



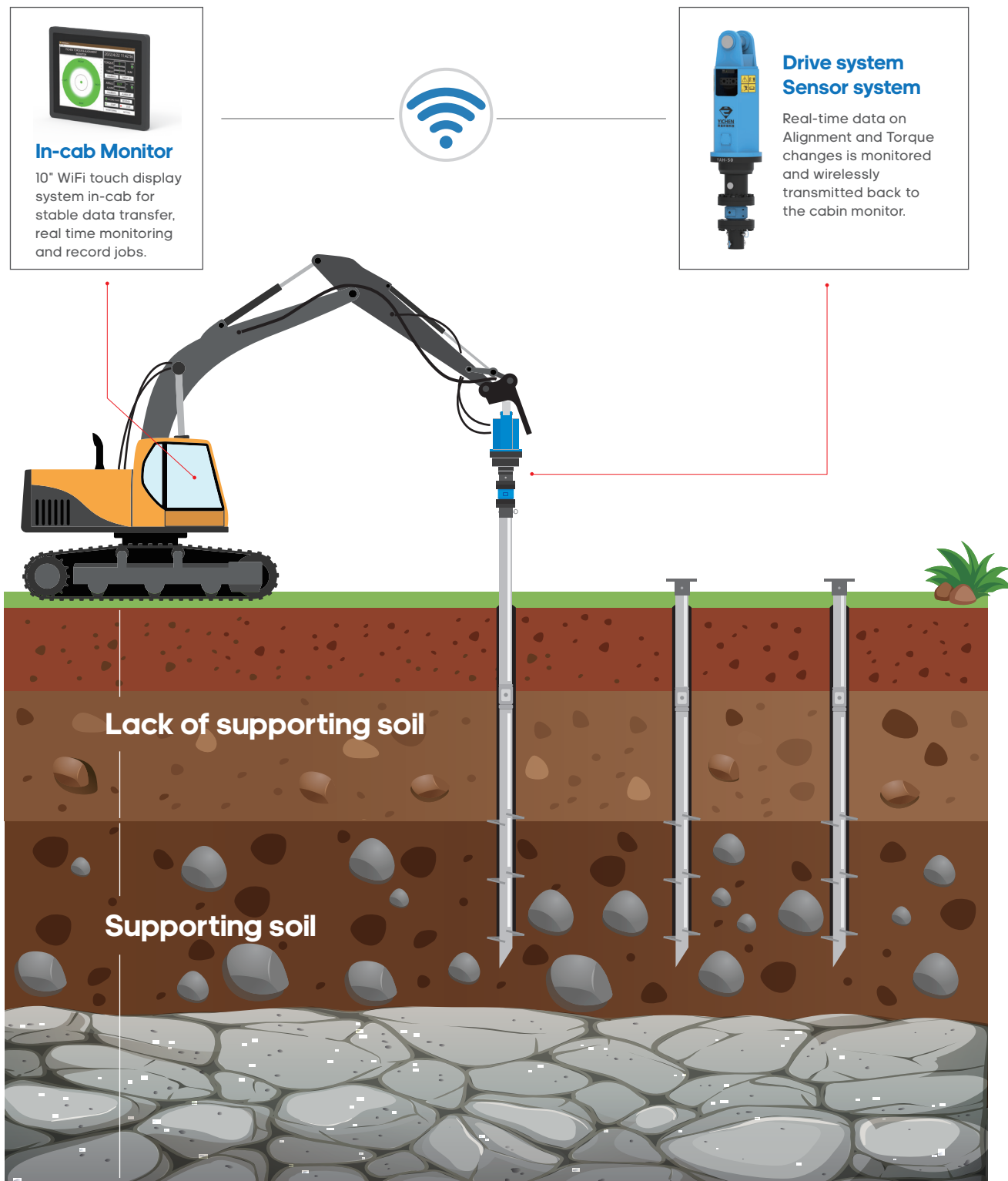
2023

HELICAL PILE INSTALLATION SYSTEM

INSTRUCTIONS

Yichen helical pile installation system provides strong support for the installation of helical piles/anchors. It consists of a drive system, sensor system, and in-cab monitoring system. The data transmission between system components is completed through wireless signals, the monitored real-time data will be fed back to the monitoring system in the cab of the base machine. Yichen helical pile installation system can endow operators with the ability to accurately control the installation angle and read real-time changes in the ground state.

WORKING DIAGRAM



PRODUCT PARAMETERS



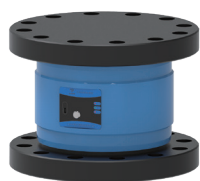
Helical pile installation system

ITEMS	PARAMETERS		
MOD.	YAH-2C	YAH-5C	YAH-10C
Max. Output Torque	18000N.m	50000N.m	100000N.m
Base Machine Weight	8 - 15ton	20 - 36ton	32 - 52ton
Pressure	80 - 240bar	220 - 350bar	250 - 300bar
Flow	80 - 170lpm	100 - 300lpm	300 - 477lpm
Speed	0 - 42rpm	0 - 15rpm	0 - 15rpm
Torque Measuring Range	20000N.m	50000N.m	100000N.m
Safe Overload of Torque Indicator	150% F.S.	150% F.S.	150% F.S.
Tilt Measuring Range	X: $\pm 180^\circ$	X: $\pm 180^\circ$	X: $\pm 180^\circ$
	Y: $\pm 90^\circ$	Y: $\pm 90^\circ$	Y: $\pm 90^\circ$
	Z: $\pm 180^\circ$	Z: $\pm 180^\circ$	Z: $\pm 180^\circ$
Tilt Measuring Accuracy	0.1°	0.1°	0.1°
Operating Temp Range	-20°C TO 80°C	-20°C TO 80°C	-20°C TO 80°C
Data Transmission	Wireless	Wireless	Wireless
Protection Class	IP66	IP66	IP66
Power	Lithium Battery	Lithium Battery	Lithium Battery



In-cab Monitor

ITEMS	PARAMETERS
MOD.	EM-10W
Display Size	10.1"
System	Win
Operating Temp Range	-20°C TO 60°C
Data Transmission	Wireless
Power	Lithium Battery
Protection Class	IP67



Torque Indicator

ITEMS	PARAMETERS
Operating Temp Range	-20°C TO 80°C
Linearity	0.05% F.S.
Hysteresis	0.05% F.S.
Repeatability	0.05% F.S.
Zero Balance	0.05% F.S.
Safe Overload	150% F.S.
Temp Effect on Output	0.05% F.S./10° C
Temp Effect on Zero	0.05% F.S./10° C
Impadance	700Ω
Working Voltage	5-15V
Data Transmission	Wireless
Protection Class	IP66



Angle Indicator

ITEMS	PARAMETERS
MOD.	AAS-360
Temp Effect on Output	$\pm 0.5^\circ$ (-40° C~+85° C)
Operating Temp Range	-20°C TO 80°C
DataTransmission	Wireless
Power	Lithium Battery
Protection Class	IP66
Accuracy	0.1° (static)
	0.5° (dynamic)
Capacity	X: $\pm 180^\circ$
	Y: $\pm 90^\circ$
	Z: $\pm 180^\circ$

ITEMS	PARAMETERS			
MOD.	ATS-10	ATS-20	ATS-50	ATS-100
Max. Capacity	10000N.m	20000N.m	50000N.m	100000N.m
Size	Ø230x180mm	Ø230x180mm	Ø280x190mm	Ø300x220mm
Weight	34.5kg	34.5kg	48kg	74.7kg

HELICAL PILES

Every design detail of Yichen helical pile has been accurately calculated, which can enable Yichen helical pile to obtain the best penetration capacity when entering the soil, and minimize the disturbance of helix to the soil, so as to optimize the bearing capacity and tension capacity. At the same time, our helical pile also adopts the hot galvanizing process, so that it still has good performance after 75 years of underground use.



Product advantages

- Cost Effective
- Quick Installation
- No Curing Time
- Can be battered
- Proven Engineering
- Environmental Friendly
- Installation in All Weather Conditions
- Re-Usable
- Low Construction Noise
- Vibration Free
- Removable for Temporary Structures
- Can Be Grouted After Installation
- Resist Corrosion Through Galvanization

AP18 Helical Piles Product parameters

Specifications	
Shaft	2.875" x 0.217" Nominal
Bolts	0.875"
Helices	0.375" Thick, Helix Die-Pressed 8", 10", 12", 14" & 16" Diameter Available
Pitch	3"
Coating	Galvanized (G), Bare Steel (NG), Epoxy Powder Coated (EP)
Compression Capacity	
Ultimate Capacity	36 Tons
Allowable Capacity	18 Tons
Tension Capacity	
Ultimate Capacity	32 Tons
Allowable Capacity	16 Tons

AP22 Helical Piles Product parameters

Specifications	
Shaft	3.5" x 0.3" Nominal
Bolts	0.875"
Helices	0.5" Thick, Helix Die-Pressed 8", 10", 12", 14" & 16" Diameter Available
Pitch	3"
Coating	Galvanized (G), Bare Steel (NG), Epoxy Powder Coated (EP)
Compression Capacity	
Ultimate Capacity	44 Tons
Allowable Capacity	22 Tons
Tension Capacity	
Ultimate Capacity	36 Tons
Allowable Capacity	18 Tons

AP36 Helical Piles Product parameters

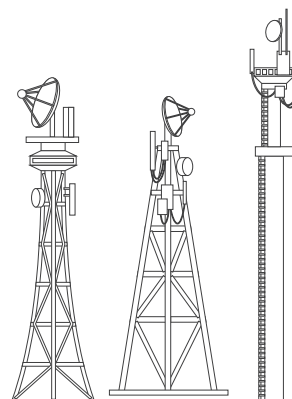
Specifications	
Shaft	4.5" x 0.337" Nominal
Bolts	1"
Helices	0.5" Thick, Helix Die-Pressed 10", 12", 14" & 16" Diameter Available
Pitch	3"
Coating	Galvanized (G), Bare Steel (NG), Epoxy Powder Coated (EP)
Compression Capacity	
Ultimate Capacity	72 Tons
Allowable Capacity	36 Tons
Tension Capacity	
Ultimate Capacity	62 Tons
Allowable Capacity	31 Tons

AP46 Helical Piles Product parameters

Specifications	
Shaft	5.5" x 0.361" Nominal
Bolts	1"
Helices	0.5" Thick, Helix Die-Pressed 10", 12", 14" & 16" Diameter Available
Pitch	3"
Coating	Galvanized (G), Bare Steel (NG), Epoxy Powder Coated (EP)
Compression Capacity	
Ultimate Capacity	92 Tons
Allowable Capacity	46 Tons
Tension Capacity	
Ultimate Capacity	78 Tons
Allowable Capacity	39 Tons

*The data provided above is not binding, as the manufacturer reserves itself the right to make improvements to its products at any time and with no advance notice.

GRILLAGE

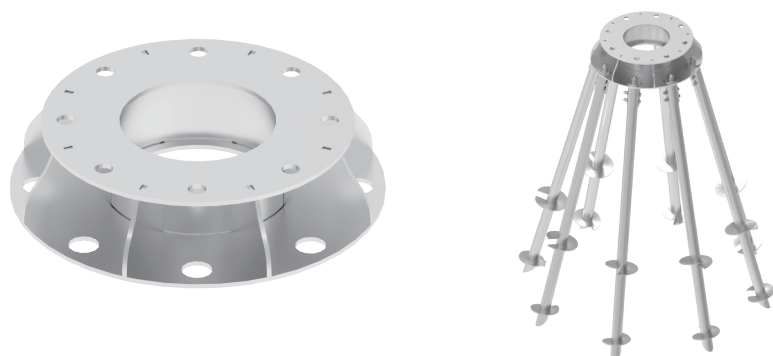


YICHEN® YPG118-10 UTILITY GRILLAGE

7200 kNm Ground Line Moment

8-Pile Steel Grillage Foundation System

Description: YICHEN® YPG118-10 Prefabricated Grillage has a groundline moment capacity of 7200 kNm. YPGs are custom-made to order in the ISO 9001 certified quality program. The central mounting plate of the YPG will be customized to match the mounting structure of the project specific mounting components. YICHEN's AP series helical piles can directly adapt to YPG, providing all-steel foundation solutions for remote or demanding on-site locations.



ITEMS	PARAMETERS
Bending moment (kNm)	7200
Number of piles	8
Pile ring diameter (mm)	2900

YICHEN® YPG133-7 UTILITY GRILLAGE

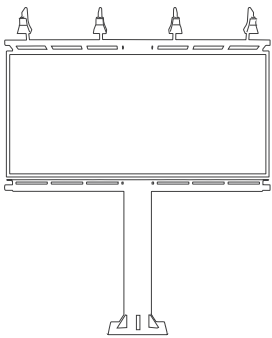
2800 kNm Ground Line Moment

3-Pile Steel Grillage Foundation System

Description: YICHEN® YPG133-7 Prefabricated Grillage has a groundline moment capacity of 2800 kNm. YPGs are custom-made to order in the ISO 9001 certified quality program. The central mounting plate of the YPG will be customized to match the mounting structure of the project specific mounting components. YICHEN's AP series helical piles can directly adapt to YPG, providing all-steel foundation solutions for remote or demanding on-site locations.



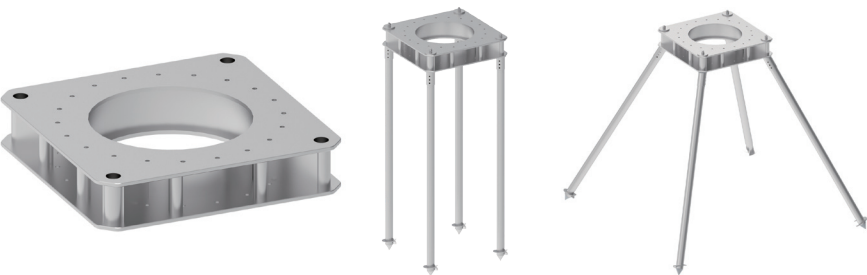
ITEMS	PARAMETERS
Bending moment (kNm)	2800
Number of piles	3
Pile ring diameter (mm)	2133



YIHCHEN® YPG144-8 UTILITY GRILLAGE
4000 kNm Ground Line Moment

4-Pile Steel Grillage Foundation System

Description: YICHEN® YPG144-8 Prefabricated Grillage has a groundline moment capacity of 4000 kNm. YPGs are custom-made to order in the ISO 9001 certified quality program. The central mounting plate of the YPG will be customized to match the mounting structure of the project specific mounting components. YICHEN's AP series helical piles can directly adapt to YPG , providing all-steel foundation solutions for remote or demanding on-site locations.

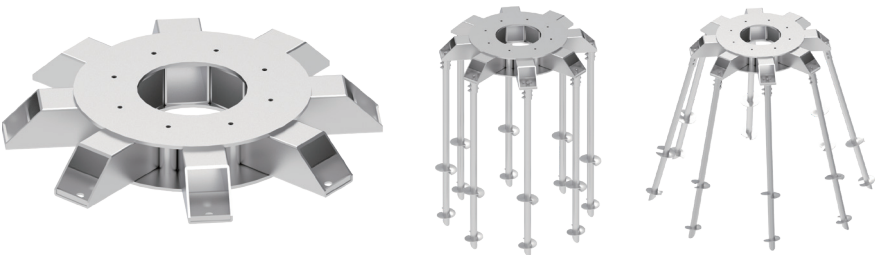


ITEMS	PARAMETERS
Bending moment (kNm)	4000
Number of piles	4
Pile ring diameter (mm)	2440

YICHEN® YPG208-7 UTILITY GRILLAGE
3800 kNm Ground Line Moment

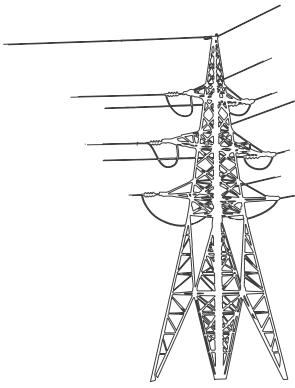
8-Pile Steel Grillage Foundation System

Description: YICHEN® YPG208-7 Prefabricated Grillage has a groundline moment capacity of 3800 kNm. YPGs are custom-made to order in the ISO 9001 certified quality program. The central mounting plate of the YPG will be customized to match the mounting structure of the project specific mounting components. YICHEN's AP series helical piles can directly adapt to YPG , providing all-steel foundation solutions for remote or demanding on-site locations.



ITEMS	PARAMETERS
Bending moment (kNm)	3800
Number of piles	8
Pile ring diameter (mm)	2240

GRILLAGE

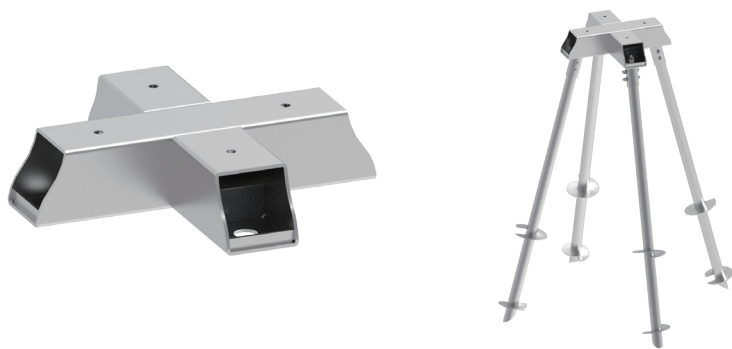


YICHEN® YPG244-4 UTILITY GRILLAGE

200 kNm Grount Line Moment

4-Pile Steel Grillage Foundation System

Description: YICHEN® YPG244-4 Prefabricated Grillage has a groundline moment capacity of 200 kNm. YPGs are custom-made to order in the ISO 9001 certified quality program. The central mounting plate of the YPG will be customized to match the mounting structure of the project specific mounting components. YICHEN's AP series helical piles can directly adapt to YPG , providing all-steel foundation solutions for remote or demanding on-site locations.



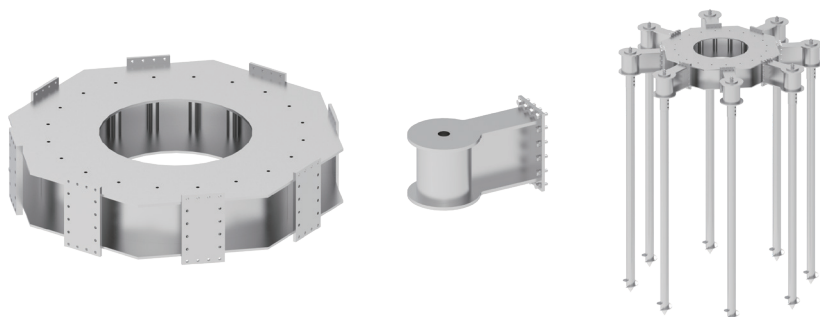
ITEMS	PARAMETERS
Bending moment (kNm)	200
Number of piles	4
Pile ring diameter (mm)	1220

YICHEN® YPG308-19 UTILITY GRILLAGE

21260 kNm Ground Line Moment

8-Pile Steel Grillage Assembly

Description: YICHEN® YPG308-19 Prefabricated Grillage has a groundline moment capacity of 21260 kNm. YPGs are custom-made to order in the ISO 9001 certified quality program. The central mounting plate of the YPG will be customized to match the mounting structure of the project specific mounting components. YICHEN's AP series helical piles can directly adapt to YPG , providing all-steel foundation solutions for remote or demanding on-site locations.



ITEMS	PARAMETERS
Bending moment (kNm)	21260
Number of piles	4
Pile ring diameter (mm)	5640

APPLICATIONS

- Pole bases
- Underpin existing foundations
- Walkways, boardwalks
- Telecommunication masts/platforms
- Electrical equipment, pylons and poles
- Buildings/modular buildings (mobile houses)
- Highways structures (signage)
- Concrete slab lifting and stabilization
- concrete-less foundations
- Rail structures (signalling, platforms, overhead line equipment)
- Structural support (compression or tension) for both permanent and temporary structures
- Temporary/permanent seating (stands)
- Anchors (back stays/tension guys)
- Retaining walls, flood defences, sea walls, bulkheads
- Wind turbines
- Solar farms
- Fencing
- Utility and pipeline tie downs
- Slope stabilization,

A helical pile can be used in nearly any situation and where driven or cast in place piles are currently used.

Utility and pipeline tie downs



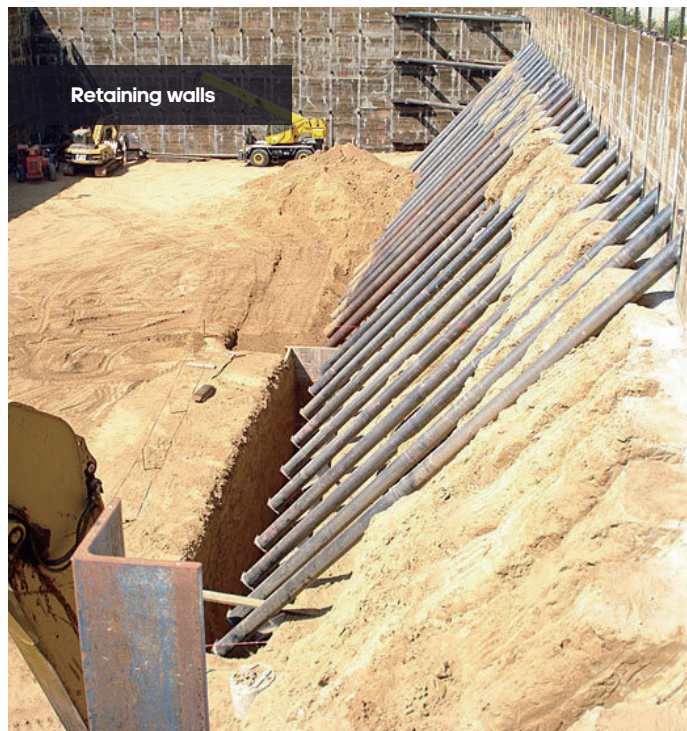
Buildings/modular buildings (mobile houses)

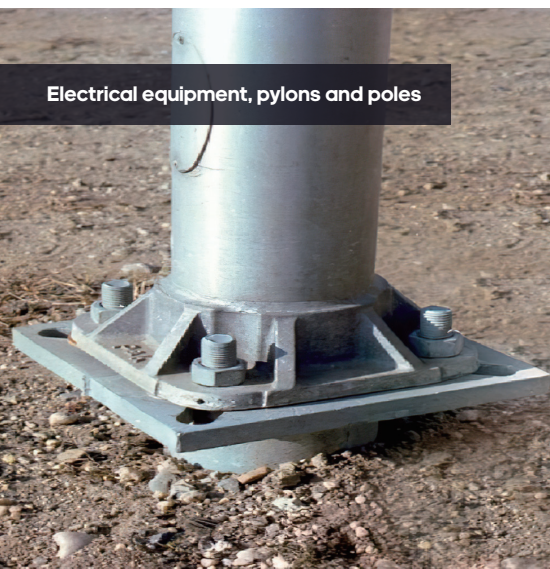


Structural support (compression or tension) for both permanent and temporary structures



Retaining walls





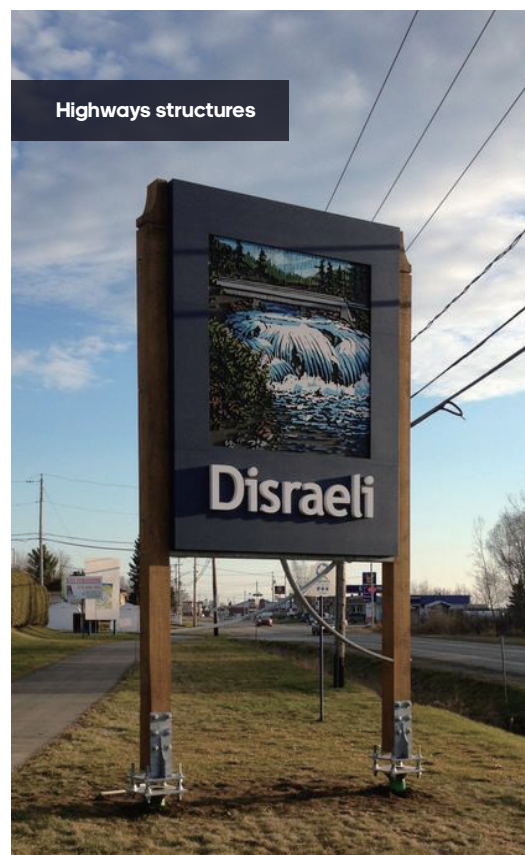
Electrical equipment, pylons and poles



Concrete slab lifting and stabilization



Supporting commercial and residential structures



Highways structures



Utility and pipeline tie downs



Solar farms

APPLICATION CASES

SHAOXING

Songwan 110KV Transmission and Transformation Project

The Shaoxing Songwan 110KV power transmission and transformation project is divided into the following four lines: the Honghu Binhai 110kV line project, the Honghu Sanjiang T-connected Haitan substation 110kV line project, the Honghu Sangang Song 110kV line project, and the Sanggang Mahai 110kV line capacity expansion and transformation project. Among them, the iron towers used for the old transmission line of the Hong Kong Ma Line no longer meet the current iron tower standards, and new iron towers that meet the standards need to be replaced. Compared to the old iron tower, the new tower is at least three times larger in size. The power department has chosen to build a new line 10 meters next to the line to replace the old one. After the new line is built, the old line will be demolished. In the entire newly built line, one tower adopts our company's developed spiral anchor foundation, replacing the traditional cement grouting pile foundation, becoming a new attempt by the power sector.

The tower is constructed using a helical pile foundation combined with a cement poured bearing platform. A tower has four legs, each supported by four helical pile. A total of 16 helical pile are used, with a depth of 8 meters, and all of them are vertical piles. The equipment used for construction is the XCMG 305 excavator, with an 80000Nm drive head installed. The construction personnel first rotate the helical pile vertically into the ground, and the entire project is closely monitored by the verticality and torque monitors. Real time data is wirelessly transmitted to the cockpit, improving the construction personnel's ability to perceive the construction situation. Then use a small excavator to excavate a square foundation pit around the helical pile, and tie it into a steel cage to play a compressive and uplift resistance role. After tying the steel reinforcement cage, start pouring the concrete cushion cap, and once again create an oxygen free environment for the helical pile, achieving the effect of corrosion and oxidation resistance. After the pouring is completed, cement curing will be carried out. The curing period will end and the pile foundation construction will be completed. According to on-site calculations, a helical pile foundation can withstand a pressure of 70-80 tons and a pull-out force of 30-40 tons, fully meeting the new standards for tower pile foundations.

At present, the renovation project of the Hong Kong Ma Line has been fully completed, and the high adaptability between the helical pile foundation and the tower pile foundation is evident. Although its cost is basically the same as that of traditional construction, construction efficiency is greatly improved and construction difficulty is significantly reduced. Its highly mechanized and standardized construction mode can greatly reduce safety hazards. Power departments across the country are vigorously promoting helical pile foundation testing, accumulating richer experience and data, and promoting the reform of tower pile foundation construction.







The 220 kV transmission project of Xinjiang Hotan Thermal Power Plant consists of two lines. The first part is the 220kV transmission line from Hetian Thermal Power Plant to Guanjing substation, and the construction of two 220kV transmission lines. The second part is the 220kV transmission line from Guanjing substation to wutong substation, and the construction of one 220kV transmission line. The total investment of this project is 164 million yuan, with a total length of 92 kilometers and a total of 256 towers along the entire line.

Among them, the first line is located in the desert, and two iron tower points are selected as pilot helical pile foundations. In the other route, three points were selected as pilot sites. These five pilot projects all adopt the method of welding steel bearing platforms with helical pile foundations for construction, and have innovated the method of inserting helical pile into the soil. Each tower has 4 legs, each supported by 3 helical pile, with an helical pile body length of 7 meters and a depth of over 6 meters. One of the piles closer to the center of the tower is a vertical pile, while the other two are inclined piles. The inclined single helical pile is more in line with the stress characteristics and more scientific.

The specific construction process is as follows: first, at the designated location of the pile, use the spiral pile information construction system to vertically screw one helical pile into the ground, and the other two at a 15 ° inclination angle. After confirming that the helical pile reaches the load-bearing layer, cut the top to ensure that the top of the three helical pile are on the same horizontal plane. Then, grouting is carried out, and cement is poured into the interior of the helical pile to enhance its compressive, pull-out, and rust resistance capabilities. Finally, weld the steel bearing platform. The requirements for welding are very high for helical pile foundations, so simply welding the bearing platform and the top of the anchor together is not enough. It is necessary to add reinforcement bars to ensure the stability of the pile foundation. The completion of welding represents the completion of the construction of the helical pile foundation, and then the main body of the tower can be installed on the bearing platform.

Compared with traditional concrete pouring pile foundations, helical pile foundation construction has a shorter construction period, no solidification period or maintenance period, is not limited to rainy and snowy weather, has less impact on the surrounding environment, does not generate noise and vibration, and does not affect soil structure and water sources. It is an efficient, environmentally friendly, and economical pile foundation construction technology. In addition, as this process can achieve fully mechanized construction, it can greatly reduce the demand for human resources, improve construction efficiency, reduce construction risks, and ensure the quality and safety of the project.

Part 1- Hetian Thermal Power Plant to Guanjing Substation 220 kV Transmission Line ≡



Part II -220kV transmission line from Guanjing substation to wutong substation ≡



ENTERPRISE INTRODUCTION



COMPANY NAME

Ningbo Yichen Environmental Technology Co., Ltd. referred to as "Yichen", formerly known as Ningbo ANT Heavy Industry Technology Co., Ltd., was officially renamed in November 2020. It is a one-stop service provider for all environmental engineering equipment solutions. Products are widely used in new/reconstructed roads, airports, tunnels, bridges, heavy engineering infrastructure and other fields, providing a strong guarantee for municipal construction, transportation, water conservancy and other urban construction.

TECHNICAL STRENGTH

The company integrates technology research and development, manufacturing, construction guidance, and after-sales service, and has won 20 national patents. The products are exported to dozens of countries including the United States, Australia, Britain, Southeast Asia and so on. Provide products and technical services for more than ten Fortune 500 companies such as China Communications Construction, China Railway Construction, China Railway, Xugong Group, Sany Group, etc.

PROBUCT LINES

With nearly two decades of experience in the development of excavator attachments and solid material handling equipment production. At present, the company has six product series, including earth drill (auger drive, auger, helical pier and torque indicator), drum cutter, rock saw, crusher bucket and screening bucket. In 2015, the company completed the design and development of soil stabilization system and put it into the market. The successful development of the system makes Yichen the first in-situ soil solidification and remediation system using a more environmentally friendly slurry solidification agent in the world.





OFFICIAL WEBSITE



+86-139 -8932- 4095



www.ycattachments.com



+86-0574- 27851020



info@ycattachments.com



No.380, Chunbai Road, Tongjiaosi industrial Park, Fenghua District, Ningbo, China