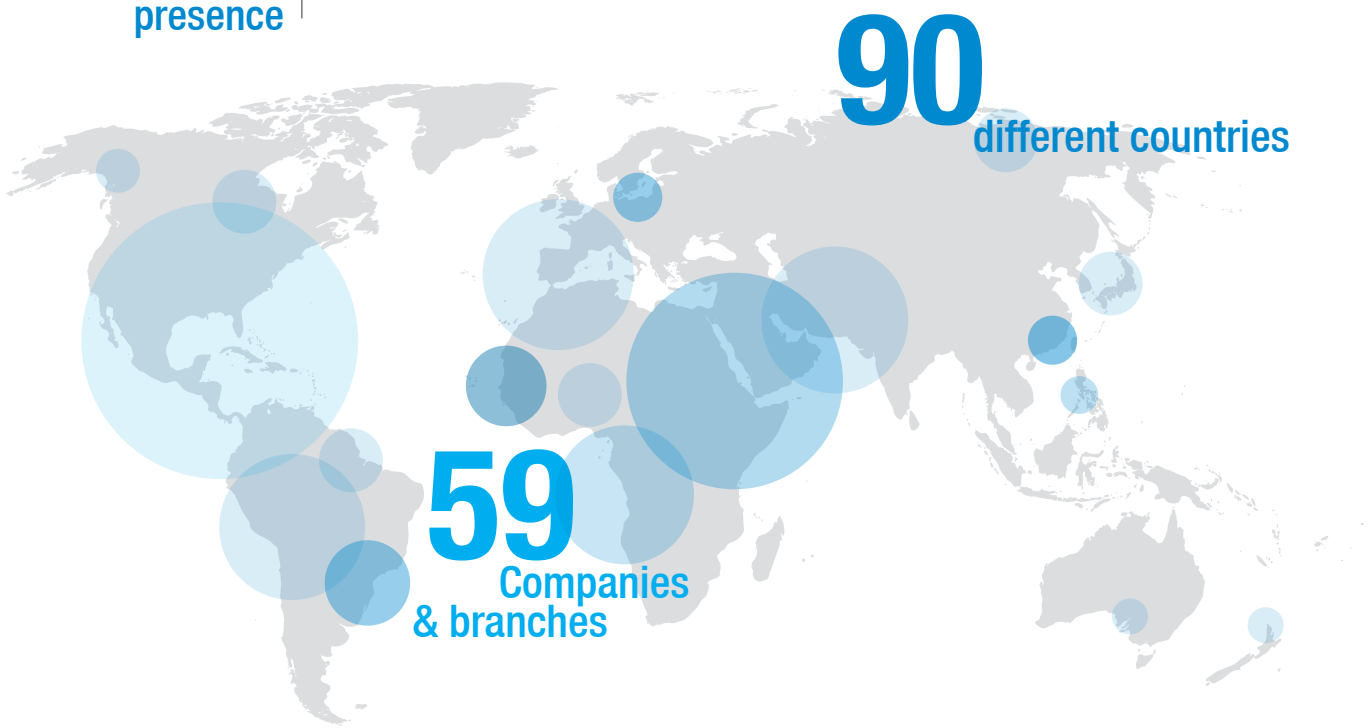
The company was founded in Cesena in 1957 and, over time, achieved a remarkable specialisation in the field of underground engineering, building a leadership acknowledged worldwide in the execution of various types of intervention and strengthening its ability to solve any issues linked to soil engineering. Trevi Group's competence found and still finds a never-ending application in each corner of the world, both at sea and on land. **Trevi operates in over 40 countries with many direct branches.**

For 60 years, Trevi has played the role of leading company in the field of underground engineering at a global level, executing special foundations and soil consolidation works for major infrastructural interventions (**undergrounds, dams, ports and docks, bridges, railway lines and highways, industrial and civil buildings**) and environmental protection (**remediation of polluted sites and soil treatment**).

Trevi is devoted to innovation and works tirelessly to come up with solutions to the complex problems that civil engineering is called to deal with all over the world. The experimentation of leading-edge technologies along with entrepreneurial tradition and willingness **to invest in research and human resources are its strengths**.

Trevi executed foundation works for some of the major projects in the world: in the field of foundations (**Ground Zero** in **New York, One Mall Project and Palm Jumeirah** in **Dubai,** the **Vasco Da Gama Bridge** in **Lisbon**), in the excavation of tunnels (**new metro lines** of **Copenhagen, Rome** and **Riyadh**), in the soil consolidation (**LPV-111 levee** in **New Orleans**), in major restorations (consolidation of the Leaning **Tower of Pisa** and of the **Buddhas of Bamiyan** niches), in dam restorations (such as the **Wolf Creek Dam** in the **USA**, the **Mosul Dam** in **Iraq** and the **Ertan Dam** in **China**), in special projects (recovery of the **Costa Concordia** in **Italy**, safety intervention for the **Lungarno Torrigiani** in **Florence**) and in reclamation of polluted sites (**Manfredonia Landfill** in **Italy**).

A global presence



Anniversary of excellence

Over the last 67 years, foundation engineering has had **one main leader at worldwide level: the Trevi Group.**

The Group, which has been listed on the Milan Stock Exchange since 1999 (Trevi-Finanziaria Industriale Spa), has always based its growth on the integration and the continuous exchange between technological and process innovation among its divisions: **Trevi, which is specialised in special foundations and soil consolidation works for major infrastructures** and **Soilmec that designs, produces and sells rigs, plants and services for the underground engineering.**

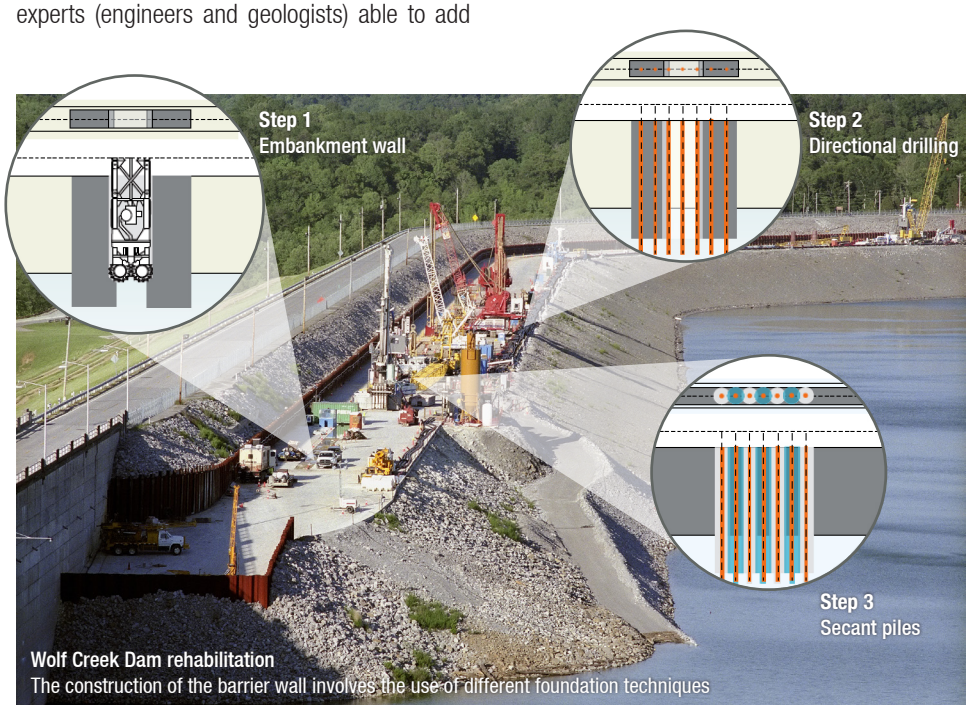
This innovative approach allowed to develop cutting-edge technologies, able to meet the most complex requirements of soil engineering.

Design, Research and Development Department

Since its establishment, the TREVI Group has capitalized on its experience through the organisation of a technical office that has been initially responsible for **contract design aspects** and that, subsequently, has expanded its competences to the technological aspects of the projects.

As of today, the Design, Research and Development Dept. (DRD) of TREVI includes experts (engineers and geologists) able to add value to any project by conceiving the most efficient solution from a technical, design and economic point of view.

TREVI embodies the capacity to find innovative solutions, as evidenced by the following examples: Wolf Creek Dam (USA), Arapuni Dam (New Zealand), W.F. George Dam (USA), Stans (Austria), Paso de las Piedras (Argentina), Ponte Vasco da Gama (Portugal), East Bathtub (Twin Towers, NY), Buddha Bamiyan (Afghanistan), Mosul Dam (Iraq), Bibliotheca Alexandrina (Egypt), etc.



Wolf Creek Dam rehabilitation
The construction of the barrier wall involves the use of different foundation techniques

Environment and Sustainability

The Trevi Group operates with and for the environment, in harmony with people and in alignment with diverse cultures, pursuing sustainable development. Since its foundation in 1957, Trevi has upheld a tradition that **places individuals and their work at the core of its mission.**

An integrated culture of quality, safety, and environmental responsibility has always been a hallmark of Trevi our calling card in both national and international markets.

Since 1995, the company has obtained certifications that officially attest to the compliance of its Quality, Environmental, and Safety Management System with European standards **UNI-EN ISO 9001, 14001, and 45001.**

Our expertise

DAMS

With more than **170 projects** to its credit, Trevi is a **worldwide leader in the field of dams.**

The company has been actively involved in the construction of new dams or in the repair of existing ones presenting seepage problems, thus tackling major engineering, Geological and geotechnical issues requiring special attention, especially with respect to water-tightness of the dam body and foundations. Special technologies and systems have been designed, tested and used to set up watertight barriers, along with soil treatment in order to drastically reduce seeapage.

Among the most recent projects, we mention the **Mosul Dam in Iraq**, which received the **DFI Outstanding Project Award in 2022.**

MARINE WORKS

TREVI boasts a wide experience acquired in the execution of important and complex marine projects and works in every corner of the world.

The Company can provide comprehensive solutions including special foundation works and shore protection, off-shore excavations and dredging, reinforced concrete civil and structural works, paving, viaducts, electrical and hydraulic systems. Trevi's projects are designed and executed using state-of-the-art technologies and equipment, ensuring environment protection and complying with the requirements set by local port authorities.

INDUSTRIAL AND CIVIL BUILDINGS

The execution of foundation and consolidation works in confined urban areas where buildings and pre-existing services are very close to each other require dedicated technologies and equipment: **work execution must be perfect in terms of quality and time, minimizing construction impact** (low vibrations, noise, emissions, waste to be disposed, etc.)

Thanks to the experience gained on world-class foundation projects - from the **new Library of Alexandria in Egypt** to the **World Trade Center in New York** and the **Frankfurt Four in Frankfurt** - Trevi aims to make its international expertise available also for small and medium-sized projects

Building a **37 km-long causeway across** the Bay of Kuwait, linking the Port of Shuwaikh with the town of Subiya.

GROUND AND UNDERGROUND TRANSPORTATION

Undergrounds, high-speed railway lines, motorways, ship canals.... all these infrastructures require a significant underground intervention, a paramount activity to ensure the success of the project.

Very often, this kind of projects requires a dedicated solution due to the geology of the soil and the context in which the project is developed.

Trevi gained a considerable experience in this sector as evidenced by the more than **50 subway projects carried out in every part of the world.**

ENVIRONMENT

Over the past 30 years, Trevi has acquired a remarkable experience in remediation interventions for contaminated sites, thanks to the works carried out in Italy and abroad. Today, Trevi is acknowledged as a technological partner able to provide significant added value during the design phase and as a problem solver during the execution of the works.

By using well-established technologies and with the support of both the Design, Research and Development Dept., Trevi can offer a wide range of solutions such as **the confinement of contaminated areas, the management of building materials aimed at maximising the recovery of resources and the treatment of contaminated soil and sediments by means of on-site technologies** (Soil & Sediment Washing).

SPECIAL PROJECTS

Some unique projects require a specific competence: a combination of expertise, analytical capacity and ability to go beyond already known solutions.

This is the case of the consolidation of the **Leaning Tower of Pisa**, the removal of the **Costa Concordia wreck**, the stabilization of the **Buddha niches in Bamiyan**, the restoration of the **Lungarno in Florence**, and the securing of the **Garisenda Tower in Bologna** - unique projects that required in-depth study and customized solutions.

Capabilities that Trevi has successfully deployed with outstanding results

Services

RETENTION SYSTEMS

Deep excavations are usually supported by diaphragm or secant pile walls.

The diaphragm walls can be executed by means of buckets (hydraulic or mechanic) or hydromills. The excavation must be supported by an appropriate stabilising mud (bentonite or polymer).

An advantageous alternative technique is the CSP (Cased Secant Piles) allowing the execution of piles without drilling mud. This option offers organisational advantages for the site.
Once the wall is completed, anchors or internal bracing are installed to limit the wall deformation during the excavation phases.

FOUNDATION ELEMENTS

Deep foundations are LBEs (Load Bearing Elements) made of concrete (with or without reinforcement) capable of transferring loads through weak and compressible soil to the underlying soil or rock.

LBEs, such as circular piles and rectangular elements, are generally excavated using a fluid (bentonite or polymer) for the support of the excavation. A temporary or permanent steel casing can be used for the drilling of piles in unstable soil.
Alternatively, CFA piles (Continuous Flight Auger) can be installed, thus eliminating the need for static fluid and minimizing, in turn, the impact of site installation and the volume of slurry waste to be managed.

Trevi offers a wide range of hydraulic drilling rigs through which it is possible to execute cased and non-cased piles with diameters up to 1200 mm and to a maximum depth of 36 m.

SOIL IMPROVEMENT

When soil properties do not meat the project requirements, it is necessary to resort to soil improvement techniques.

Soil properties can be modified by densification or strengthening process, or by installing inclusions. The most suitable solution is generally based on the specific site aspects (logistics, schedule and applied loads).

Thanks to its sixty-year's experience in the field, Trevi has been able to develop, test and offer a very wide range of soil improvement techniques.

Environmental recovery, dry dock, Palermo - Italy

Chacao bridge foundation works - Chile

Tower of Pisa foundation remediation - Italy

WATER CUT-OFF BARRIER

The execution of water cut-off barriers is essential to allow the excavation of underground structures below the groundwater table, or to minimize the flow of water underneath dams and levee.

If the project requires the installation of a continuous, vertical and watertight barrier, the use of diaphragms filled with plastic concrete is preferred. These have been extensively applied for cut-off walls dams, both under new structures and as a way to repair the existing ones.

Secant piles can be used for the same purpose, applied mainly in those situations where the specific conditions of the project make it difficult to build a diaphragm wall using panels.

Horizontal waterproof bottom plugs can be installed using soil improvement techniques such as grouting, jet grouting or soil mixing.

NEOM"The Line" project - Saudi Arabia

South Station, Boston, MA - USA

Securing of the Mosul dam - Iraq

4 Frankfurt Project - Germany

Technologies

- Driven Piles
- CFA Piles
- CAP/CSP Piles
- Bored Piles
- Displacement Piles
- Diaphragm Walls - Hydromill
- Plastic Diaphragms Walls
- Micropile Walls
- Directional Drilling
- Tie Rods
- Compaction Grouting
- Dynamic Compaction
- Artificial Ground Freezing
- Sand and Wick Drains
- Dynamic Replacement
- Rigid Inclusions
- Cement and Chemical Grouting
- Jet Grouting
- Sheet Pile and Combi Walls
- Deep Soil Mixing
- Vibro Compaction
- Vibro Replacement

Wreck removal 'Costa Concordia' - Italy

North East Link - Australia

www.trevispa.com

Communication & Sustainability Dept. | Trevi Group
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