CAMBODIA













SOILS Soletanche Bachy

World leader in special foundation and underground structures

Menard

Recognised world specialist in soil improvement

Together, **Soletanche Bachy** and **Menard** form the world's most comprehensive network of geotechnical engineering contractors

STRUCTURES

Freyssinet

World leader in prestressing, cable stayed structures and strengthening of structures

Our DNA

Reinforced Earth

Inventor and world leader of the mechanically stabilised earth market

Menard Asia views safety as top priority and encourages employees to be entrepreneurs in providing solutions to our clients. At here, we work hard and have fun!



WORLD LEADER IN GROUND IMPROVEMENT

A wide range of geotechnical solutions for the benefit of your projects. Our geotechnical experts and broad range of techniques are tailored made for our clients. From design to construction, Menard proposes and implements innovative foundation solutions based on high-performance ground improvement and reinforcement techniques.

Menard Asia belongs to Menard Group part of Soletanche Freyssinet, a group of world leaders in soil, structural and nuclear engineering. Its dynamic cultures are backed by the security and strength of belonging to an international group.



Menard Group in 2020

1,500 Employees +3,000 Projects a year

80 Countries of operation €680 M billion of

revenue

Step Up For Safety

Our conviction is that safety is more than procedures, but relies on behavior, positive and committed attitude.

OUR SOLUTION

Menard Cambodia delivers the full range of foundations and ground improvement techniques to provide effective, innovative, and economical solutions for our clients. Our design and build capability, and the broad range of techniques tailor-made to meet your needs, make us your ideal turn-key solution provider. We guarantee the design and performance of our works will meet our client project's requirements.

OUR APPLICATION

Supported by worldwide expertise, Our solutions and technologies are applicable to any kind of project and whatever its size: road, railway, airport, seaport, housing, commercial, industrial, and energy infrastructure. No project is too small for us nor too big.

OUR TECHNIQUES Consolidation & Compaction Rapid Impact Consolidation Menard Vacuum Dynamic Vibrocompaction (Preloading + Consolidation Compaction Compaction Vertical Drains) **Reinforcement with Inclusions** Dynamic Stone Column Controlled Soil Mixing Jet Grouting Replacement Modulus Column

Discover our full range of techniques by scanning this QR code :

OUR PROJECTS IN CAMBODIA

Menard has been working in Cambodia since 2019, Menard has established a permanent office in Phnom Penh, which allows to efficiently coordinate the work everywhere in the country. Our presence also means that we can stay in close contact with our clients and the relevant decision-makers. Menard Cambodia offers tailor-made ground improvement services to suit the construction needs of our clients. The methods we offer are well a to a wide variety of problematic soils or grounds. This is because our projects are carried out by professionals to meet international standards and supported by local expertise.



Runway extension of Sihanoukville Airport

Controlled Modulus Columns and Prefabricated Vertical Drain (2019 - 2020) *Sihanoukville*

The extensive of the sihanoukville airport to handle more increasing passengers which Menard how was completed the ground improvement working on a new runway extension. it was started in 2019. The solution of soft soil, water-saturated clays requires the installation of Controlled Modulus Columns (CMC).



Bakheng Water Treatment Facilities Prefabricated Vertical Drain (2020 - 2021) Phnom Penh

In 2019, VINCI Construction Grands Projects signed a contract with the Phnom Penh Water Supply Authority to design and build the water treatment plant, call the Bakheng Water Production Facilities on the northern outskirts of the Cambodian capital. the challenge of the site area is soft saturated clay has been achieved. To consolidate and avoid the deep foundation of the construction's foundation, Menard Cambodia's solution is PVD technology combined with a sandy surcharge.



Zuellig Pharma Warehouse Controlled Modulus Columns (2020) Kandal Province

The project consists in building a new warehouse with a footprint of $95m \times 70m$. It is located near the national road 2, at the border between kandal Province and Phnom Penh city in Cambodia. The building is divided in 2 parts; 1 area of $1000m^2$ dedicated to offices and circulation area with live loads up to $2,5T/m^2$, 1 sotage area of $5200m^2$ with live loads up to $5T/m^2$.

It was the very first time that CMC has been applied under a building in Cambodia.



New Phnom Penh International Airport Prefabricated Vertical Drain (2021)

Kandal

The 4F-class Airport is constructed across more than 2,600 hectares of land in the Kandal Stung district and Sa'ang district in Kandal province. it is the highest in the class of airports that allow the takeoff and landing of all sizes of aircraft. Menard Cambodia applies a solution to consolidate the foundations of the airport apron and taxiway of this 4F-class Airport, PVD to hard soil which has cone resistance value Qc up to 10-15Mpa.





Bakheng Intake Deep Soil Mixing (2021)

Chroy Changvar

In this project Menard Asia participate as ground improvement project for water and sewage construction owned by The Phnom Penh Water Supply Authority. Our solution for this project is Deep Soil Mixing and this successful project has completed in September 2021.



Phase 1 of New Apron and Taxiway of Sihanoukville Airport Prefabricated Vertical Drain (2021)

Sihanoukville

Menard Asia was responsible for ground improvement by using Controlled Modulus Column (CMC). This technique was made to reinforce the ground for the construction of runways and taxiways.



CBL Boiler Project Controlled Modulus Columns (2021) Kbal Kaoh

Heineken wishes to reduce its CO2 emissions in production by 60 per cent (saving 17,000 tonnes of CO2 per year) in Cambodia. In this context, Berkeley Energy Commercial Industrial Solutions (BECIS) has been awarded to design and build a biomass power plant to generate thermal energy for the brewer's production site in Phnom Penh. The plant would enable the brewery to reach 100 per cent renewable thermal energy. The Plant is going to be built just in front of the existing brewery on a land of 2000m2Controlled Modulus Columns came as an alternative solution to optimize the project schedule and the costs of the building.



60M Mall

Prefabricated Vertical Drain (2021)

Chak Angrae Kraom

A new shopping center (mall) is about to be built on Hun Sen Boulevard, the main road that is connecting the New Phnom Penh International Airport to the center of the capital city. The shopping center is about 27 000m2 and is going to be built on an area that must be previously backfilled with 2 to 6 of material. Prefabricated Vertical Drains was carried out by Menard Cambodia as an alternative solution to Bored Piles, which means a important cost optimization for our client.



French Embassy Soil investigations & Foundations diagnostics (2022) Along Boulevard Monivong

the residentail building, Ambassade de France au Cambodge which is located along Boulevard Monivong is the first consulting and soil investigations on the settlement damages.



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Early Works Package D of Sihanoukville Airport

Prefabricated Vertical Drain (2022) *Sihanoukville*

Menard Asia was responsible for ground improvement by using Prefabricated Vertical Drain (PVD). This technique was made to reinforced the ground for the early works package D of Sihanoukville Airport.



National Road 5 Fly Over Controlled Modulus Columns (2022) Khan Russei Keo

Menard Cambodia has conducted on the "National Road 5 Fly Over" project in Khan Russei Keo, Phnom Penh using Controlled Modulus Column (CMC) to consolidation soil treatment.



Elite Villa Controlled Modulus Columns and Retaining Wall (2022) Tonle Basak

The project consists in building one single villa in the city center of Phnom Penh, in a residential area called ELITE TOWN located on Koh Pich Island. The villa is 25m long by 15m large. Those dimensions are exactly the same than the land on which the project is built. In addition, this villa has 1 level of basement + 4 Floors levels. Menard Cambodia's solutions are soil improvement with CMC under shallow foundations of the villa, retaining wall system using tangent pile method, and pit excavation down to the bottom level of the basement slab.



New Chroy Changvar Bridge Controlled Modulus Columns (2022) Phnom penh

The project involved the use of CMC grid with varying square spacing of 2.5m x 2.5m to 1.3m x 1.3m and a diameter of 320mm due to heavy trapezoidal loading from embankments and traffic loads. The CMC was combined with a lighter Reinforced Earth Wall to extend access ramps and save two spans on the bridge.







Bassac Lane Restaurant Controlled Modulus Columns (2023) Phnom penh

We have completed the controlled modulus column for the restaurant building in Sangkat Boeng Keng Kang Ti Mouy, Phnom Penh. The use of controlled modulus columns is an excellent choice for constructing buildings in areas with soft soils or high water tables, as they provide added stability and support. The project consists of a new RC structure of a restaurant building in the center of Phnom Penh city where the overall land size is about 450m2. The condition of the subsoil below the structure is composed of weak soil which makes the project require a deep foundation to ensure the stability of the building. Menard has proposed the ground improvement solution using controlled modulus columns combined with the shallow foundation to support the structure load, and as consequence the deep foundation has been replace by soil improvement technology.

Master Suki Soup National Road 1 Controlled Modulus Columns (2023) Phnom penh

The project is located along national road 1 where the subsoil composes of soil with unfavorable geotechnical conditions within the existing pile foundation that does not meet the design requirement. To fulfill the client's requirement, Menard has proposed an alternative soil improvement solution combined with raft design to ensure the stability of the building. It was the very first time that CMC applied with the existing piling foundation.



60 Mall - RC Building Controlled Modulus Columns (2023) Phnom penh

We used the CMC method to treat the foundation of the 60 Mall (RC Building), which covers an area of 27,000 square meters. The project is located at the new shopping center (mall) at Hun Sen Boulevard Menard has carried out the prefabricated vertical drain in 2021. As per the client's requirement to build a building in the untreated area immediately, Menard has proposed another soil improvement solution called a controlled modulus column combined with a shallow foundation system for this project. A controlled Modulus Column is known as an alternative solution for optimizing the project schedule and the cost of the building's foundation.

We solve soil and ground problems from small to mega project

The need to do something arises when the existing ground is unable to adequately sustain the load that is to be applied as assessed by the design criteria:

- Bearing capacity & stability
- Settlement & rate of settlement
- Liquefaction potential



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Menard Cambodia Office

Aquation Building - #540 Koh Pich Street, Sangkat Tonle Bassac, Khan Chamkarmon, Phnom Penh cambodia@menard-asia.com

