

Screw Pile Overview

EEA - Overhead Lines Designers Forum: 2021

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AGENDA

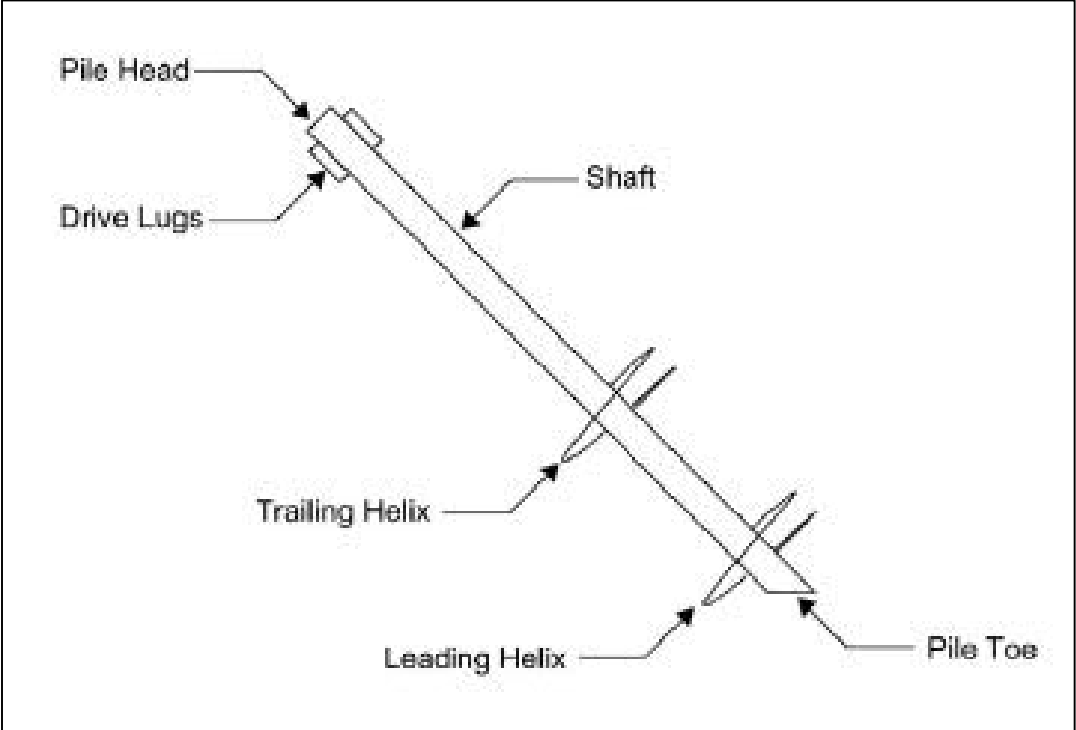
1. What is screw piling?
2. Screw Pile Basics
3. Tight Access Applications
4. Power Project Applications



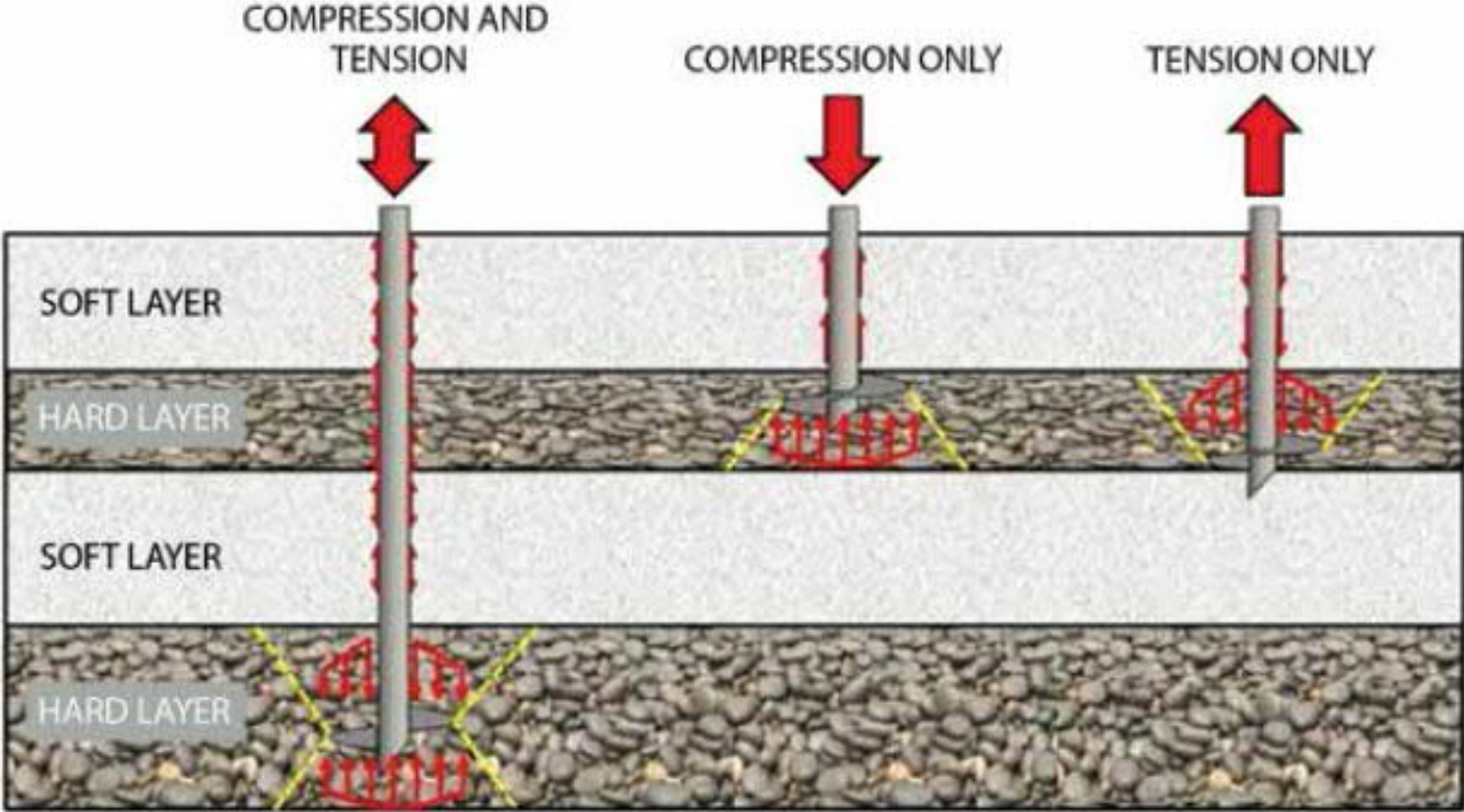
What is Screw Piling



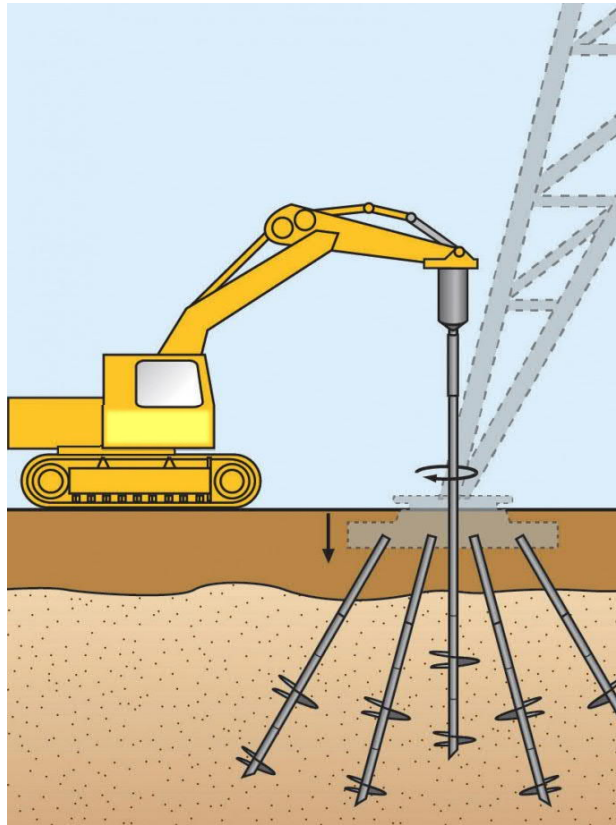
WHAT IS A SCREW PILE?



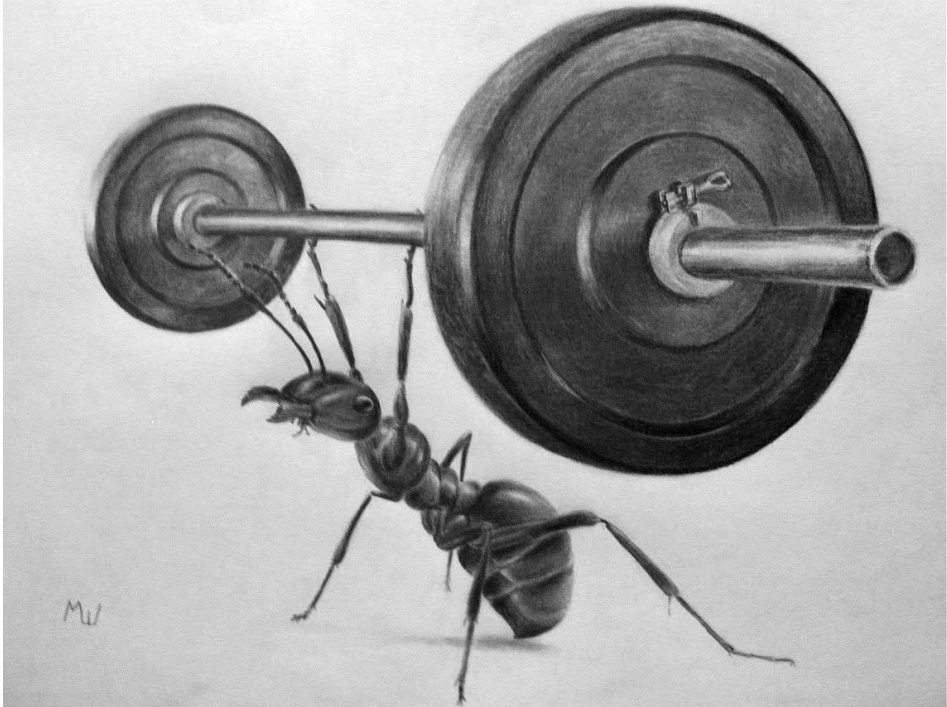
SCREW PILE BASICS



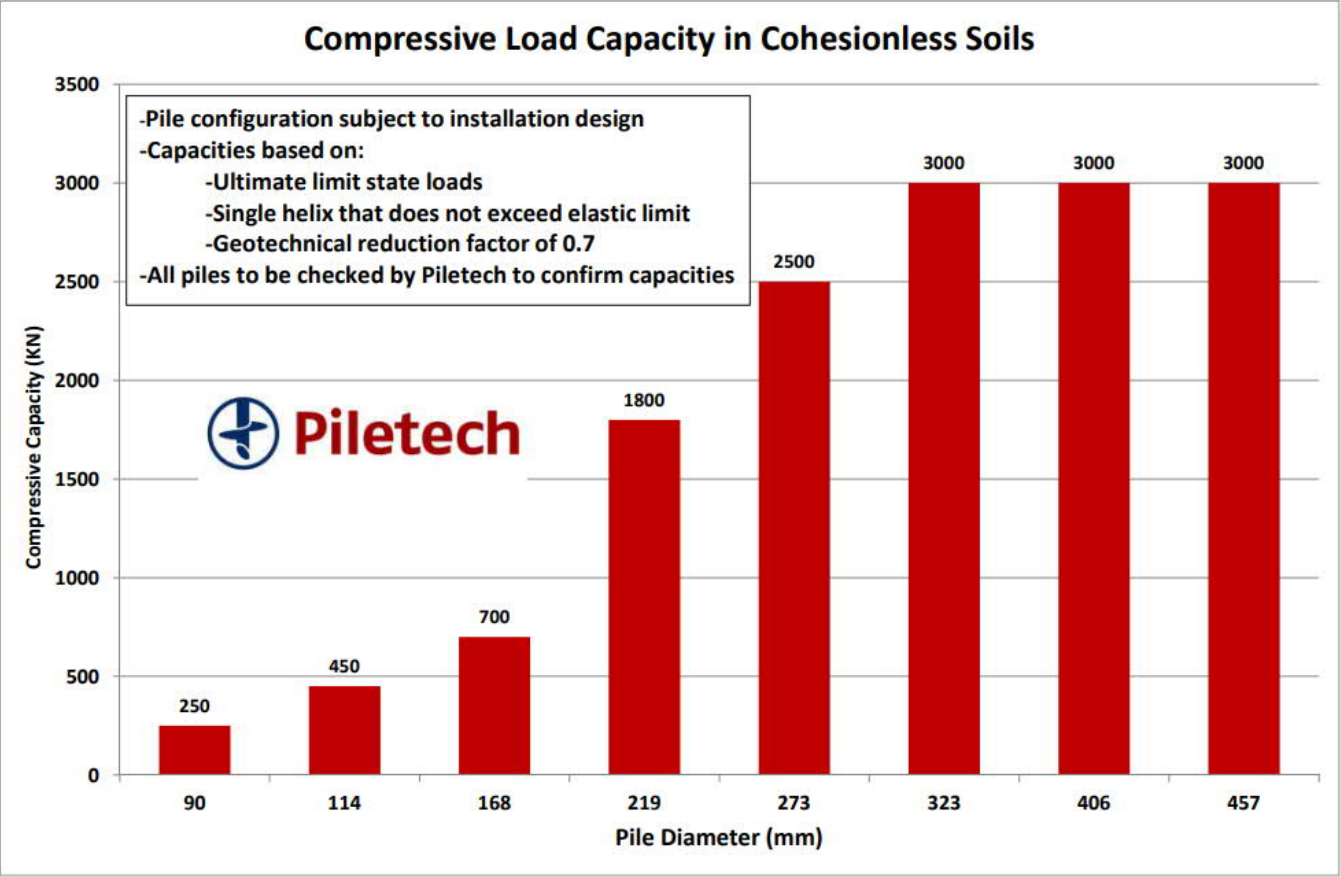
SCREW PILE BASICS



LOAD CARRYING CAPACITY



SIZES AND LOAD CAPACITY



SCREW PILES USED FOR THE 2012 LONDON OLYMPICS

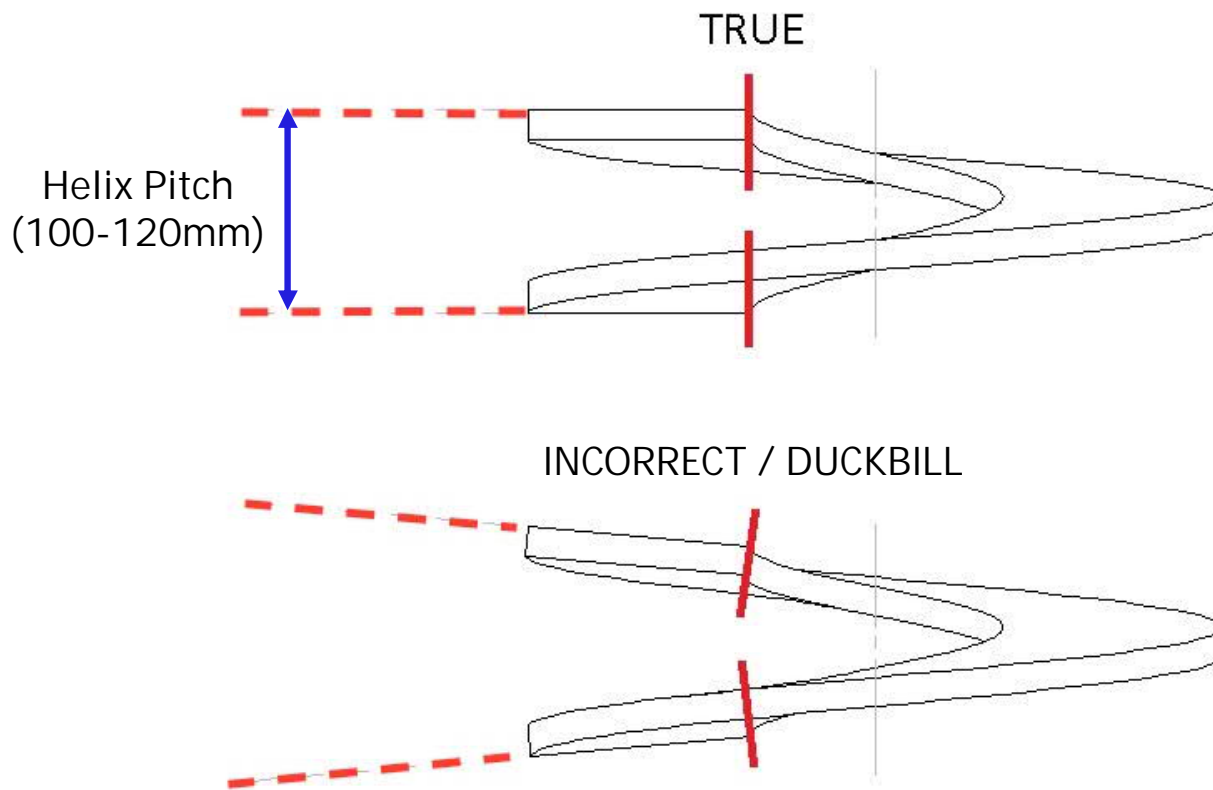
- Lee Valley – 12,000 seats, 1067 piles to 8m. (8.5kms of tube installed, uninstalled and recycled)
- Eton Dorney – 500 seats, 61 piles
- Hadleigh Farm – 500 seats, 190 piles
- BMX – 2000 seats, 118 piles
- Water Polo Venue – The building housed the pool and 5000 seats. 405 piles to average of 8.5m (3.5kms of tube installed, uninstalled and recycled)



GROUND DISTURBANCE...?

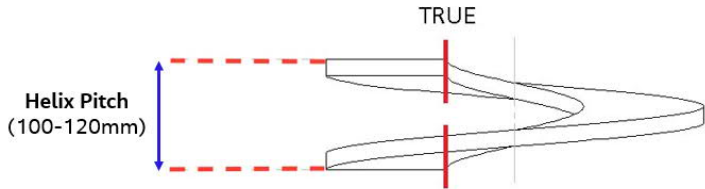
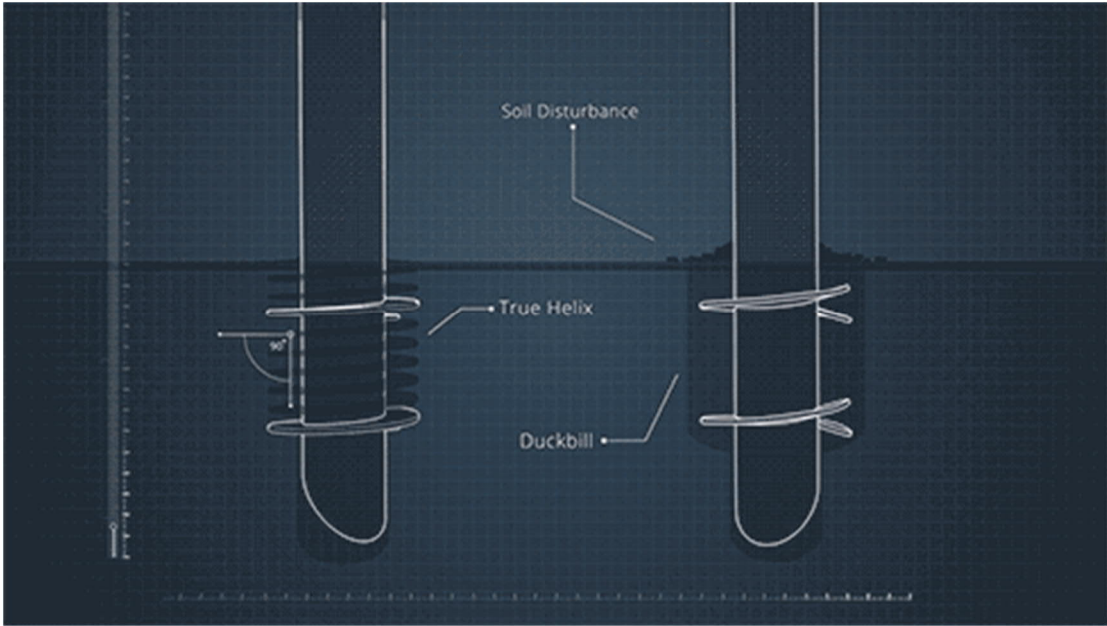


WHAT IS A "TRUE" HELIX?

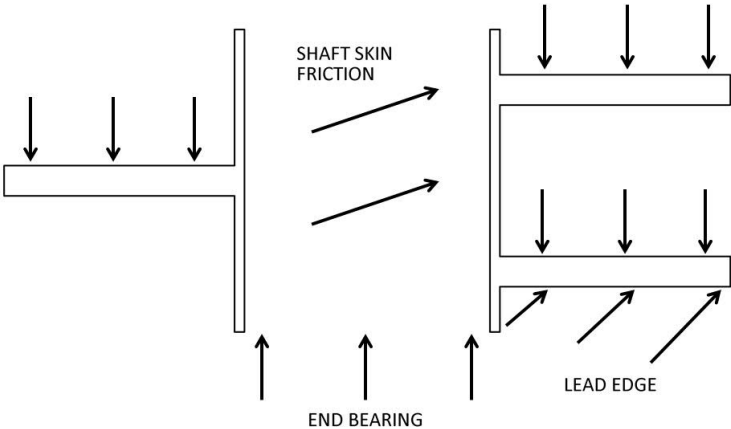


- Perfect Symmetry
- Uniform pitch angle throughout the 360° revolution
- Radial points extending across the helix flange will be perpendicular to the shaft
- Inside and outside diameter of the helix will be perfectly round

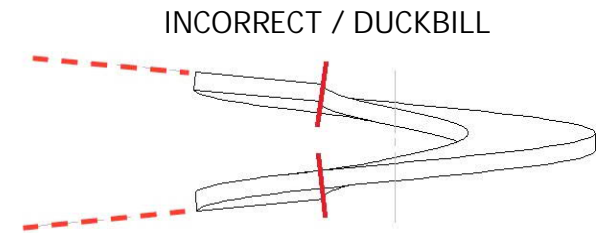
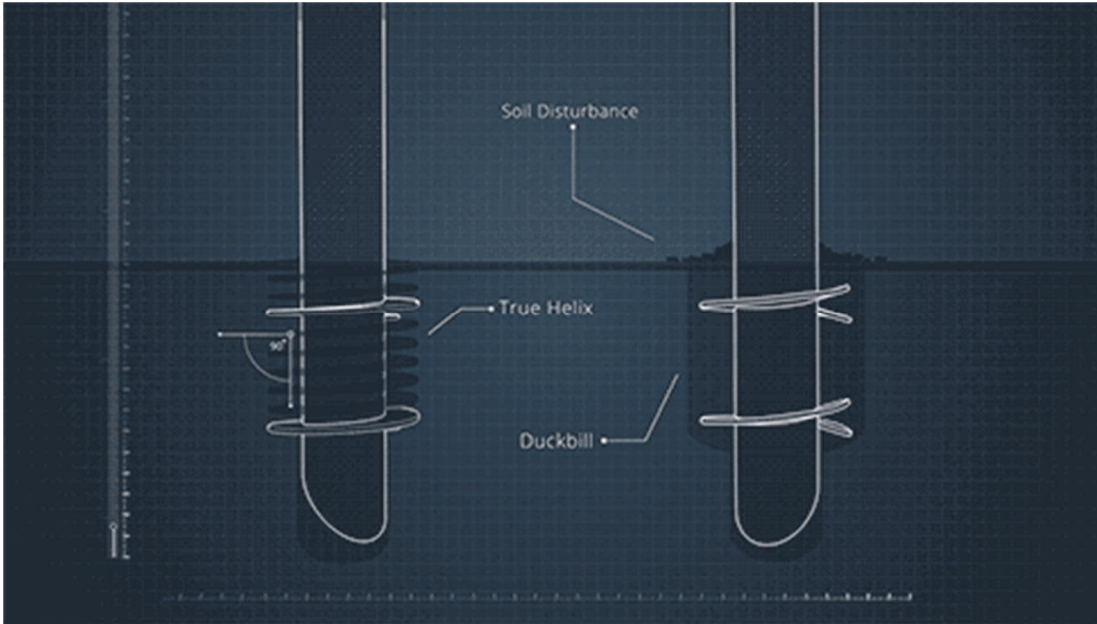
TRUE HELIX



TYPICAL TRUE HELIX



INCORRECT HELIX / DUCKBILL



INSTALLATION FORCES ON UPPER & LOWER SURFACES
TYPICAL POOR QUALITY HELIX

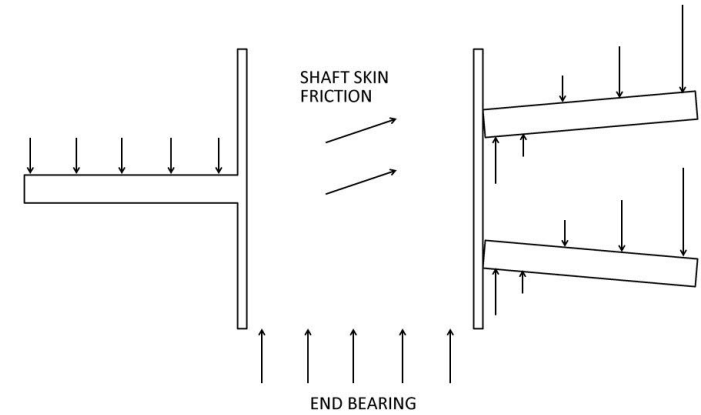
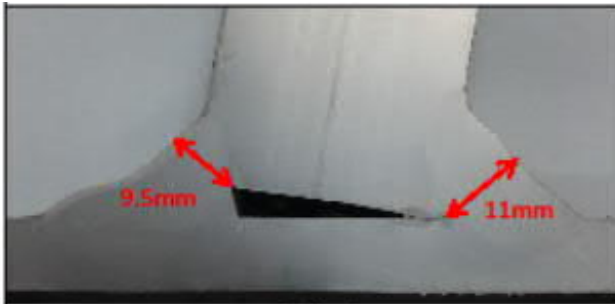


DIAGRAM 6

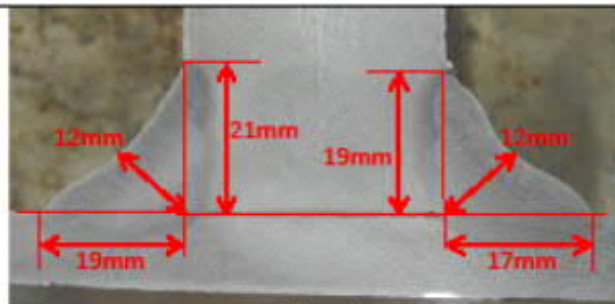
© HELIX FLIGHT MANUFACTURING MACHINES 2012

UNIFORM TRACKING

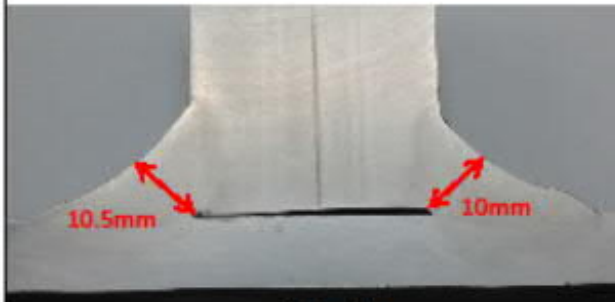




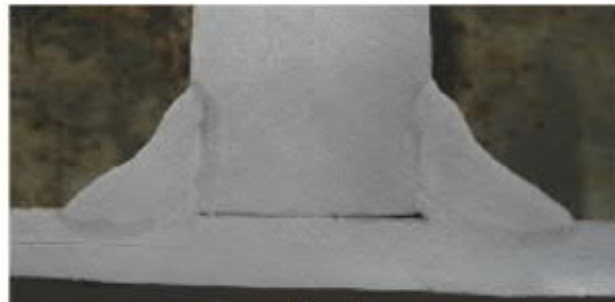
False 1



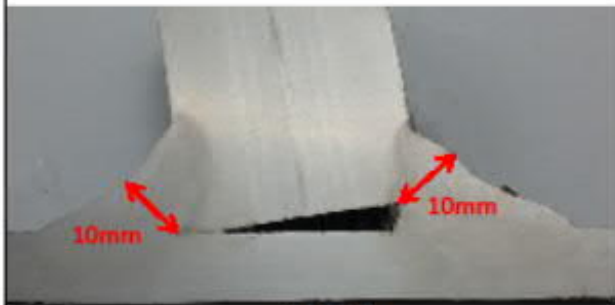
True 1



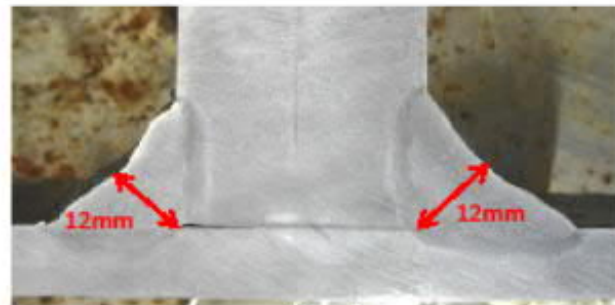
False 2



True 2

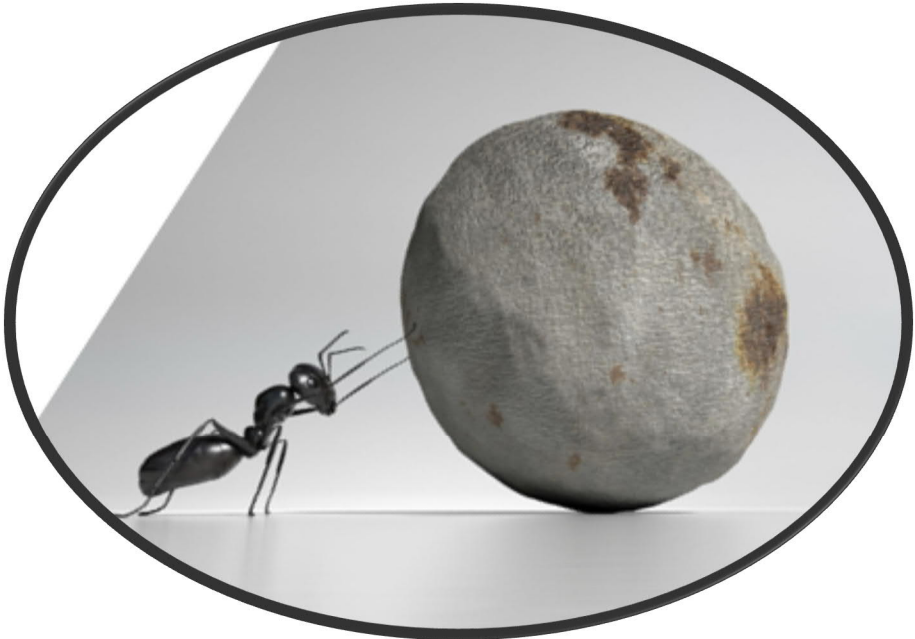


False 3

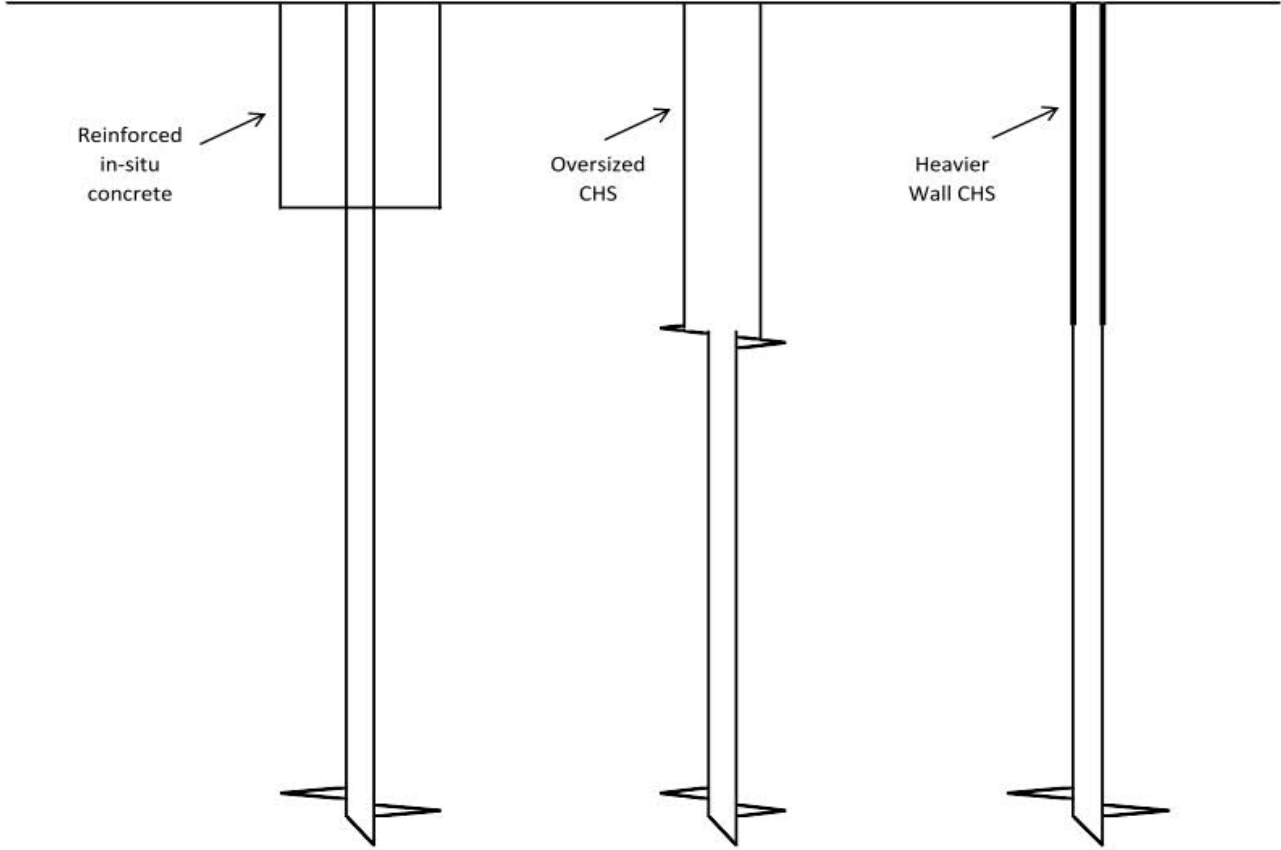


True 3

LATERAL RESISTANCE



LATERAL RESISTANCE



LATERAL LOADING

Step up piles



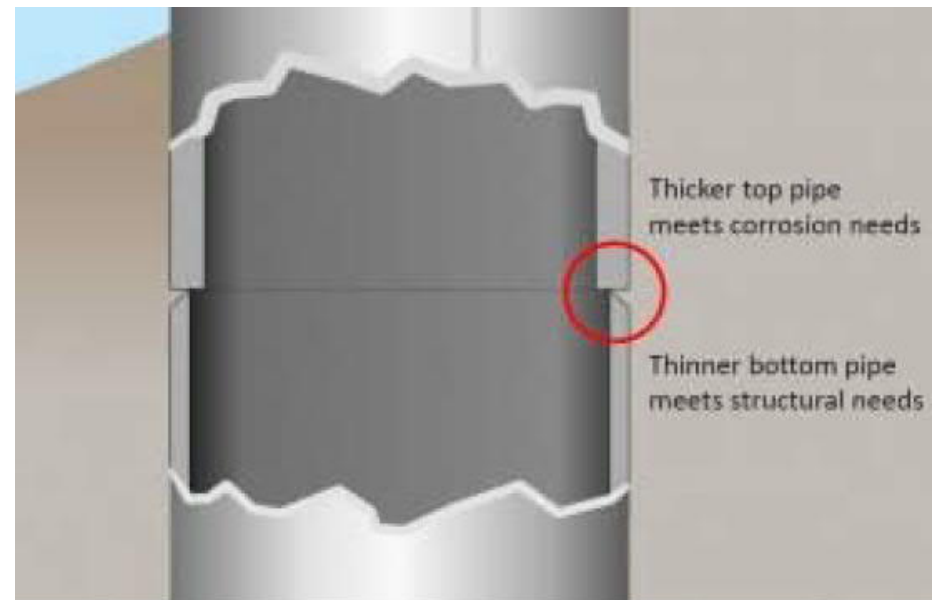
LATERAL LOADING

Bored over screw piles



CORROSION

- Corrosion can be accounted for in the design
- Given the soil conditions, the corrosion rate of steel can be estimated
- The shaft wall can be designed to account for the steel corrosion over the design life
- Concrete filled to avoid internal corrosion



SOME KEY POINTS – SCREW PILES

- ✓ Deeper = Better
- ✓ Most ground conditions
- ✗ Basalt
- ✗ Boulders
- ✗ Large lateral

TIGHT ACCESS APPLICATIONS



TIGHT ACCESS



INSIDE STRUCTURES – CREATIVE THINKING



INSIDE STRUCTURES – CREATIVE THINKING



INSIDE STRUCTURES – CREATIVE THINKING

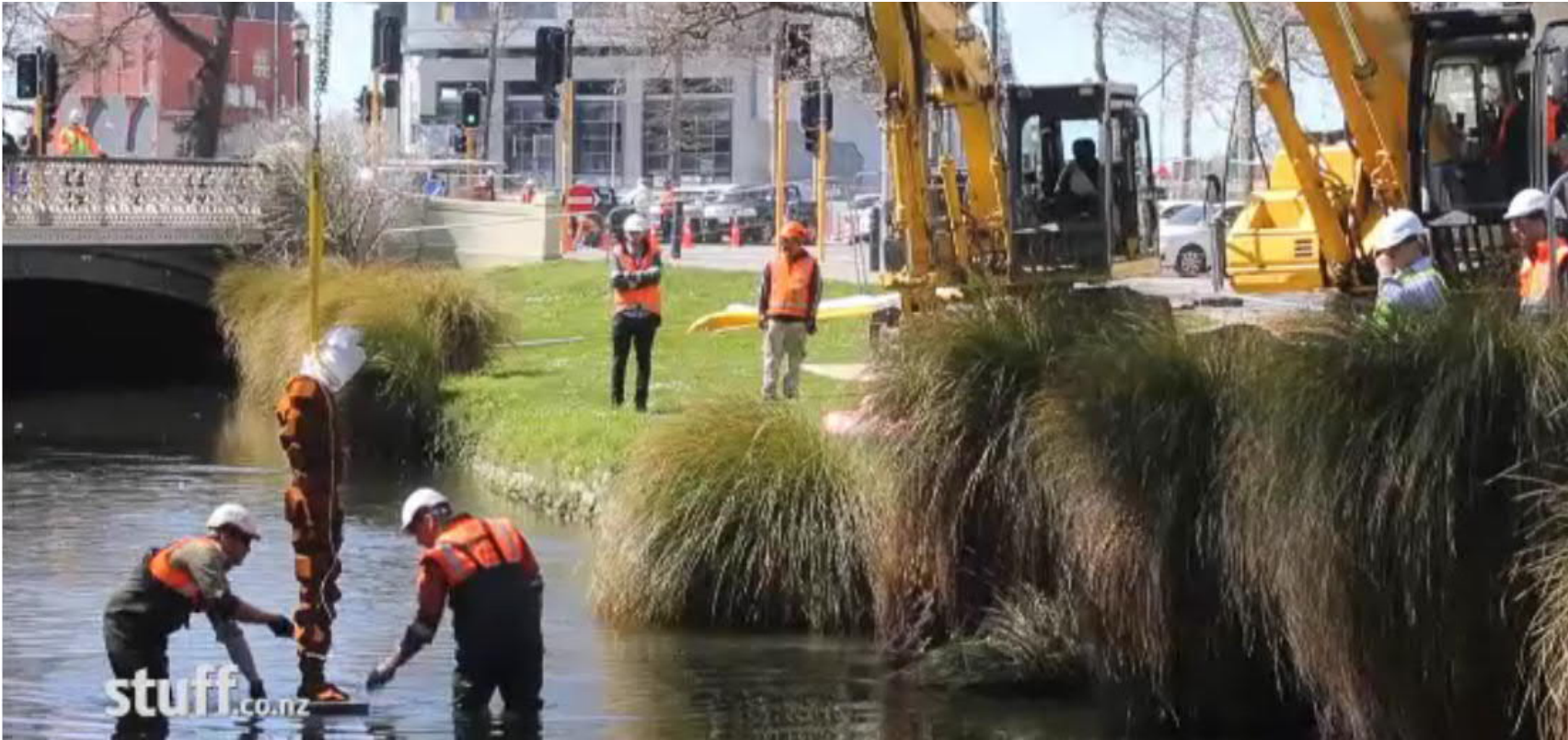


TIGHT ACCESS—RAIL



- THE ISSUES:
 - Spotters
 - Safety
 - Restricted Movement / Access
- THE RESULT:
 - Reduced productivity
 - \$\$\$

WATER + ACCESS



WHARF CONSTRUCTION



Power Project Applications



Transmission Tower Upgrades



Tower Retrofits and New Tower Legs



Substations



Monopole Foundation Design with Grillage



Monopole Foundation Design with Grillage



Grillage



Tower Retrofits and New Tower Legs



Benefits of Screw Piles

- Cost
- Speed
- Environmental
- Quality
- Adaptability



Thank You

Jacobs

Challenging today.
Reinventing tomorrow.

