menard

Meet Menard Oceania

Your local specialist in foundation solutions based on ground improvement and reinforcement technologies

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About Us

We improve unstable or compressible soft soils to provide solid foundations and ensure the success of your project.

What do we do?

Menard is a specialist contractor for geotechnical and civil engineering activities operating throughout Australasia and the South Pacific region.

Our expertise in ground improvement, specialised foundations, all methods of grouting and environmental remediation has facilitated the delivery of cost-effective solutions for the construction of a wide range of projects.

How do we do it?

Our in-house design capabilities underpin our strength in undertaking contracts in both subcontractor and main contractor capacities at the highest level of technical excellence. As the only dedicated ground improvement contractor in Oceania, we have established ourselves as industry leaders in both design and construction by pioneering techniques needed to get your job done ahead of schedule and budget.

Our first projects in the region can be traced back to the 1970s. Since then, we have delivered some of the largest ground improvement projects within both public and private sectors in Oceania such as NSW Pacific Highway Upgrade, Brisbane International Cruise Terminal, Parakariore Sports and Recreation Centre in Christchurch, Melbourne Metro, Sydney Gateway and Perth Optus Stadium.

With more than 50 years of local experience, we are familiar with both the Australian and New Zealand incredible geotechnical diversity, the many challenges they bring as well as local codes and design guidelines.

*"Excellent **Design** and **Construct** services, great **working relationship** during tender, design and delivery. A great plus was the **confidence and knowledge** demonstrated by the design team during complex stakeholder geotechnical discussions to design and deliver a ground improvement system in challenging geotechnical conditions. They always exceeded our expectations and provided expertise with a professional approach."*

Tim Perry | Project Manager | Brookfield Multiplex | **Perth Optus Stadium** |

Who are we?

Menard is a *family feel* company with 1,900 employees in more than 80 countries.

We have a local approach supported by our global network.

We are the Oceania subsidiary of Menard and part of Soletanche Freyssinet group, which is world leader in geotechnical, structural and nuclear engineering.

Every year, Menard works on over 4,000 projects worldwide. From improving the ground that will stabilise the foundations of wind turbines in Tasmania to the Spaceport in Kourou for the Ariane 5 rockets. We are focused on optimising the ground to support your projects.

With offices in Sydney, Brisbane, Melbourne, Adelaide and Perth, we cover every Australian state plus Papua New Guinea. Our office in Auckland also manages our local New Zealand projects.

We have worked on some of Oceania's most technically challenging construction sites. This includes everything from major sporting stadiums to wind turbines, tank farms, industrial and residential builds and large-scale infrastructure projects including bridges, highways and rail links connecting Australia.

"At Menard, we are working every day to provide the people of Oceania with a solid foundation for their infrastructure, industrial facilities and their homes. We pride ourselves in building tomorrow's world on solid ground.

Our team is passionate and has years of local experience in Oceania. You can rely on our expertise to deliver your project on time and budget."

Philippe Vincent, Managing Director

Our Values

#1 HOME SAFE

At Menard we always strive to be the contractor of choice that clients can trust on and off site. We pride ourselves on being quality driven, and our clients can always bank on the strength of our foundations. However, it is health and safety that forms our first and foremost priority.

"Safety is not just our first priority. Safety is not just the most important moral obligation to ourselves, peers, colleagues and industry partners. Safety is simply the way we do things. It's a mindset to be adopted that enables us to plan, encourages us to communicate and empowers us to act for the health and well-being of all. So, all of us make it home safely every day."
Olaf Duwer | QSE Manager

Our Health and Safety Performance:

Consistently outperforming the Australian Piling Specialists Federation in incident frequency rates.

Lost Time Injury free in 2022. Total recordable injury frequency rate= 0 in 2022.

#2 LESS IS MORE MENARD

We live in a world where resources are becoming increasingly scarce, so we develop optimal solutions using the **least amount** of material possible with a view to improving the sustainability of your projects.

The Less is More Menard attitude relies on several simple principles:

- less quantities through better designs, better operation, better organisation
- less 'big toys' but instead ones that are adapted to the task
- less carbon-emitting resources when replacements are available through the supply chain.

The group has set the goal to reduce our Scope 1[1] & 2[2] emissions by 40% and our Scope 3[3] emissions by 20% before the end of 2030.

The Environmental Management System (EMS) ensures Menard recognises that its commitment extends to the protection, care and responsibility for the environment. This includes the environmental impact, together with the implications of responsibility to the workforce under the company control.

#3 INNOVATION IN OUR BLOOD

In 1954, Louis Ménard, a young French civil engineering student, invented a device to measure the soil's stress - deformation relationship at various depths in a borehole. The **pressuremeter** was a drastic innovation in the geotechnical industry that continues to inspire the Menard spirit to this day!

Since then the group has invented and developed the **Dynamic Compaction** technique for granular soils as well as the **Menard Vaccum™** for cohesive soils and the **Controlled Modulus Columns (CMC)** technology for high-level control of ground deformations accommodating higher loads.

Working on the most demanding projects, our engineers, technicians and operators concentrate on bringing value to our clients by keeping up to date with the **latest state-of-the-art technologies**.

Performing thousands of successful projects each year provides a constant flow of information to support our local and group R&D teams in generating a **continuous flow of innovations**.

(1) Scope 1 (direct emissions): Greenhouse gas emissions directly produced by Group operations, in particular from fossil fuels used by vehicles, equipment and generators owned or controlled by the Group. — **(2) Scope 2 (direct emissions)**: Emissions from the generation of energy purchased by the Group. — **(3) Scope 3 (indirect emissions)**: Downstream activities.

Major Projects

Port Botany, Sydney, New South Wales

Technique
Dynamic compaction and Vibrocompaction

Industry
Ports

Wheatstone LNG, Onslow, WA

Technique
Stone columns

Industry
Marine structures

Brisbane Airport, QLD

Technique
Vertical drains

Industry
Infrastructure, Building, Airport

Optus Stadium, Perth, WA

Techniques
Vertical drains, CMC, Dynamic compaction, Sheet piling

Industry
Infrastructure, Building, Sport Facilities

Parakiore Recreation and Sports Centre, Christchurch, NZ

Technique
Stone columns

Industry
Infrastructure, Building, Sport facility

Melbourne Metro, Vic

Techniques
Grouting (jet+rock), Drilling

Industry
Transport, Metro, Tunnelling

Ichthys LNG, NT

Techniques
Stone Columns and Dynamic Replacement

Industry
LNG (Oil and Gas)

Sydney Gateway, NSW

Techniques
CMC, Soil Mixing

Industry
Infrastructure, Roads

A wide range of geotechnical options for the benefit of your project

Our broad range of techniques (many developed within the Group), combined with our 50+ years of experience in Oceania, guarantee that we will determine the best-suited solution to meet your ground engineering challenges.

Our Techniques

Consolidation

- Vertical Drains (PVD)
- Menard Vacuum™

Densification

- Dynamic Compaction (DC)
- Rapid Impact Compaction (RIC)
- High Energy Impact Compaction (HEIC)
- Vibrocompaction (VC)

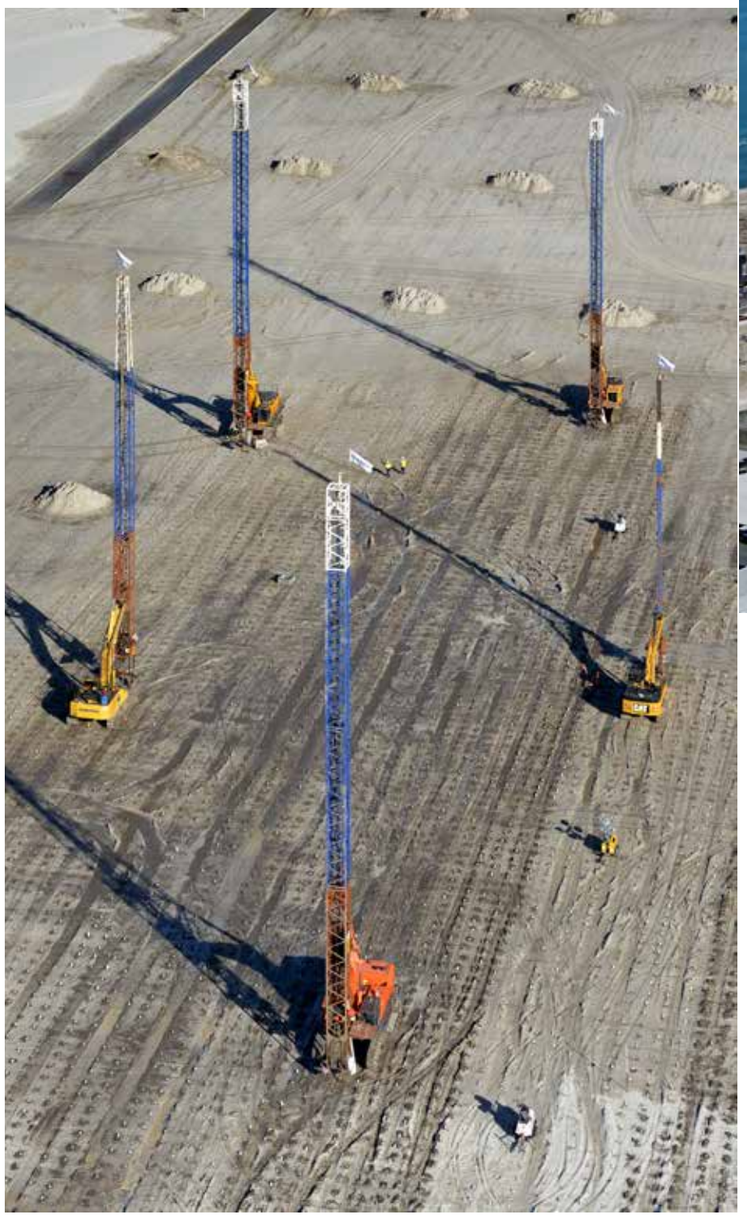
Reinforcement

- Controlled Modulus Columns (CMC)
- Stone Columns
- Bi-Modulus Columns (BMC)
- Soil Mixing (SM)
- Slurry Wall
- Jet Grouting/Grouting
- Dynamic Replacement (DR)
- Compaction Grouting

Drilling

- Anchoring
- Micropiling
- Rock grouting

Consolidation



Vertical Drains

What is it?

Vertical drains often called wick drains or prefabricated vertical drains, are made up of a plastic core encased by a geotextile that acts as a filter that allows water to enter the drain without soil clogging it.

The vertical drains create paths that accelerate water drainage and consolidation of saturated cohesive compressible soils. The drains are installed in a grid that is designed to satisfy the settlement requirements.

There are various types of vertical drains (round and flat) and various sizes to suit project requirements.

When and why use it?

Fine cohesive soils have low permeability and it takes relatively long periods for them to consolidate under loads. Installation of vertical drains greatly shortens the water drainage path and significantly reduces the consolidation time.

The machines used can conventionally install drains up to depths of about 50 meters.

Menard's tip

The combination of vertical drains with preloading or a surcharge program accelerates the consolidation period.

Menard Vacuum™

What is it?

Menard Vacuum™ is an atmospheric consolidation system. The procedure consists of installing vertical and horizontal drainage networks that are combined with a vacuum pumping system under an airtight impervious membrane.

This creates a depression under the airtight membrane that has been lain over the soil, which imposes an isotropic pressure on the soil matrix whose magnitude is close to the atmospheric pressure!

When and why use it?

Menard Vacuum™ is a technique created and developed by Menard to control long term residual settlement in saturated cohesive compressible soils.

The drainage of water and soil consolidation can be a very lengthy process. Menard Vacuum™ accelerates the process so you can safely develop your projects.

Menard's tip

Menard Vacuum™ is particularly relevant for deep layers of highly compressible cohesive soils. Because of the stabilising effect of the isotropic pressure, it is effective in reclaimed coastal environments and other projects where the stability of the earthworks and additional embankments may be of concern.

Densification

Dynamic Compaction

What is it?

Dynamic compaction is a technique that uses large pounders typically weighing between 12 to 30 tonnes to densify the soil. The pounder is dropped in free fall from heights of 10 to 25 meters.

The impact transmits high energy waves through the compressible soil layer to reduce the soil matrix void ratio and improve its geotechnical properties.

When and why use it?

Dynamic compaction is applicable to any type of granular soil.

This technique is particularly well-adapted to nonorganic heterogeneous fill, made ground and reclamation areas with varying characteristics, even when large boulders are present. Dynamic compaction is effective in both unsaturated and saturated soils.

Since the late 60s, Menard has applied this technique to thousands of sites for very different types of structures and conditions (port and airport platforms, heavy storage, buildings, landflls, etc.) to compact the ground and reduce settlement, mitigate liquefaction, stabilise or treat hydraulic fill, limit lateral earth pressure behind quay walls, and increase bearing capacity.

Did you know?

The technique was invented and developed by Mr. Louis Ménard!

Rapid Impact Compaction (RIC)

What is it?

Rapid Impact Compaction is a controlled energy, soil compaction technique. A compaction plate is placed on the targeted ground area. A hydraulic hammer, generally weighing less than 10 tonnes, is fitted to an excavator or piling rig base and used to transmit compaction energy to the soil via repeated impact.

When and why use it?

Rapid Impact Compaction is widely used to densify loose granular soils (sand or gravel) as well in industrial brownfield sites for surface compaction, foundations and floor slab support, and liquefaction mitigation.

The principle of this technique is the transmission of energy into a compressible/ loose soil layer to improve its geotechnical properties.

Menard's tip

Without specific site precautions, a safe working distance to sensitive structures can usually be defined in the order of 8 to 10 m. However, for classical structures a distance of 5 to 6 m can usually be adapted. At this distance noise attenuation usually results in a decibel reading of lower than 90 dBA.

High Energy Impact Compaction (HEIC)

What is it?

High Energy Impact Compaction, or Impact Roller Compaction, relies on rollers that transmit high energy impacts to compact the ground.

Impact roller module cross-sections are 3 to 5-sided to increase compaction depth compared to conventional circular rollers.

As with conventional roller compaction, ground treatment is achieved by applying HEIC in several passes. The number of passes depends on ground conditions, the targeted level of compaction, roller shape and roller weight.

When and why use it?

This technique can be applied to loose, compressible granular soils.

Menard's tip

High Energy Impact Compaction can be performed in thicker lifts compared to conventional roller compaction, which reduces cost and time!

Vibrocompaction

What is it?

Vibrocompaction is executed using a vibratory probe. Under the effect of its weight, jetted water, and sustained horizontal vibrations, the vibratory probe rapidly reaches the desired depth. The probe is then gradually lifted in successive steps, producing a 2m to 4.5m diameter cylinder of compacted ground.

When and why use it?

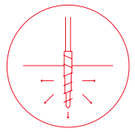
Loose granular soil or fill can be compacted at depth through the insertion of vibratory probes with large volumes of water to generate localised liquefaction of the soil. This enables the particles to rearrange to achieve a denser formation and thus increases the overall density of the soil.

It is used to control and reduce settlement, mitigate liquefaction, stabilise or treat hydraulic fill and limit lateral earth pressure behind quay walls.

Menard's tip

Vibrocompaction approximately achieves settlement of between 7% to 10% of the soil thickness treated.

Reinforcement



Controlled Modulus Columns (CMC)

What is it?

Controlled Modulus Column (CMC) is a rigid inclusion ground improvement method that reinforces the soil with a network of grouted columns. The columns reduce the overall compressibility of the soil.

Rigid inclusions are installed using a simple and efficient process with or without soil displacement during drilling. Grout or concrete is injected at low pressure through the hollow stem of the drilling tool. CMC diameters are generally between 280 mm to 450 mm.

When and why use it?

The objective of this solution is to provide an equivalent improved soil mass stiffness to globally reduce total and differential settlements by distributing loads between the ground and the CMCs.

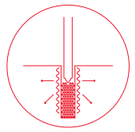
CMCs can be used in all types of loose or soft grounds, including soils with significant organic content and fill material. The technique can uniformly support slab-on-grade, shallow footings, spread footings, strip foundations and retaining walls. The use of a rigid inclusion ground improvement enables us to reduce the cost of the structure (decrease of concrete thickness and steel reinforcement).

The entire process is vibration-free and generates a very limited amount of surface spoil, which decreases spoil removal costs, limits risk of contamination and makes for a clean working environment.

They are an economical alternative to traditional deep foundation solutions and in most cases can prove to be beneficial for the global design of the superstructure.

Menard's tip

Our CMCs can provide significant savings on both cost and time over more traditional techniques.



Stone Columns

What is it?

Stones columns, also known as aggregate piers, reinforce the soil with a grid of compacted semi-rigid columns.

Menard uses a vibratory probe that penetrates the soft soils to the necessary depth. These vertical inclusions can be made of stone, or other recycled construction material and are installed in a grid pattern beneath the structure.

When and why use it?

Stone columns are well suited for the improvement of soft or loose soils as they create vertical inclusions with high stiffness, shear strength and draining characteristics. The result is an increased bearing capacity and a reduction of the total and differential settlements.

They are particularly effective for improving slope stability and preventing liquefaction by increasing the ground's shear strength.

Menard's tip

The ability to install Stone Columns with cranes, makes this technique highly effective in the nearshore and offshore environments.

Bi-Modulus Columns

What is it?

Bi-modulus columns are a combination of stone columns and the CMC technique.

CMCs are installed in the ground, then stone columns are installed at the top of the CMC head, thus creating a hybrid Stone and CMC Column.

When and why use it?

Bi-modulus columns combine the advantages of both techniques and can be applied to very soft soils where a stone column solution could not work due to the lack of lateral confinement and the risk of bulging.

Bi-modulus columns result in an increased bearing capacity, reduction of total and differential settlements as well as improved stress distribution from the structure to the inclusions. This leads to an optimisation of the thickness of the load transfer platform between the structure and the inclusions.

Menard's tip

The application of Bi-Modulus Columns is an example of the innovation and adaption of conventional ground improvement techniques. It demonstrates Menard's ability to respond specifically to site-specific challenges. It is always advised to consider the right technique and possible alternate approaches to the problem!

Soil Mixing

What is it?

Soil mixing is a technique that mechanically mixes the in-situ soil with a cementitious binder.

In this method the soil is sheared using specially designed augers or mixing tools, and a binder is injected and mixed with the soil to create a strengthened soil profile. Solid blocks can be formed by overlapping columns.

When and why use it?

Soil mixing is used for a wide variety of applications: controlling and reducing settlement under structures, increasing the bearing capacity of the soil, ensuring stability, reducing liquefaction risk, mass stabilisation, reducing earth pressure behind retaining structures, blocking groundwater, and increasing lateral reaction around foundation piles.

It is a very flexible technique that can be applied to many different applications Binder dosage and mixing parameters are selected according to soil characteristics and specifications to be achieved.

Menard's tip

Menard has proven over the years that soil mixing can be utilised across a wide range of soil types. However, caution is advised where obstructions are expected.

Slurry Walls

What is it?

Slurry walls are non-structural subsurface elements that could be either used for stiffening the ground or creating barriers with specific hydraulic and permeability characteristics.

First, a trench is excavated under slurry, which provides lateral stability of the trench. In the case of cement-bentonite walls the fluid slurry that contains cement and bentonite will set and form the permanent element; however, in all other cases the slurry is replaced with a specially designed and mixed backfill.

For cut-off walls the backfill consists of a homogeneous mix of excavated soil, bentonite slurry, clay and sometimes cement. For permeable barriers the trench is backfilled with a permeable material and may include special products to neutralise contaminants.

When and why use it?

Slurry walls can be used on a wide range of applications applicable to groundwater related issues. These walls are a fast and cost effective method to contain, divert or intercept groundwater. These techniques have been implemented to manage a wide range of water-borne contaminants and complex water chemistry environments.

Menard's tip

Slurry walls have been installed to depth of approximately 50 m. Soil-bentonite slurry walls create reduced volumes of spoil because excavated material is reused as backfill material.

Jet Grouting

What is it?

Jet grouting uses fluid jetting with a very high kinetic energy to erode the soil structure and mixes the in-situ soil particles with grout. It creates a homogeneous mass of high strength reinforced soil-cement material.

When and why use it?

Jet grouting is used to control and reduce settlement under structures, increase bearing capacity, create an impervious cut-off wall or reduced permeability base for excavation, install retaining walls, underpin existing structures, and reinforce soils for buried utilities or structures.

Depending on the overall design and soil conditions, several methods of treatment have been developed (single or double curtain walls, secant columns walls, plugs, isolated columns, etc.) making jet grouting a flexible technique.

Menard's tip

Jet grouting can be applied in areas that are difficult to access using inclined columns, directional drilling and masts of different sizes to fit within tight spaces.

Dynamic Replacement

What is it?

This method combines dynamic compaction and stone columns techniques by creating large-sized crushed stone inclusions with high internal shear resistance. The columns are dynamically installed using a heavy pounder that is dropped from height.

In this application, the tamping energy drives granular material down through the compressible soils to form large-diameter reinforcement columns (with column diameters ranging from 2 m to 3.5 m).

When and why use it?

If the ground cannot be dynamically compacted directly due to high fines content within the soil, a granular material must be added.

This technique is well suited to highly compressible and weak soils and can be applied to structures with high loading (including high embankment and storage tanks). It improves the bearing capacity of the poor soils and controls the total and differential settlement. An additional benefit is that dynamic replacement pillars allow for rapid drainage of the ground.

Menard's tip

The technique can be carried out with or without pre-excavation!

Compaction Grouting

What is it?

Compaction grouting is a pressure grouting technique that forms cylinders of grout and densifies the surrounding soils.

Global improvement of a volume of compressible soils requires sequencing the grouting work into a series of primary, secondary and even tertiary grid locations.

When and why use it?

Compaction grouting is classically used to densify loose sands for liquefaction mitigation or to improve the bearing capacity of the ground.

Compaction grouting is particularly well-adapted to liquefaction mitigation for the following reasons:

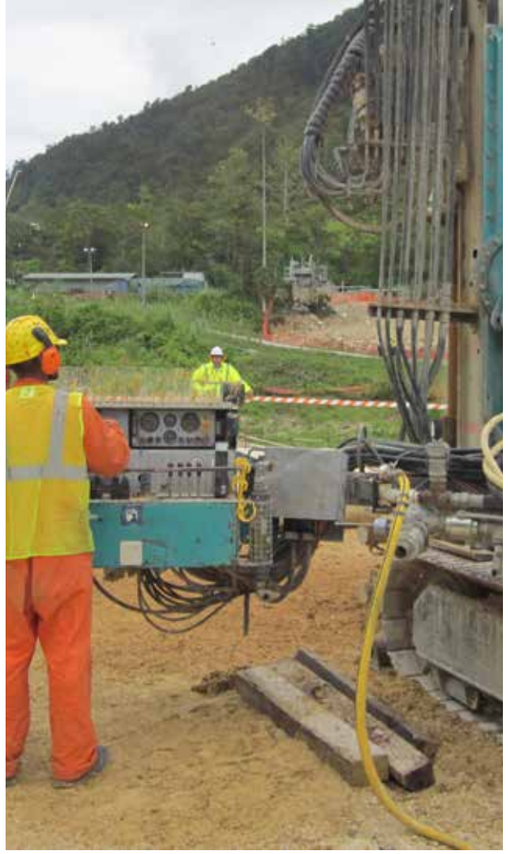
- It increases the density of sandy soils
- It increases the horizontal coefficient of earth pressure at rest
- It induces ageing of the soil by low strain shear deformation

Did you know?

In addition to jet and compaction grouting, Menard undertakes a variety of specialist grouting techniques such as permeation grouting of rocks and soils.

These techniques can be utilised for a range of applications from the improvement of dam foundations, waterproofing of tunnels, deep basement located below groundwater level, stabilisation of rock mass and structural underpinning.

Drilling



Micropiling

What is it?

Drilled micropiles are piles with diameters of up to 300 mm. They are constructed by installing reinforcement bars, cages, and occasionally structural casing. The structural elements are then grouted.

When and why use it?

Micropiling is most commonly utilised as a direct structural underpinning to support existing structures or tying down ground slabs against uplift forces.

This cost-effective technique is often employed when space constraints do not allow the utilisation of conventional piling equipment.

Menard's tip

Micropiles can also be installed in closely spaced groups or grids as an alternative to conventional piling schemes on remote sites or under bridge abutments.

Anchoring

What is it?

Ground anchoring is a technique that connects structures to the soil or underlying rock formations. The application of anchoring can provide reaction loads to structures and help retain excavations.

There are many different types of anchors that we can design, supply and install:

- Permanent (with monitoring) or temporary anchors
- Various anchoring systems: post-tensioned bar or strand anchors, passive bar anchors, rock bolts, cable bolts, and soil nails, that can be used separately or in combination. We have locally introduced several innovative anchoring solutions such as MASB (Multiple anchors Single Bore) and Self-Drilled Freyssibar system.
- Cement-based and/or chemical bonding grouts

When and why use it?

Ground anchors are commonly used to provide stability and reduce deformations of retention walls.

A wide variety of structures, including dams, wharves, retaining walls and foundations are subject to hydraulic uplift forces. Rock anchors can tie down these structures to counteract these forces.

Menard's tip

Post-tensioned systems have been developed in-house for load capacities of up to 1,500 tonnes in strand anchors.

Rock anchors represent the first ground engineering activity established by Menard in Australia.

Rock grouting

What is it?

Rock grouting is a technique in which cracks and fissures in rock are filled with a cementitious material, typically cement and sometimes micro fine cement, to reduce rock permeability.When the openings in the rock become large, either naturally or as a result of underground mining, then filler materials (sand, fly ash, or gravel) are mixed with cement to fill and stabilise the underground cavities.

We have an in-depth knowledge of grout mix composition and can tailor the selection of grout to suit strength and rheology requirements with consideration of cost and material availability.

When and why use it?

Rock grouting has been used to control water flowing through rock mass in new and existing dams, basement and metro excavations, and to control contamination mobilised in rock structures.

Rock grouting is used as it is a highly effective, fast and low cost method for reducing permeability in rock structures.

Menard's tip

Where the project performance criteria are linked solely to permeability, rock grouting can replace structural elements and provide significant cost and time savings.

Note that Menard has access to a large fleet of drilling rigs that can reach treatment depths over 100 to 140 meters!

Providing solutions across a broad range of sectors

As a ground improvement specialised contractor, Menard has a track record of providing solutions for small to large projects, for both private and public stakeholders.

Applications

Our experience and wide range of techniques allow us to work across various sectors, including:

Buildings

- Commercial
- Residential
- Industrial
- Warehouse
- Stadiums

Infrastructure

- Ports
- Airports
- Roads
- Railways

Process and energy

- Dam Engineering
- Tanks
- Wind Farms
- Mining & Tailings
- Solar
- Batteries

Buildings

Commercial and Residential

Commercial, institutional, and residential building projects are generally driven by a financial model that requires a high-quality product under the umbrella of very demanding cost constraints.

Menard can help you:

- Control total and differential settlements
- Provide good bearing capacity under spread footings
- Allow for conventional and economical shallow foundations
- Reduce the need for off-site soil disposal

It is imperative that well-performing, warranted and cost-conscious construction techniques are used for these projects.

Menard's innovative and economical ground improvement solutions have been implemented numerous times to help developers meet their project's cost and schedule constraints.

A wide range of ground improvement technologies such as:

- Menard Vacuum™ consolidation
- Dynamic Replacement
- Jet grouting, an attractive solution to get you out of trouble on sites with tight access and enclosed structures.
- Controlled Modulus Columns with high load carrying capacity and speedy construction

Industrial

We have a proven track record of delivering ground improvement works for industrial buildings providing great beginnings through strong floor support systems.

If specific solutions are not applied, warehouse structures that are located in poor soil areas may be subject to excessive total and differential settlements under the footings and floor slabs.

Ground improvement of warehouses optimises in-situ ground usage to satisfy settlement criteria; this removes the need to bridge poor soil conditions with structural piles and a thick structural slab.

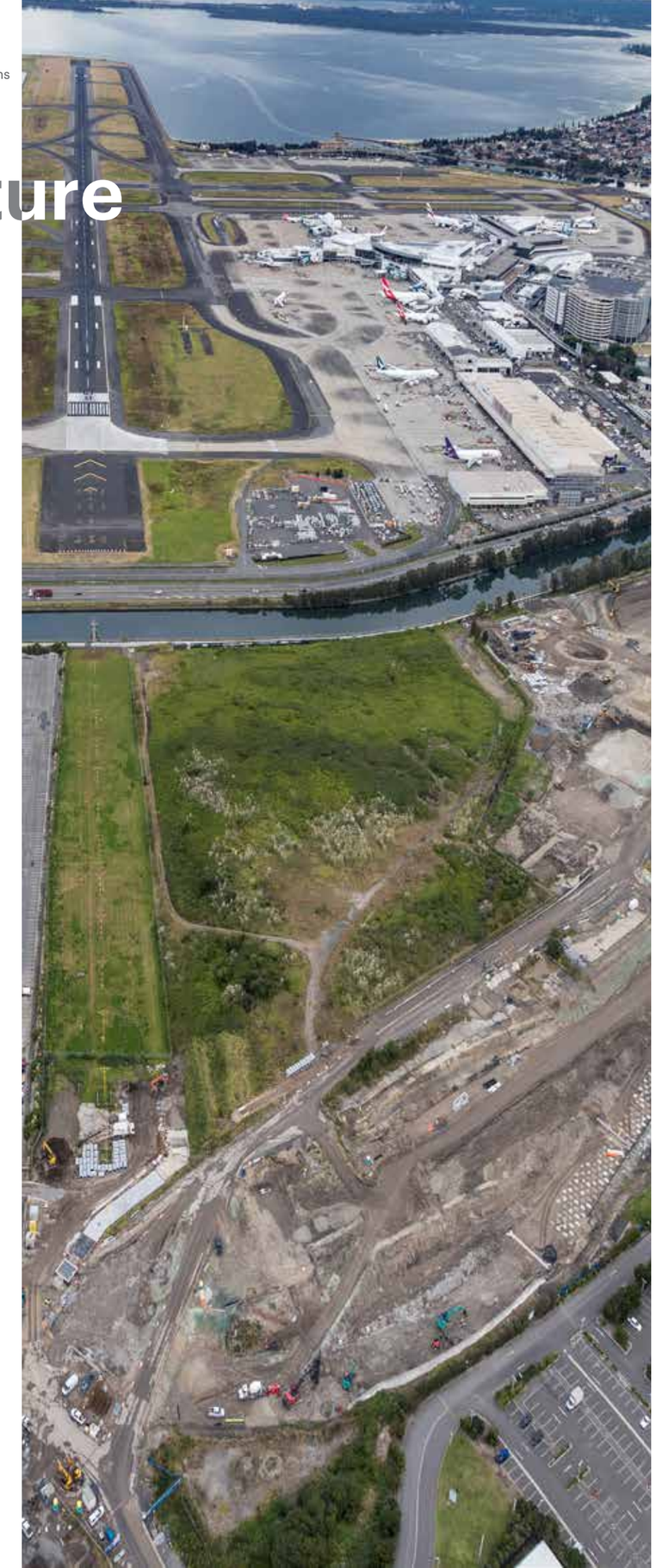
Our technologies are well adapted to the loads induced by factories and warehouses, such as slab-on-grade and isolated footings. Typically, the load intensity is not too high and the floor area to be treated is large.

For structures to be built on non-cohesive soils, dynamic compaction or vibrocompaction will likely be the ground improvement method selected.

The reinforcement method using either dynamic replacement, stone columns or Controlled Modulus Columns (CMC) is more suited for structures to be built on saturated cohesive soils.

Often CMCs are the most suitable method due to its speed and cost-effectiveness.

Infrastructure



Ports and Airports

Given the large surface areas generally required for the development of port or airport platforms, land is often reclaimed from the sea using hydraulic or terrestrial backfill. As such, a complex geotechnical problem needs to be addressed over a considerable area.

Cost-effective ground treatment techniques are very commonly used to treat such sites:

- To ensure the self-bearing and stability of the fill and soils
- To accelerate subsoil consolidation
- To improve retention systems
- To reduce long term residual settlements
- To reduce loads on quay walls

For these facilities to be built, our techniques provide economical solutions to consolidate poor soils within a reduced timeframe.

In cases of strong seismic loading, the treatment can include measures to reduce or mitigate the risk of liquefaction.

For these large projects Menard is accustomed to mobilising multiple work fronts to accelerate program requirements.

Roads and Railways

Transport infrastructures—roads, tunnels, bridges, and railway systems—are frequently built in areas such as swamps, marshes, and watercourses. In such cases, engineering solutions are required to avoid excessive settlement and shear failure of embankments. Ground improvement has become the go-to engineering solution for overcoming these challenges.

These projects generally comprise extensive corridors transversing a wide range of geological conditions. Multiple ground improvement solutions may be required on one project to correctly manage the project risk. Menard Oceania offers the ability to manage the delivery of all ground improvement methods in one team.

When settlement criteria are relaxed or non-time critical solutions are required, pre-loading with wick drains and even vacuum consolidation can be implemented. For projects that require more stringent settlement criteria or a critical path program, reinforced soil solutions such as Controlled Modulus Columns, Deep Soil Mixing, or even Stone Columns may be implemented. For projects that use bridges to overcome geotechnical risk or water bodies, it is also customary to reinforce the foundations of bridge approaches using Controlled Modulus Columns. This strategy ensures a smooth transition between the non-rigid embankments and the rigid piled bridge abutments.

Transport projects are more commonly built underground. Tunneling is being utilised more often than ever before. Most tunneling projects will comprise a range of ground treatment techniques to stabilise excavations or provide groundwater ingress control in both in-situ soil and rock mass.

Through years of experience, Menard Oceania have designed and constructed cross-passages between tunnels using jet grouting and rock-mass grouting. These techniques have proven to be highly efficient methods, which can be installed and constructed from the surface.

Process and Energy

General

Industrial plants and equipment consist of unique structures that are often very heavy and sensitive. When foundations are built on compressible soils, careful consideration must be taken during design and execution to ensure the safe operation of the plant. Ground improvement has provided this industry a unique solution to control settlement to match the required performance criteria, rather than utilising structural solutions like piles to eliminate settlement all together.

Our ground improvement techniques make it possible to:

- Support heavy uniform loads (water, oil and gas storage)
- Support individual loads (pipeline supports and industrial equipment)
- Support dynamic loads (oscillations vibrations seismic loadings)
- Reduce absolute and differential settlement of structures
- Mitigate the risk of soil liquefaction.

This type of project calls for a sound knowledge of the constraints and specifications of each structure to be treated. However, it is also important to be familiar with the potential technical issues, which could arise during the various stages of the project from concept to handover.

We have more than 30 years of experience in ground improvement in the industry including:

- Tank farm
- Wind energy
- Oil
- Gas
- Power plant

Dam Engineering

Dams are critical assets that provide water storage for irrigation, drinking, hydropower, industrial processing and the containment of mine tailings. Menard has a long history of delivering ground improvement solutions for both the development of new and existing dam infrastructure. Dams are high-risk and sensitive structures governed by the Australian National Committee on Large Dams (ANCOLD). As these guidelines are updated and re-assessed, there is a requirement for remedial work to ensure the stability and long-term safety of these assets. Menard Oceania are an active member of ANCOLD and are frequently sought after in this space, delivering ground improvement techniques such as rock anchoring, rock grouting and stone columns.

The principal areas where Menard can assist with these matters are in:

- Seismic upgrading of existing dams
- Tailings stabilisation
- Water, Seepage and erosion control
- Upgrade or replacement of the dam core
- Global factor of safety upgrade
- Spillway modification
- Monitoring of dam performance

To do so, we use techniques such as:

- High capacity vertical rock anchors or rock bolts
- Ground Improvement methods including soil mixing and stone columns
- Installation of cut-off walls and drains

Mining

When it comes to mines, ground improvement and geotechnical services have become an increasingly important topic: settlement controls and mitigation requirements must always be studied to avoid any potential technical issues.

To avoid the issues and facilitate mining activity, Menard can assist on the following:

- Dam construction and raising
- Dam upgrading
- Seepage control and water management
- Rehabilitation for closure
- Slope stabilisation
- Settlement control for structures
- Mine backfilling
- Tailings management and improvement

Neutralise contamination to build a future

We develop state-of-the-art containment and soil remediation methods to treat sites affected by subsurface contamination.

Environmental Remediation

In addition to our core competencies as a ground improvement specialist, we also offer expertise in soil remediation, giving a fresh future to contaminated sites.

Applications

- Treating sites
- Gasworks
- Petrochemical
- Mining Remedial

Techniques

- PRB Walls
- In situ stabilisation
- In situ treatment
- Slurry Walls & Confinement

Applications

Treating sites

Despite our best efforts, humans continue to extract, produce and consume materials that can have a potentially damaging impact on the environment and human health.

In response, Menard has developed state-of-the-art containment and soil remediation methods to treat sites affected by subsurface contamination.

Our techniques can either completely cut-off contaminated groundwater flows or facilitate passive treatment whilst providing means to perform long term monitoring and management of contaminated sites.

We can efficiently treat former gasworks sites, petrochemical or PFAS sites.

The following techniques are used to treat contamination:

- Soil mixing, (page 21)
- Pump and treat
- Jet grouting (page 23)
- Cut-off walls (page 22)
- Permeable reactive barriers, funnels and gates
- Trench support by polymer is also used when permeable backfills are required to create collector drains or reactive barriers

Techniques

PRB Walls

What is it?

Permeable Reactive Barriers (PRB) walls are narrow trenches that are excavated under slurry and backfilled with materials that decontaminate groundwater passing through them.

When and why use it?

Ideally when in-situ remediation of contaminated sites is required without impacting the groundwater flow.

Menard's tip

Menard is Australia's leading contractor for the installation of Slurry and PRB walls.

In-situ stabilisation

What is it?

In-situ stabilisation is a method for stabilising or solidifying soils in place and utilises cementitious material to create low permeability properties that help reduce the impact of the contaminants.

When and why use it?

In situ stabilisation is typically used to limit the spread of contaminants in soil and groundwater. It does not remove the contaminant but prevents leaching and migration by trapping it in the soil.

This technique applies to various types of organic and chemical contaminants.

Menard's tip

Solidification does not actively promote chemical changes in the contaminants.

In-situ treatment

What is it?

In situ method to treat contaminated soils. This is conventionally achieved by absorption, reduction or precipitation.

It actively promotes chemical changes in the contaminants, converting them to less harmful or inert products.

In-situ treatment methods will depend on the subsurface conditions and contaminant characteristics.

When and why use it?

In situ treatment is typically used to neutralise contaminants present in soils.

This technique is very versatile and can be applied to various soils and contaminants such as working sites and soils located under existing buildings.

Menard's tip

In-situ treatment is a simple, cost-effective treatment that has very little environmental impact.

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