

# Target Fixings Ltd

# Heli Pile

## Foundation Systems

### INTRODUCTION

The need for a quick and simple lightweight piling system was determined in the early 1990's. It was not until the middle of that decade that this desire, with the help of a "Smart Grant" from the DTI, bore fruit. The result was the "Millennium Product" award winning Heli Pile.

Since the introduction of the Heli Pile at the Civils Exhibition in 1998, it has led the way in modern mini piling concepts and techniques.

Originally developed as a lightweight piling system for remedial works to housing affected by subsidence, its versatility has allowed the applications to be much wider and more varied than first imagined.

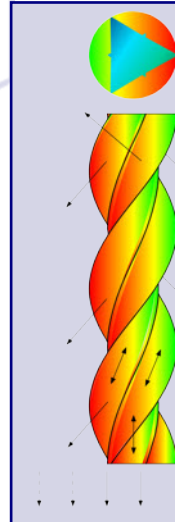
Used in combination with the Bar Flex masonry reinforcement system, the Heli Pile can be designed and used as a standard "pile and beam" repair method. The system is very quick and easy to install giving an efficient and cost-effective solution.

New build applications are not forgotten, and as such, new foundations may also be cast or bolted on to the previously driven Heli Piles. The lightweight equipment ensures that there is little disruption, even on the wettest or most difficult sites. Because of its unique design, it is very effective in tension. This allows it to be used for retaining wall stabilisation and mobile telephone mast and tower base foundations to name just a few.

A series of Standard Details are available showing the various uses and giving a full method statement. Full specification details can also be supplied.



### PERFORMANCE



The Heli Pile is installed using lightweight driving equipment and transmits the induced loads via the wedge-shaped fins at an angle into the substrate. The shape compresses the substrate and increases the effective diameter of the pile. The skin friction is greatly enhanced by compression and the mechanical effect of the fins. The end bearing load is greatly enhanced by the 'cone' effect of the compression.

### MATERIALS

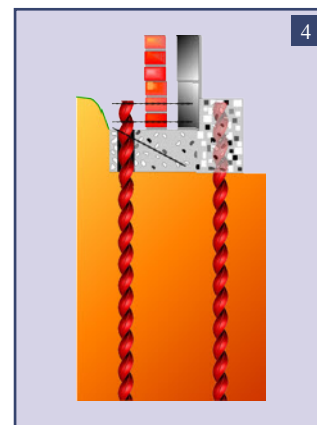
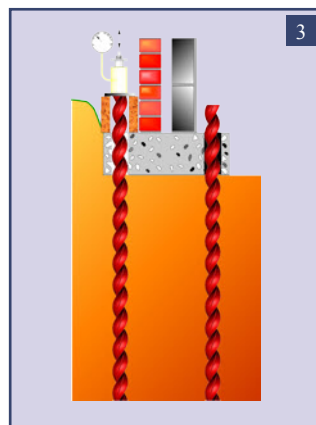
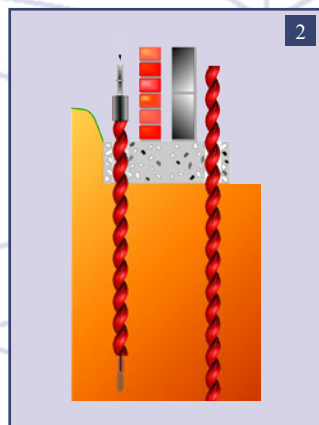
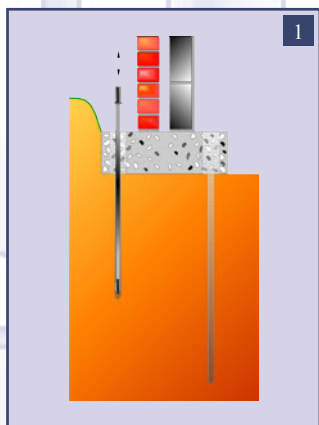
The Heli Pile is now manufactured in-house in two diameters, 60 mm and 100 mm. Both sizes are die cast from Grade LM25 (Al - Si<sub>7</sub>Mg) Aluminium Alloy. This alloy finds application in the chemical, marine, construction and many other industries, above all, in road transport vehicles where it is used for wheels, cylinder blocks and other engine and body castings. It is, in practice, the general purpose high strength casting alloy. It is also used in nuclear energy installations and for aircraft parts. It is recyclable and part of its chemical composition includes up to 10% of recycled aluminium. The "green" credentials are clear to see.

### SPECIAL FEATURES

- Millennium Product award winner
- Quick and cost-effective installation
- Clean alternative to traditional methods
- Achieves loads of up to 200 kN
- Compliments the Bar Flex beaming system
- In-situ on site proof testing
- Easily installed in poor access areas
- Reusable and recyclable
- Minimal disruption

## INSTALLATION PROCEDURE

1. Inspect and Scan area for services.
2. Mark out positions of Heli Piles, avoiding any services.
3. Create a pilot hole using the Heli Spike with a sacrificial Heli Cone.
4. Extract the Heli Spike leaving the pilot hole ready for the Heli Pile.
5. Start Heli Pile in the pilot hole by hand.
6. Secure Drive Head Washer to top of pile and drive the first metre.
7. Remove the Drive Head Washer and attach another section of Heli Pile. Replace Drive Head Washer.
8. Continue 7 to required depth.
9. For tensile testing, place load spreaders local to the installed Heli Pile.
10. For compression testing, attach beam across other installed Heli Piles.
11. Attach Heli Pile Load Test Unit and load test Heli Pile. If there is a shortfall in the loading, repeat 7 or allow a period of time for strength gain.
12. After testing, drive Heli Pile to final position.
13. For remedial work, as shown below, ensure masonry is clean and install Bar Flex as per the project-specific Standard Detail.
14. Shutter local area to Heli Pile and pour concrete to size and strength detailed on the project-specific Standard Detail.



## SITE TESTING



Site testing is achieved by means of a small hydraulic testing kit and, to suit all site conditions, it may be performed either in tension, for soil stabilisation, or compression where it is utilised as a pile. Because of the ease of testing, it is also possible to use a correlation between tensile test and a compressive load. Instead of working to “characteristic” loadings, which have been attained in laboratory conditions, the capability of simple in-situ testing allows the Heli Pile to be tested in the actual site conditions in which it is installed. Proof testing gives the specifier confidence

in the Heli Pile to cope with the imposed loads and permits a much lower factor of safety to be utilised. Heli Pile mast bases for the telecommunications industry have become widely accepted by the major networks. The in-situ proof testing of the Heli Pile and insurance backed guarantee have been a major influence on this market. The fact that the Heli Pile can be uprated or even extracted at a later date is also seen as a major green credential.

## RESEARCH & DEVELOPMENT

In addition to the data recorded from sites around the World, additional independent testing of the tensile, compressive and ductile strength, cyclic loading, pile cap design and general performance of the Heli Pile has been carried out by the Universities of Bath and Plymouth in the UK as well as the CEBTP in France.

Further technical information, including the above reports, is available on request.

