



Magnum Piering, Inc.  
ISO9001:Quality Manual Section 4  
**Product Guides and Procedures**

Document Number

**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number

**0**

Title

**Helical Pile Installation**

Issue Date


**09/21/2016**

Custodian

**Director of Engineering**

Revision Date	Description of Change	Approved By
09/21/16	Initial Release	HAP

Controlled if printed in red.

	Document Number <b>MAGNUM-ISO9001:SOP 4.1.1</b>	Revision Number <b>0</b>
	Product Guides and Procedures <b>Helical Pile Installation</b>	Page of Pages <b>2 of 20</b>

## Contents

1. PURPOSE .....	3
2. QUALIFICATIONS .....	3
3. CODES AND STANDARDS .....	4
American Institute of Steel Construction (AISC) .....	4
Occupational Safety and Health Administration (OSHA) .....	4
American Welding Society .....	4
American Concrete Institute (ACI) .....	4
4. EQUIPMENT .....	5
Hydraulic Machine .....	6
Torque Motor .....	6
Drive Tool .....	6
Drive Pins .....	6
Torque Indicator .....	7
5. EXECUTION .....	8
Examination .....	8
Notification .....	8
Personnel .....	9
Execution .....	10
Termination Criteria .....	15
6. SPECIAL PROVISIONS .....	17
7. TOLERANCES .....	17
8. QUALITY ASSURANCE .....	18
Helical Pile Installation Logs .....	19
9. MAINTENANCE .....	20



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**


Page of Pages  
**3 of 20**

## **1. PURPOSE**

These guide procedures define the minimum requirements for safe installation of Magnum helical piles primarily for support of vertical compressive loads and incidental lateral and tension loads. The scope of these procedures does not include mounting of foundation brackets, installation of manufactured steel framing systems, and load testing. See other applicable procedures for these items.

## **2. QUALIFICATIONS**

Due to the reliance of helical pile capacity on proper field techniques and quality control, work covered under these procedures shall be performed by an authorized Installer. Authorization shall be granted based on 1.) Specialization in helical pile installation, 2.) Demonstrated knowledge in specialty geotechnical construction, 3.) Successful completion of Magnum training program in the proper methods of installation, 4.) Successful completion of past helical pile projects, 5.) Installer's equipment is compatible with product, and 6.) Installer is in good financial standing.

	Document Number <b>MAGNUM-ISO9001:SOP 4.1.1</b>	Revision Number <b>0</b>
	Product Guides and Procedures <b>Helical Pile Installation</b>	Page of Pages <b>4 of 20</b>

### 3. **CODES AND STANDARDS**

The work shall be conducted in accordance with all local, state, and federal construction and safety codes and standards including but not limited to the latest versions of the following codes and standards.

#### **American Institute of Steel Construction (AISC)**

Steel Construction Manual

#### **Occupational Safety and Health Administration (OSHA)**

Excavation Safety Guidelines

Personal Protective Equipment

Operator Qualifications and Certification

#### **American Welding Society**

ANSI/AWS B2.1-00 Standard for Welding Procedure and Performance Qualification

#### **American Concrete Institute (ACI)**

ACI 318-11 Building Code Requirements for Structural Concrete



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**5 of 20**

#### **4. EQUIPMENT**

The following list of equipment is recommended for helical pile installation. Detailed requirements for special equipment are provided in the paragraphs below.

- Hydraulic Machine
- Hydraulic Torque Motor
- Drive Tool Adapters & Drive Pins
- Calibrated Torque Indicator
- Magnum Helical Pile Shaft Drill and Cut-Off Jigs
- Rotary Percussion Rock Drill (optional for pilot holes)
- Excavator (optional for shallow obstructions)
- Gas Powered Electric Generator
- Magnetic Drill Press & Drill Bits
- Portable Band Saw & Spare Blades
- Transit, Tripod and Survey Rod or Laser Level System
- Electric Impact Wrench & Deep Well Sockets
- Form Stakes
- 3lb and 15lb Sledge Hammers
- Drift Pins
- Hand Wrenches
- Carpenter Levels (torpedo & 4ft.)
- Tape Measures (100 ft. & 25 ft.)
- String Lines (2 min.)
- Shovel
- Angle Finder (magnetic)
- Marking Paint
- Sharpie Marker
- Extension Cords (4 min.)
- Spud Bars (6' and 3')
- Personal Protective Equipment



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**6 of 20**

## Hydraulic Machine

The hydraulic machine shall be capable of applying adequate crowd and torque simultaneously to ensure normal advancement of the helical piles. The equipment shall be capable of maintaining proper alignment and position. Hydraulic flow and pressure should match torque motor requirements.

***SAFETY NOTE: In high traffic areas or busy construction sites, helical pile installation work areas should be barricaded to prevent pedestrian and non-essential worker access. Zero swing style hydraulic machines, back-up alarms, and other safety features should be incorporated to protect workers and the public from being struck by hydraulic machines.***

---

## Torque Motor

Helical piles should be installed with high torque, low RPM motors, which allow advancement with minimal soil disturbance. Ideal rotation rate is 10 to 30 rpm. The torque motor shall be hydraulic power driven with clockwise and counter-clockwise rotation capability. The torque motor shall be adjustable with respect to revolutions per minute during installation. Percussion drilling equipment shall not be permitted. The torque motor shall have torque capacity equal to or greater than the minimum final installation torque required for the project or as shown on the Foundation Plan. The connection between the torque motor and the installation rig shall have no more than two pivot hinges oriented 90 degrees from each other. Additional hinges promote wobbling and affect lateral capacity.

***SAFETY NOTE: Installer should occasionally inspect hydraulic lines and hoses on equipment and replace worn or damaged parts to avoid hydraulic pressure burst.***

---

## Drive Tool

The connection between the torque motor and helical pile shall be in-line, straight, and rigid, and shall consist of a hexagonal, square, or round kelly bar adapter and helical shaft socket. To ensure proper fit, the drive tool shall be manufactured by Magnum Piering, Inc. and used in accordance with Magnum's installation instructions.

## Drive Pins

The central shaft of the helical pile shall be attached to the drive tool by ASME SAE Grade 8 smooth tapered pins matching the number and diameter of the specified shaft connection bolts.



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

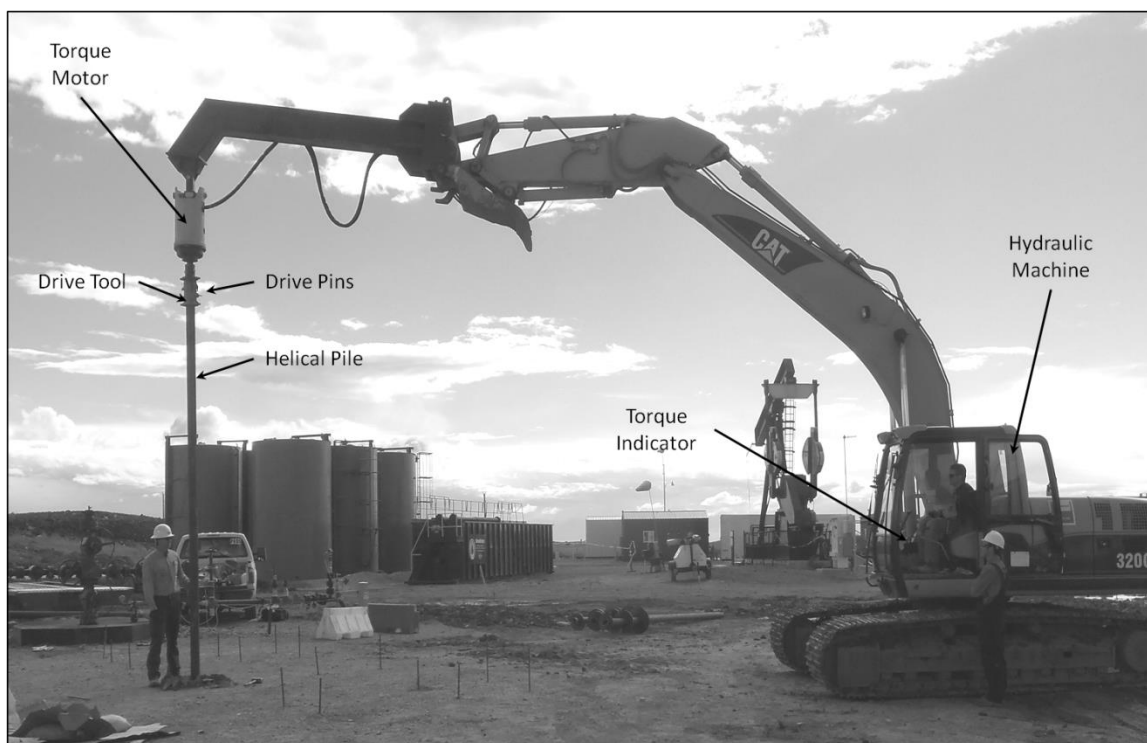
Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**7 of 20**

***SAFETY NOTE: Worn or defective drive pins can break and cause injury. Drive pins should be maintained in good condition and safe to use at all times. The pins should be regularly inspected for wear and deformation. Pins should be replaced when worn or damaged.***

## Torque Indicator

A torque indicator shall be used to measure torque during installation. The torque indicator can be an integral part of the installation equipment or externally mounted in-line with the installation tooling. The torque indicator shall be capable of torque measurements with a sensitivity of 500 ft-lb or less. Torque indicators shall have been calibrated within 1-year prior to start of work. Indicators that measure torque as a function of hydraulic pressure shall be re-calibrated following maintenance performed on the torque motor. Torque indicators shall be re-calibrated if reasonable doubt exists as to the accuracy of the torque measurements.



EXAMPLE INSTALLATION RIG



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**8 of 20**

## 5. EXECUTION

The following steps represent minimum suggested procedures. Actual procedures will vary according to project requirements, access, and site conditions. Nothing in this guide is intended to overrule the judgment of the installation foreman following the standards of care in the industry. Safety and installation quality is the sole responsibility of Installer.

### Examination

Installer shall take care to avoid underground structures, overhead power lines, and other utilities. If utilities are believed to be in area of helical pile installation, work shall be delayed until utilities can be relocated or helical pile locations changed. If buried utilities/structures are close to area of work, Installer shall pot hole to determine the exact location of underground utilities and buried structures within three feet, or a distance of two times the maximum helix diameter from a helical pile, whichever is greater.

***SAFETY NOTE: Make utility "one call" at least 72 hrs in advance of installation activities.***

---

Installer shall review aerial photographs, drawings, soil borings, geologic maps, specifications, previous installation logs, and other pertinent documents, to the extent available, so as to evaluate access and subsurface conditions for proper execution of work. In addition, Installer shall make a site visit to observe conditions prior to the start of work. Installer shall notify client of any condition that would affect proper installation of helical piles immediately after the condition is revealed.

***SAFETY NOTE: Verify nearby excavation work, if any, is in accordance with OSHA standards and that overhead power line clearance meets job-site standards.***

---

If excavation is required for proper installation of helical piles, Installer shall make safe excavations in accordance with OSHA standards. All excavations greater than 20 feet in depth or not in strict accordance with OSHA standard details shall be designed by a registered design professional specializing in the design of excavations and shoring.

### Notification

Notify client of installation schedule at least 24 hrs prior to start of work.

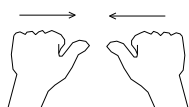




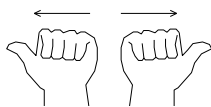
## Personnel

Installation crew should at a minimum include an experienced equipment operator, a spotter, and a laborer. The spotter's job is to stand within plain view of operator and helical pile and to convey hand signals and verbal cues to operator that assist in maintaining proper pile and drive equipment orientation. The spotter's responsibilities also include placing and removing drive pins and placement of connection bolts. The laborer's responsibilities include moving and handling helical pile extension sections, pile cut-off, and installation of steel plate caps.

***SAFETY NOTE: Personal protective equipment should include at a minimum, but not be limited to, hard hats, safety glasses, safety toed boots, work gloves, ear protection, Hi-Visibility vest, outer layer of FR clothing, and gas monitor (where required). Personal protective equipment should be worn at all times when working around pile installation equipment.***



**BOOM IN**



**BOOM OUT**



**SLEW RIGHT**



**SLEW LEFT**



**STOP**



**BOOM DOWN**



**BOOM UP**



**ADVANCE**



**WITHDRAW**



**ATTACHMENT UP**



**DOWN SLIGHT**



**UP SLIGHT**



**CLOCKWISE**



**COUNTERCLOCKWISE**



**ATTACHMENT DOWN**

**EXAMPLE SPOTTER HAND SIGNALS**



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**10 of 20**

***SAFETY NOTE: When arriving on site, survey and remove or identify and mark potential slip/trip/fall hazards. Use Ice Melt if needed. Wear traction devices on boots if needed.***

---

## **Execution**

To begin installation, connect the Lead Section to the Torque Motor using the Drive Tool and Drive Pins. Position and align the Lead Section at the location and to the inclination shown on the Drawings and crowd the pilot point into the soil. Begin rotation and continue to advance helical pile by adding Extension Sections as required to achieve the Termination Criteria. All sections shall be advanced into the soil in a smooth, continuous manner at a rate of rotation between 10 and 30 revolutions per minute. Couplings shall be made using the number and size bolts specified by manufacturer (typically supplied with the piles). Snug tight all Lead and Extension coupling bolts per AISC snug tight guidelines, which is defined as 1/2 turn past the point at which the nut contacts the pile coupling sleeve.

As an alternative, couplings may be secured by plug welding through collar tube holes to side of helical pile shaft if hot work permit has been obtained. Use 70 ksi weld rod for most helical piles, except on 5.5 inch diameter Magnum MH530, MH536, and MH547 shall be welded using high strength (100 ksi minimum) weld rod. Follow AWS procedures.

Constant axial force (crowd) shall be applied while rotating helical piles into the ground. The crowd applied shall be sufficient to ensure that the helical pile advances into the ground a distance equal to at least 80% of the helix pitch per revolution during normal advancement.

The torsional strength rating of the helical pile or Helical Anchor shall not be exceeded during installation. Torsional strength ratings are shown in the Magnum Product Catalog and typically on the Foundation Drawing.

***SAFETY NOTE: Exceeding manufacturer rated torsional strength can damage helical pile. Capacity of torque motor should be matched with helical pile rated torsional strength, or a pressure limiting device should be used to avoid exceeding torsional strength of helical pile shaft.***

---

Torsional strength ratings are based primarily on bolt hole elongation at the drive tool. Bolt hole elongation due to torsion of the shaft of a helical pile at the drive tool shall be limited to ¼ inch. Bolt hole elongation of this amount indicates torsional strength ratings have been obtained and



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**11 of 20**

installation should be halted. Helical piles with bolt hole damage exceeding this criterion shall be uninstalled, removed, and discarded.

It is important to maintain proper positioning and alignment during installation. Pile plumbness should be checked occasionally during installation with a torpedo level for vertical piles or a digital inclinometer for battered piles. At a minimum, plumbness should be checked when first helix encounters the ground and a few feet later. Alignment can be maintained by the use of offset pins. Measuring from the offset pins to the pile periodically during installation and adjusting the pile early in the installation process and often can improve placement accuracy. Lateral force on the top of the pile during installation should be minimized to that amount necessary to hold alignment but prevent damage to the pile. Position tolerance is often more important than installation angle, so it is better to hold position rather than angle if the pile starts to walk.

***SAFETY NOTE: Simultaneous application of high lateral force while applying high torque during installation may result in pile shaft rupture.***

---

After the Termination Criteria of a helical pile has been obtained, Installer shall adjust the final pile head elevation to that shown on the Foundation Drawings or as required. Set-up transit or laser level and establish final pile head elevation based on Foundation Drawings. Often, the easiest method to obtain the proper final pile head elevation is to continue installation until the final elevation is achieved. Use laser or optical target on torque motor to verify elevation. Installer shall not reverse the direction of torque and back-out the helical pile to obtain the final elevation.

If maximum torque is obtained prior to final elevation or pile installation is stopped for any reason, including installer choice, then final pile head elevation shall be obtained by cutting-off the top of the shaft. Place Magnum bolt hole and cut-off template over each pile shaft and adjust to template to desired elevation. Cut-off piles with portable band saw. Alternatively, installer may cut-off piles with torch or plasma cutter and pipe cutting jig. Using Magnum drilling template to ensure correct bolt hole locations, drill holes through cut-off pile shaft for steel plate caps with a magnetic drill press and appropriate size drill bit.

***SAFETY NOTE: Helical pile shafts may be cut-off with torch or plasma tube cutter only if hot work permit can be obtained.***

---



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**12 of 20**

Place steel plate caps on helical pile shafts and secure using heavy hex bolts and nuts. Tighten cap bolt nuts to snug tight, which is defined by AISC as one-half turn after the nut contacts the surface of the cap sleeve. See Magnum Product Catalog or Foundation Drawing for the number and size of bolt holes required for the steel plate cap. Double check that all cap plate elevations are within tolerance. If cap elevations are out of tolerance, installer shall remove, re-drill, and reset caps that are out-of-elevation.

As an alternative to drilling and bolting, pile caps may be installed by welding. Rotate cap so that cap holes are not aligned with pile shaft holes. Mark hole locations with sharpie. Remove cap and grind weld areas to remove any rust, scale, paint or galvanizing. Replace cap. Weld cap in place. For tension applications, fill all cap holes with complete plug welds. Ensure good weld penetration to plug base and sides. For compression only applications, plate style caps may be simply tack welded provided plate is bearing on pile shaft.

***SAFETY NOTE: Follow AWS standards for plug and tack welding (requires hot work permit).***



EXAMPLE USE OF PILE SHAFT CUT-OFF AND BOLT HOLE TEMPLATE



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**13 of 20**



EXAMLE USE OF WELDING EXTENSIONS INSTEAD OF BOLTING (Requires Hot Work Permit)

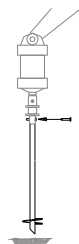


Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

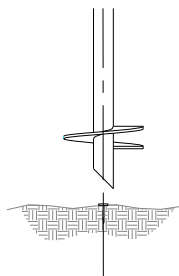
Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

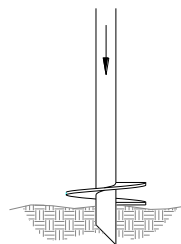
Page of Pages  
**14 of 20**



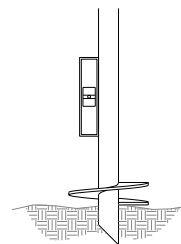
1.) ATTACH HELICAL PILE  
LEAD SECTION TO TORQUE  
ADAPTOR USING DRIVE PIN



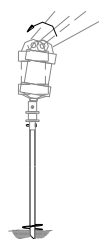
2.) CENTER HELICAL PILE  
OVER PLANNED PILE  
LOCATION



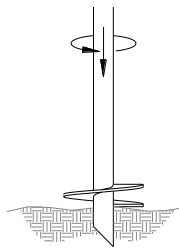
3.) PUSH PILOT DOWNWARD  
UNTIL BOTTOM HELIX  
MAKES CONTACT WITH  
GROUND SURFACE



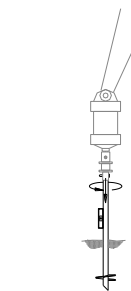
4.) CHECK PLUMBNESS



5.) CHECK ALIGNMENT AND  
PLUMBNESS OF TORQUE  
MOTOR AND ALL LINKAGE



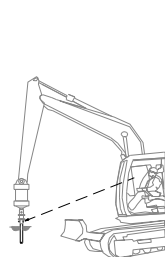
6.) BEGIN ROTATION WHILE  
APPLYING DOWNWARD  
CROWD



7.) CONTINUE  
INSTALLATION, CHECK  
PLUMBNESS AS REQUIRED



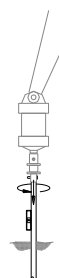
8.) RECORD DEPTH AND  
TORQUE READINGS AT  
SELECT INTERVALS



9.) STOP AT GROUND  
SURFACE SO THAT  
OPERATOR CAN SEE DRIVE  
PIN CLEARLY



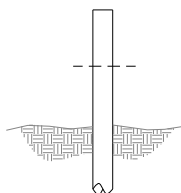
10.) ADD EXTENSION  
SECTIONS AS NECESSARY



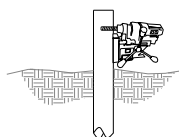
11.) CONTINUE  
INSTALLATION, CHECK  
PLUMBNESS AS REQUIRED



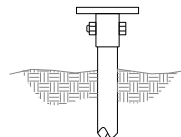
12.) HALT INSTALLATION  
WHEN SPECIFIED DEPTH  
AND TORQUE ARE  
ACHIEVED



13.) CUT SHAFT TO FINAL  
ELEVATION



14.) DRILL BOLT HOLES AS  
NECESSARY



15.) MOUNT PIER CAP



16.) RECORD FINAL DEPTH,  
TORQUE, AND ELEVATION



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**15 of 20**

***SAFETY NOTE: Avoid blocking process and emergency equipment, ladders and escape routes. Material should be stored away from high traffic areas and area should be barricaded to control access as situations warrant. Stage equipment out of the way of any current traffic routes. Back vehicles in to allow safe exit. Conduct 360 walk-arounds. Pay constant attention for any workers or non-construction personnel that could be in harm's way.***

### **Termination Criteria**

Helical piles shall be advanced until all of the following criteria are satisfied:

- Axial capacity is verified by achieving the final installation torque required for the project as shown on the Drawings. Helical pile capacity in soil and on bedrock depends on the geometric configuration of the helical bearing plates and the subsurface conditions. The torque applied during installation provides a verification of axial capacity. Ultimate capacity to torque ratios are shown in the Magnum Product Catalog. Unless otherwise specified, a minimum factor of safety of 2.0 shall be used to determine allowable capacity. Hence, all helical piles shall be advanced until a final installation torque is achieved equal to the design loads shown on the Drawings times a factor of safety of 2.0 divided by the ultimate capacity to torque ratio (e.g. final installation torque, ft-lbs = design loads, lbs x 2.0 / capacity to torque ratio, ft<sup>-1</sup>).
- Minimum depth is obtained. The minimum depth shall be as shown on the Drawings, that which corresponds to the planned bearing stratum, the depth of wetting in expansive soils, average depth of frost in cold regions, or the depth at which the final installation torque is measured, whichever is greater. When there exists a significant tension load, helical piles shall be advanced until upper helix is at least seven (7) diameters below ground surface unless otherwise noted on plans.

If the torsional strength rating of the helical pile and/or installation equipment has been reached prior to achieving the minimum depth or if practical refusal occurs defined as augering without further advancement, Installer shall have the following options:

- Terminate the installation at the depth obtained subject to the review and acceptance of the Engineer and Client.
- Reverse the direction of torque, back-out the helical pile a distance of 1 to 2 feet and attempt to reinstall by adjusting crowd up or down to auger through the obstruction.



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**16 of 20**

- Remove the helical pile and install a new one with fewer and/or smaller diameter helical bearing plates or with Magnum dual cutting edge helical bearing plates. The new helical configuration shall be subject to review and acceptance of the Engineer and Client.
- Remove the helical pile and pre-drill a pilot hole with diameter approximately equal to helical pile shaft diameter in the same location and reinstall the helical pile.
- If the obstruction is shallow, remove the helical pile and dislodge the obstruction by surface excavation. Backfill and compact the resulting excavation and reinstall the helical pile.
- Remove the helical pile and relocate 1-foot to either side of the installation location subject to the review and acceptance of Engineer and Client.
- Remove the helical pile and sever the uppermost helical bearing plate from the lead section if more than one helical bearing plate is in use, or reshape the helical bearing plates to create the Magnum dual cutting edge shape by cutting with a band saw. Reinstall the helical pile with revised helical bearing plate configuration.

If the final installation torque is not achieved at the contract length, Installer shall have the following options:

- Until the maximum depth is achieved (if any), install the helical pile deeper using additional extension sections.
- Remove the helical pile and install a new one with additional and/or larger diameter helical bearing plates.
- Decrease the rated load capacity of the helical pile and install additional helical piles as required to support loads. The rated capacity and additional helical pile location(s) shall be subject to the review and acceptance of the Engineer and Client.





Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**

Page of Pages  
**17 of 20**

## 6. SPECIAL PROVISIONS


Round-shaft helical piles with Magnum dual-cutting edge helix installed in long leads in uniform sandy to clayey soils produce minimal disturbance and shafts are generally tight against the ground. These typical conditions do not require special provisions for lateral performance. However, an annulus can form around the helical pile shaft on sites with soft, compressible soils or sites with occasional cobbles that jar installation. An annulus also can form as a result of inattentive installation or when extensions and couplings are used in certain cohesive soils.

If an annulus forms around the upper pile shaft and the shaft is not tight against the ground, special provisions should be taken to grout the shafts for proper lateral performance. Shaft grout shall consist of neat cement and water or a high performance fast-setting pre-mix such as "Precision Grout" by Quikrete®. Maximum w/c ratio shall be 0.5 to limit shrinkage and ensure adequate strength or per grout manufacturer recommendations. Small quantities of grout can be mixed by hand and poured into the annulus from the surface using a pail or bucket. Larger quantities shall be batched using colloidal mixer and gravity fed into annulus from ground surface. Grout shall be high mobility (milk-like consistency). In freezing temperatures, follow ACI Standard 306.1-90 for Cold Weather Concreting with respect to mixing, handling, and placement.

## 7. TOLERANCES

Helical piles shall be installed as close to the specified installation and orientation angles as possible. Unless otherwise shown on Foundation Drawings, tolerance for departure from installation and orientation angles shall be  $\pm 3$  degrees.

Helical piles shall be installed at the locations and to the elevations shown on the Foundation Drawings. Unless otherwise shown on Foundation Drawings, tolerances for helical pile placement shall be  $\pm 2$  inches and for elevation shall be  $\pm 1/8$  inch. If adjustable caps are used, tolerance for elevation shall be  $\pm 3$ ".

	Document Number <b>MAGNUM-ISO9001:SOP 4.1.1</b>	Revision Number <b>0</b>
	Product Guides and Procedures <b>Helical Pile Installation</b>	Page of Pages <b>18 of 20</b>

## 8. QUALITY ASSURANCE

The Installer shall provide oil producer with copies of installation records substantially similar to the attached log form within 48 hours after each installation is completed. These installation records shall include, but are not limited to, the following information:

- Name of project and Installer
- Name of Installer's supervisor during installation
- Date and time of installation
- Make and model of installation equipment
- Type of torque indicator used and calibration date
- Location of helical pile by grid location, diagram, or assigned identification number
- Type of helical pile and number and size of helical bearing plates
- Installation duration and observations
- Total length installed, required minimum length, and length above grade
- Final elevation of top of shaft and deviation, if any
- Final plumbness, batter angle, or inclination angle of shaft
- Installation torque at three to five-foot depth intervals
- Final installation torque
- Comments pertaining to interruptions, obstructions, or other relevant information
- Verified axial load capacity

An example installation log is provided on the following page. If specified on the Drawings, by oil producer, or by local codes, an inspection agency shall observe and document helical pile installations. Installer shall provide 24 hr notice to inspection agency regarding schedule of helical pile installation work.



Document Number  
**MAGNUM-ISO9001:SOP 4.1.1**

Revision Number  
**0**

Product Guides and Procedures  
**Helical Pile Installation**


Page of Pages  
**19 of 20**

## Helical Pile Installation Logs

PROJECT NAME \_\_\_\_\_ PROJECT NUMBER \_\_\_\_\_  
PROJECT LOCATION \_\_\_\_\_ DATE OF INSTALLATION \_\_\_\_\_

PILE DESIGNATION							
PILE LOCATION							
START TIME							
PILE GEOMETRY	SHAFT SIZE						
	NUMBER OF HELICES						
	HELIX DIAMETERS						
LENGTH	REQUIRED MINIMUM						
	TOTAL INSTALLED						
	ABOVE GROUND						
ELEV.	PLANNED						
	ACTUAL						
ANGLE	PLANNED						
	ACTUAL						
TORQUE MEASUREMENTS	DEPTH (FT)	5					
		10					
		15					
		20					
		25					
		30					
		35					
		40					
		45					
		50					
		55					
TERMINATION	REQUIRED TORQUE						
	FINAL TORQUE						
	VERIFIED CAPACITY						
	COMMENTS						

PILE MANUFACTURER \_\_\_\_\_ INSTALLED BY \_\_\_\_\_  
INSTALLATION EQUIPMENT \_\_\_\_\_  
TORQUE INDICATOR \_\_\_\_\_ CALIBRATION DATE \_\_\_\_\_  
PREPARED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

	Document Number <b>MAGNUM-ISO9001:SOP 4.1.1</b>	Revision Number <b>0</b>
	Product Guides and Procedures <b>Helical Pile Installation</b>	Page of Pages <b>20 of 20</b>

## 9. MAINTENANCE

The performance of foundations depends in part on maintaining proper site grading and drainage. Site grading should be inspected annually after a period of heavy rain or spring thaw. If standing water or poor drainage is noted in the area of the foundation, re-grading work should be scheduled and completed.