



SQUARE SHAFT HELICAL PILES
FOR LOADS FROM 5 TO 55 TONS



IDEAL GROUP IS A FAMILY-OWNED AND OPERATED MANUFACTURER OF AMERICAN-MADE DEEP FOUNDATION SYSTEMS.

We pioneered the high-capacity helical pile industry, and today we manufacture round and square shaft helical piles with shaft sizes ranging from 1.5" to 36" in diameter. We offer the industry's most comprehensive range of high-tensile steel helical piles and anchors. We pride ourselves in providing quality products that adhere to International Building Codes and meet or exceed design guidelines. Our standard helical products have been third-party evaluated by ICC Evaluation Service (ICC-ES), and findings are covered in our comprehensive ESR-3750 report. Leave behind any misconceptions you had about helical piles and see what IDEAL has to offer. We're going places.



GET FAMILIAR

The unit is called a **helical pier** if it resists compressive loads, which are usually downward. It is called a **helical anchor** if it resists tensile loads, which are usually upward or inclined. Many helical units function as both piers and anchors.

A typical helical unit is shown to the right. It consists of a central steel shaft, to which can be attached one or more steel helices. The central shaft can be lengthened by adding extension pieces as necessary. The final component to the helical unit is the Load Transfer Device (LTD). This is used to transfer the tension or compression load from the structure to the helical unit.

The central shaft of a helical unit may be round or square and hollow or solid. Helical units with round shafts are typically hollow, and square shafts tend to be solid. Round and square shaft helical piles share many of the same advantages. However, each type of shaft has a few key areas where it outperforms the other in certain situations. Areas where solid square shaft piles perform well are:

TENSILE STRENGTH – Square shaft piles are a preferred and cost-effective choice for tension-only applications.

LIGHT COMPRESSION LOADS – Square Shaft piles are best suited for light compression loads. In situations with high compression loads, square shaft piles are often too slender, and there may be buckling concerns.

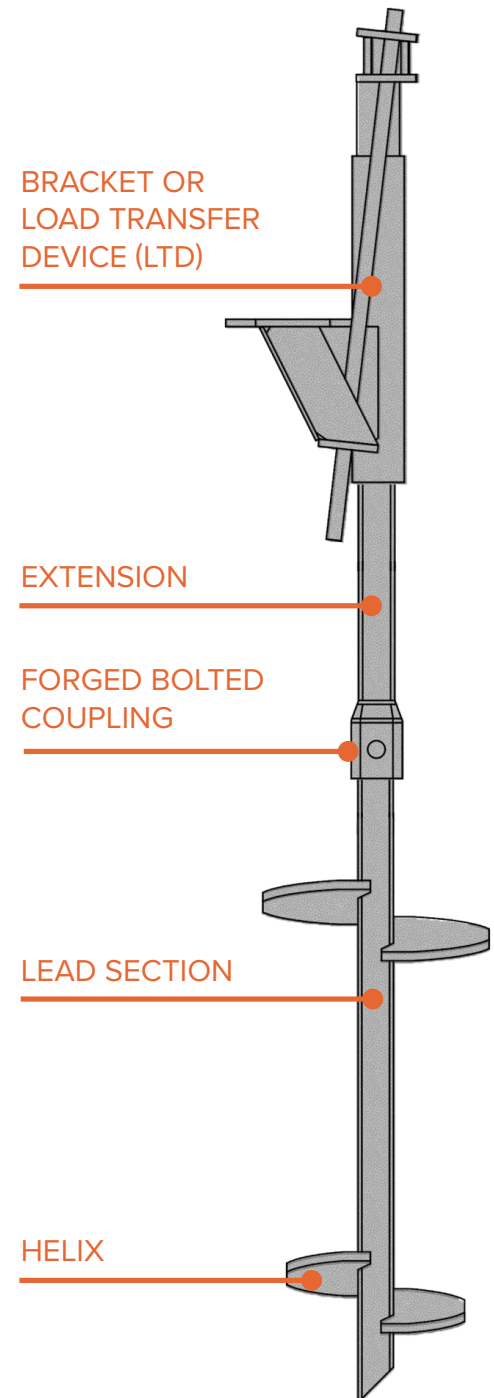
SACRIFICIAL STEEL – The solid steel shaft of square shaft helical piles allows more sacrificial steel, which can be beneficial in corrosive soils or high-water tables.

TORQUE EFFICIENCY – Square shaft helical piles have a greater torque correlation factor (Kt) due to the lower displacement and resistance compared to round shaft helical units.

MORE ECONOMICAL – Square shaft helical piles are often the most economical solution on projects with loads less than 30 tons due to the lower cost of materials.

BETTER PENETRATION OF STIFF SOILS – When configured correctly, square shaft helical piles are easier to install in dense or stiff soils due to the lower resistance and displacement from a square shaft.

Experience and theory have combined to suggest that the preferred spacing between helices is equal to 3 times the helix diameter of the preceding helix.



APPLICATIONS

A helical pier is an end-bearing deep foundation. Its purpose is to transfer a structural load to deeper, stronger, and less compressible materials, bypassing any weaker and more compressible materials that would be unsuitable for supporting conventional shallow foundations.

As a deep foundation, a helical pier should be considered for most applications that would call for a driven pile, drilled pier, or mini pile.

Helical piles and anchors are usually an excellent foundation solution to any of the applications below, whether it's a new build or an existing structure.



ADVANTAGES

For many applications helical units may offer significant advantages over other systems. Some of these include:

WIDE RANGE OF LOADS

A wide range of allowable loads. Anywhere from 10-500 tons to be exact.

VERSATILE INSTALLATION ANGLES

Adaptability to a variety of installation angles to accomodate compression, tension, lateral, and overturn.

LESS DEPTH = MORE MONEY

Lower cost than driven or drilled piles. While the cost per foot may be higher, piles can be installed to lesser depths and reach the same required capacities.

RAPID INSTALLATION

Not quite lightning fast, but it's hard to beat the ease and speed of installation.

MINIMAL EQUIPMENT

Minimal support equipment is needed for installation. A drive head, torque indicator, and a few other components and you're up and running. Just by the way, IDEAL offers the most complete drive head packages in the industry.

GREAT FOR LIMITED ACCESS

Helical piles are great for low-headroom and other limited-access areas inside, underneath, and in between existing structures.

SIMPLE CUTOFFS

With a band saw or torch, on-site cut-offs are a breeze.

NO CONCRETE DELAYS

No concrete-related delays, and we all know time is money...

INSTALL IN EXTREME WEATHER

Helical piles can be installed in any weather except thunderstorms and whatnot. We play it safe, and you should too.

LIMITED EARTHWORK AND NO SPOILS

Little or no earthwork or spoil material is created during helical pile installation. This is a huge advantage when working at contaminated sites.

MINIMAL VIBRATION AND NOISE

With minimal vibration and noise, helical piles are a perfect fit for historic structures and other urban projects surrounded by fragile people and buildings.

TEMPORARY INSTALLATIONS

Easily removed and reused in temporary applications such as shoring and movable structures.

LOW MOBILIZATION COST

Very low mobilization and demobilization costs. Look at the real costs of installing alternates and you might be as surprised as we were when we did the math.



INSTALLING

A helical screw pile is rotated into the ground by using a hydraulic drive head, powered by an excavator, pile driving rig, or any other equipment with hydraulic capability. IDEAL requires installers to monitor installation torque and pile alignment during the installation process. This is required for a few reasons.

First, it is important to have a qualitative assessment of the soils being penetrated at various depths. Using a graph, the recorded installation torque and depth is interpreted against the existing soil data to obtain a correlation that enables a simple verification strategy to be determined.

The soil data is interpreted against the installation torque and a correlation is obtained to maintain the integrity of the helical screw pile during installation as well as mitigate damage by exceeding the allowed torsional strength to any of the pile's components. Every helical screw pile has a maximum stress level that must not be exceeded in order to avoid compromising the structural integrity of the helical screw pile unit.



THE HISTORY

The first helical screw pile was invented in the 1830's by a blind Irish marine construction engineer named Alexander Mitchell. His design proved to be a major improvement over traditional straight pile designs, so Mitchell and his son promptly patented the cast iron screw pile. In 1840 the first screw piles were installed to support the Maplin Sands lighthouse at the mouth of the Thames River. This innovative design caught on and made its way across the pond quickly and before long most of the lighthouses in the Mid-Atlantic region were being built on helical pile foundations. There were more lighthouses built on helical pile foundations in Chesapeake Bay than anywhere else in the world. A total of Forty-two helical screw pile lighthouses were built on Chesapeake Bay between 1850 and 1900.

The helical screw pile technology didn't stay on the east coast. Over the next few years, helical screw pile lighthouses could also be found in the Great Lakes Region and the Gulf of Mexico.

The foundation of a typical screw pile lighthouse consisted of one central pile installed in the center and then flanked by another six or eight piles around the perimeter. This design increased the anchoring properties and the bearing power of the helical screw piles. These early helical screw piles were often installed by using large torque bars and the power of men, horses, or oxen.

Alexander Mitchell's helical screw pile design is just as effective today as it was in the late 18th century and continues to be installed around the world.



OUR PRODUCTS

IDEAL manufactures and supplies a wide range of deep foundation products, including round shaft and square shaft helical screw piles and anchors. Our highly efficient production processes and principles combined with our commitment to consistent quality allow us to provide superior products that you can depend on. The IDEAL team is often called on to fabricate custom piles and brackets to exact client specifications or designs. This is another area where our design and production teams have become highly recognized for their innovation and skill. Our unique approach to design and production, as well as our commitment to continuous improvement allows us to provide you numerous benefits whether you're an installer, contractor, engineer, or end user.

We offer the industry's most comprehensive range of high-tensile steel helical piles and anchors, which includes our 1.5" and 1.75" square shaft product lines. We also fabricate standard and custom new construction caps, brackets, and a variety other termination accessories. All helical products can be bare or galvanized depending on soil conditions or design guidelines. Our standard Helical Piles, Helical Anchors, and associated Brackets and Hardware are ICC-ES Certified under ESR-3750-IDEAL Manufacturing, Inc. This includes our 1.50" solid square shaft.

STANDARD SQUARE SHAFT PILE CONFIGURATIONS

SHAFT		TORQUE/CAPACITY				STANDARD HELIX CONFIGURATIONS					
PRODUCT CODE	O.D. (INCHES)	WALL THICKNESS (INCHES)	MAX TORQUE (FT*LBS)	TORQUE INSTALLATION FACTOR k_t	ULTIMATE CAPACITY $k_t * T_{max}$ (BY TORQUE) (kip)	SINGLE HELIX (INCHES)	DOUBLE HELIX (INCHES)	TRIPLE HELIX (INCHES)	FLIGHTED EXTENSION SINGLE HELIX (INCHES)	FLIGHTED EXTENSION DOUBLE HELIX (INCHES)	HELIX THICKNESS (INCHES)
SQ150	1.50	NA	7,000	10	70	8, 10, 12	8/10, 10/12	8/10/12, 10/12/14	14	14/14	0.375
SQ175	1.75	NA	11,000	10	110	8, 10, 12	8/10, 10/12	8/10/12, 10/12/14	14	14/14	0.5

UNSURE OF WHAT YOU NEED?

Our in-house design team is always willing to provide foundation recommendations or design support for all types of deep foundations.

DON'T SEE THE PRODUCT YOU NEED?

We also manufacture and supply micropiles and round shaft helical piles with shaft sizes up to 36".

UNIQUE PROJECT REQUIREMENTS OR SPECIFICATIONS?

Our team frequently designs and manufactures deep foundation systems specific to project requirements. No matter the application or restrictions if it needs support, we can provide a solution.



The background of the slide features a dark blue, almost black, industrial setting. On the left, a large, metallic, cylindrical component of a machine is visible, partially obscured by shadows. To the right, a dense trail of small, glowing orange and yellow particles or sparks extends from the center towards the right edge, suggesting a process of manufacturing or a high-speed event. The overall atmosphere is technical and dynamic.

OUR MISSION

To provide our clients and associates with proprietary technology, products, equipment, and support, ensuring excellence in the design and performance of deep foundation and earth anchoring projects.