Gabion earth retaining structures

Technical manuals define a retaining structure as any structure capable of resisting an applied soil pressure. Retaining walls are permanent structures typically constructed at the toe of a slope or to retain backfill. The planning and implementation of these structures must take careful account of several structural and functional considerations:

- Geomorphological conditions
- Analysis of the static and dynamic (seismic) forces present
- Presence of phreatic surfaces
- Costs of the completed structure

"Functionality" must include not only the overall environmental impact of the structure, but also the various local environmental mitigations and improvements that the entire road works should provide. The variety of gabion applications, combined with the testimonial of existing gabion structures built since 1894, represents the reliability and reassurance that Maccaferri offers its clients. Over time, design standards and approaches have changed. What has not altered is the ability of Maccaferri gabions to perform as designed; fundamentally the structural stability and integrity, but in addition the capability to establish vegetation on the external facing.

The key to the longevity of these structures is obviously based upon the quality of the steel wire, but mainly due to the original idea of gabions. To combine the passive function (soil retention) with the active function (the creation of a new local environmental equilibrium).

Gabion structures were, perhaps unconsciously in the beginning, the first historical examples of "environmental insertion" of an artificial structure.
Advantages and characteristics

- Robust
- Flexible
- Permeable
- Durable
- Versatile
- Good environmental and aesthetic impact

The assembly and installation of gabions is extremely simple in any environment without the aid of specialised equipment or personnel. A structure with outstanding characteristics is the result.
Reinforced structures

Gabion structures are capable of resisting any type of stress, in particular bending, tensile and shear.
Flexible structures

Gabion structures are capable of accommodating large differential settlements and unpredictable loads. These characteristics do not reduce the structural integrity, but improve it by promoting the interaction of the entire structure.
Permeable structures

The drainage capability of gabions is created by the voids in the gabion stone fill, which collect and transport water away from the structure, eliminating one of the main causes of soil instability: water logged backfills and/or foundation. Also, without formal drainage, the total cost for the structure is reduced.
Structure with long durability

The durability of the structure is dependent upon:
- Good natural integration with the backfill and retained slope
- Advanced technical characteristics of the steel wire and its Galfan (Zn-5% Al-MM) coating with an optional polymeric sheathing, all in accordance with the most stringent international Standards
- The use of hexagonal woven double twisted wire mesh which avoids any unravelling or unzipping of the mesh

These characteristics optimise the longevity of the structure, which has been certified by independent international bodies to offer a design life of over 60 years.
Versatile structures

- Ease of installation in any environment, without the aid of specialised equipment or personnel, reducing costs
- Future modification of the structure is straightforward; e.g. new layers can be installed to increase the height of the structure, (provided structural stability is verified)
- Immediate performance following installation
- Ease of maintenance

These benefits allow Maccaferri gabions to be used for most retaining structures alongside roads, railways and buildings where reliability and safety is paramount.
Good environmental and aesthetic impact

The opportunity to combine live plants with a high sound absorption capability, make gabion structures ideal solutions to balance engineering and environmental needs in the construction of roads and railways. The structural flexibility of Maccaferri gabions allows several interesting architectural possibilities for residential and commercial areas.
Design software

Laboratory and full scale tests carried out in partnership with the University of Bologna, have proved and calibrated the stability analyses of the Maccaferri Gawac design software. The software takes into consideration geometry, loads and other factors associated with the design of Maccaferri gabion structures in a wide variety of conditions. Gawac graphically displays cross sections of the structure, the retained material, foundation, phreatic surfaces and external loads.
Officine Maccaferri Group Profile

Founded in 1879, Officine Maccaferri was soon to become a reference worldwide in the design and development of advanced solutions for erosion control and reinforcement structures. Over time, however, the company has innovated and evolved so that today it is also a reliable partner for complex civil and environmental engineering applications.

This aptitude for technological innovation is the result of continuous dedication, which, alongside experience and technical know-how, has enabled the Maccaferri Group to leverage high levels of efficiency. Concepts transformed into versatile solutions meet our customers specific requirements, whilst maintaining a sustainable environmental balance.

Consultancy and partnership

Maccaferri does not just offer its customers simple collaboration but a real partnership which goes beyond merely supplying products. Maccaferri is a partner that works alongside its customers from the very start. It is a reliable partner thanks to its extensive portfolio of top quality products. As well as versatile solutions that can be adapted to local situations, it makes its technical know-how available to create a virtual circle in which each factor (products, experience and innovative practice) is improved by each activity.

Maccaferri tackles every project with the aim of identifying, dealing with and resolving each customer’s actual needs, and the results of this attitude produce benefits which can be appreciated over time.

Organizational Structure

Maccaferri researches, designs and develops solutions for the construction, erosion protection and soil stabilisation sectors in over 100 countries across the world. The organizational structure has been designed to be global and local at the same time. It is made up of subsidiary companies which make Maccaferri’s products and design and offer the company’s solutions throughout the world.

This ensures greater flexibility, a widespread presence and a better awareness of continued market development. Maccaferri’s presence throughout the world allows the company to deal with problems which results in new know-how that, in turn, feeds into further innovation for other solutions offered on the market.

As well as the parent company in Italy and subsidiaries in France, Britain, Russia, Spain and Portugal, the company is also active in all five continents, with 40 operating companies. Where there is no internal sales force, there are distributors in all the continents so that all markets are monitored indirectly.