The ground improvement specialist
Ground improvement specialist

Menard is a specialist contractor for geotechnical and environmental engineering activities operating throughout Middle East and Central Asia, with a reputation for quality, innovation and engineered solutions.

Our expertise in ground improvement, specialist foundations and environmental remediation has facilitated the delivery of cost effective solutions for the construction of a large range of structures.

Our services

Ground improvement can be described as range of activities which aim to enhance the existing properties of soils and provide good geotechnical solutions for situations where shallow foundation are insufficient, but piling is not sustainable.

With an emphasis on value added design and innovation, Menard can bring its extensive experience to projects in the planning and design development phase to provide optimal geotechnical solutions. Our in house testing and design capabilities underpin our strength in undertaking contracts in both subcontractor and main contractor capacities at the highest level of technical excellence.

Local expertise supported by a global network

Menard Vibro is the subsidiary of Menard Group with headquarter in Paris and part of Soletanche Freyssinet Group, who are world leaders in geotechnical, environmental and civil engineering construction. With permanent bases in more than 25 countries and operating worldwide, Menard provides local service backed by Group expertise and resources, being comprised of individual companies that are all pacesetters in their own fields.

A successful 45 years history in Middle East

Our first operations in the region can be traced back to the 1970’s and since that date, the company kept growing and conquering the local market. Amongst the most recent significant projects completed are the world’s largest dynamic compaction project in Kuwait New Cities, and ground improvement works on the well known Dubai coastline developments, including Dubai Palm to name but a few.
Our broad range of techniques – many developed by Menard – combined with our 45 years of experience in the region, make us a strong and reliable partner. It guarantees that our teams will determine the best suited solution to handle your ground engineering challenges.

Techniques
Dynamic compaction

Dynamic Compaction and Rapid Impact Compaction are ground improvement techniques using energy input to densify loose, coarse soils. Dynamic Compaction - technique invented and developed by Louis Menard - employs steel weights, known as pounders, weighing 15 to 40 tons released in free fall from a height up to 30m. Shock waves generated by the fall have a compacting effect on the underlying soils. Rapid Impact Compaction is a shallow ground densification method. It uses energy waves generated by a hydraulic hammer weighing 7-12 tons that rapidly and repeatedly impacts the ground at 40 or more blows per minute. Both techniques are particularly well-adapted for non-organic heterogeneous fill, made ground and reclamation areas with variable characteristics, even with the presence of large blocks.

Vibrocompaction

Vibrocompaction is a process for the compaction of deep, loose non-cohesive soil layers, through the use of a vibratory poker. It is used to improve the mechanical properties and settlement characteristics of the soil. It consists of transmitting vibrations (horizontal oscillations) into the soil to cause the reorientation of soil particles into a more compact state. The poker method we use demonstrates higher levels of compaction achieved than the mandrel method (vertical oscillations).

Vertical drains

Vertical drains also known as wick drains are used to accelerate the consolidation of soft, impervious, fine soils and for most of our applications, they are combined with surcharge loading. Vertical drains are made of a band-shaped plastic core wrapped in a geotextile fabric – installed by both static or vibratory methods into compressible saturated silts and clays on a triangular or rectangular grid spacing – to penetrate stiff surface layers, preaugering or predrilling can be used.

Menard Vacuum™

Menard Vacuum™ is a proprietary system that uses the atmospheric pressure to preload and rapidly consolidate soft saturated fine-grained soils. A network of vertical and horizontal vacuum transmission pipes are installed under an airtight membrane. The air below the membrane is evacuated producing a vacuum under the membrane and a pressure on the soils equivalent to 14ft of fill material. Main advantage of this method is the fact that it eliminates the risk of failure under additional loading of permanent construction, which leads to significant time savings. In addition the system itself generates the load equivalent to 4-5m of fill material, which allows budgetary optimizations.
Stone columns

Stone columns are semi-rigid inclusions, used to improve the engineering characteristics of loose granular soils or soft cohesive soils. The columns are formed by the introduction of a vibrating poker into the ground; this poker is used to create the void in the ground into which stone backfill is introduced. Stone columns provide an economical method of ground improvement and act as reinforcement to the soils into which they are installed, using either the wet top feed method or the dry bottom feed method.

Controlled Modulus Columns

The Controlled Modulus Column (CMC), developed by Menard, is the environment-friendly column for the 21st century. It consists in reinforcing the soil, effectively increasing the global soil modulus through installation of a network of rigid inclusions. CMCs are formed by rotary techniques using an auger designed to displace the soil laterally during installation. This system is well suited to high surface loading conditions and strict settlement criteria in such applications as heavily loaded slab-on-grade and bridge approach embankments, over compressible clays, fills or organic soils. CMC is a cost-effective method of improving the shear strength and moduli of the in-situ soils and requires no spoil disposal, which is particularly beneficial for installation in contaminated soils.

Soil mixing

Soil mixing uses a wide range of techniques to inject binder agents to mix with the soil and form columns, for example, to reinforce the ground for subsequent construction. The type and amount of binder will determine the hydraulic and mechanic characteristics of the soil. Soil mixing generally comprises three stages: premixing of the soil, injection of the binding agent and incorporation of the soil/binder mix. The technique produces no, or very little, spoil. The structures produced by soil mixing can be columns, or also panels or continuous structures, such as trenches.
Menard has a long track record of providing solutions for small to large infrastructure, for private and public stakeholders throughout the Middle East. Our experience and wide range of techniques allow us to work across varied applications.

- Oil & Gas and heavy industry
- Transport and communications routes
- Residential developments and commercial buildings
- Ports and coastal infrastructure
- Dam engineering
- Environmental remediation

Applications

Vibrocompaction
La Mer project - Dubai, UAE
Oil & Gas developments, power and desalination plants in addition to the heavy industrial developments are commonly known as the most challenging projects due to their high complexity, very short periods allowed for construction, their structural aspects and the size of the developments. While very often developed in remote areas and on territories featuring difficult ground conditions, such projects require intensive foundation works to accommodate stringent requirements in terms of performance and planning.

Menard has extensive experience with ground improvement applications for storage tanks, LNG tanks, refineries, pipelines, desalination and wastewater plants, mining and heavy industrial developments.

Transport infrastructure is often confronted with the problem of building over soft, compressible soils such as wetlands or alluvial flood plains. Treatment of the soil to contain settlement and eliminate the risk of failure is unavoidable. Menard’s ground improvement techniques offer a variety of cost-effective solutions to address these problems. Soil type and the depth of treatment required shall be considered when selecting the ground improvement methods. Whatever solution is chosen, the object remains to minimise long term creep settlement and improve the shear strength of the soil. Access embankments to bridge structures often generate the most critical demand for soil treatment. The improved soil will increase and preserve the service life of the road pavement, thus reducing life-cycle costs for the roadways and structures.

Commercial and residential building construction projects are driven by a financial model that requires a high-quality product for the client, under the umbrella of very tough cost constraints. It is imperative that well performing, warranted and cost-conscious solutions are used in these projects. Often the least cost available ground includes a component of poor soil. Most warehouses and industrial buildings situated on sites with poor soil have been constructed using piles and reinforced concrete floors that span to the piles. Menard ground improvement solutions are routinely employed to allow construction of economical slab-on-grade floor systems, resulting in benefits of economy, system performance and environmental advantages.

Menard creative and economical ground improvement solutions have been implemented numerous times to help developers create a project that meets the required constraints.
Design criteria for dams are constantly evolving, generating the need in the design of new dams for the adoption of upgraded parameters and in the maintenance or extensions of existing dams, additional works to ensure compliance with changing standards. The principal areas in which Menard can assist with these matters are in the treatment of the dam foundation rock to eliminate seepage and erosion, the improvement of safety margin against failure by the use of high capacity vertical rock anchors, upgrading or replacement of the dam core, installation of cut-off walls and drains as well as spillway and slab anchors often combined with monitoring of dam performance.

Environmental remediation

Menard offers a range of environmental remediation solutions to treat in-situ the source of contamination. Techniques such as soil mixing, pump and treat and jet grouting can be offered. Trench support by polymer is also used when permeable backfills are required in order to create collector drains or reactive barriers. In addition, Menard offers a full range of contamination containment solutions involving cut-off walls, permeable reactive barriers, funnel and gate. These techniques can either completely cut-off contaminated ground water flows or facilitate passive treatment whilst providing means to perform long term monitoring and management of contaminated sites.

Quays, jetties... infrastructure built on the coast often require complex geotechnical works. Permanent prestressed anchors, caissons lying on underwater stone columns, jet grouting stabilisation... all of these techniques are in Menard’s range of expertise. Reclamation and seabed improvement projects at ports generally involve vast areas of land, either reclaimed or natural deposits. Treatment objectives can range from retention systems, settlement control and increased bearing capacity, to liquefaction prevention against seismic events. Often reclaimed land lies over wetlands which are recovered using dredged or imported fill materials. The resulting areas of reclaimed land frequently present challenges to the designer to identify economical means of improving such large areas of land. The designer’s primary objective is to induce a soil treatment which stabilises the fill for short-term and long-term performance in the most cost-effective manner. Menard provides the methods combined with experience to address this objective. Marine ground improvement works are often complex, but provide a cost-effective way to maintain a port’s activity at full capacity. Menard’s years of experience, range of activities and ownership of equipment in-house, enables the Group to provide solutions to many problems associated with long-term settlement, erosion and corrosion of retaining structures that are present in existing port and jetty facilities. Global warming and associated rise in sea level create an ever increasing requirement for coastal and offshore infrastructure maintenance.

References

Ports and coastal infrastructure

Turkmenbashi Port – Turkmenistan
Satah Al-Razboot artificial islands – Abu Dhabi, UAE
Palm Jebel Ali – Dubai, UAE

Environmental remediation

Menard Applications

Ports and coastal infrastructure

Menard Applications
Management systems
Health and safety

Safety is our top priority and Menard commits to perform in accordance with not only regulatory requirements but the guidelines of Occupational Health & Safety Management Systems (OHSMS). Its commitment to align to the standard’s guidelines through the development of the OHSMS is the client’s assurance of Menard’s engagement to provide for the safety and health of all, at workplaces under the company’s control or those affected by its operations including: employees, contractors, visitors and the public.

Menard commits to compliance with statutory regulations which apply to each workplace, wherever situated, as a minimum requirement and exceed those requirements, where considered necessary for protection against injury, ill health and property damage. The company acknowledges and exercises a duty of care to all employees while carrying out their work, consistent with current practice and accepted community standards. This duty extends to rehabilitation of accidentally injured persons in other company’s employees.

Quality Management Systems

Menard works are accredited under ISO 9001:2015. The company recognises that in order to meet its customers’ needs as the organisation’s goals, it must have competent, able staff who fully achieve specified requirements and meet contractual obligations before seeking customer approval and acceptance. The QMS also enables Menard to maintain effective control of the quality of all supplies, provide testing facilities, and perform all reviews and examinations necessary to demonstrate compliance of the supplies with the contract specification requirements. This is achieved and assured to clients by the required third party audits, conducted regularly to ensure the system’s approach of review and improvement is carried through and reviewed by management.

Environment

Environmental sensitivity and care through the company’s Environmental Management System (EMS) has also added to the QMS and OHSMS that Menard is committed to observing. Menard supports the principles of sustainable development and ensures all its employees comply, not only, with statutory requirements but to be environmentally responsible. ISO 14001:2004 Environmental Management Systems is the benchmark for the development and future accreditation plan to complete the Business Management Strategy for ongoing development. The EMS ensures Menard recognises that its commitment extends to the protection, care and responsibility for the environment including in particular the environmental impact outbound and inbound to sites, together with the implications of responsibility to the workforce under company control.

Innovation

Innovation is a key focus for Menard’s activity which benefits from the expertise of the group’s R&D teams. Working on the most demanding projects, engineers, technicians and operators concentrate on satisfying the client by bringing state-of-art technologies to construction, repair and services. Employing new processes, equipment and technologies to adapt to the constantly changing configurations and constraints of the thousands of projects carried out every year; the R&D teams generate a continuous flow of innovations.

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