

# SCREW PILING INFORMATION SHEET HELIX PERFORMANCE



## QUOTE COMPARISONS

Carefully review your various quotes.

Misleading understated corrosion assumptions can lead to premature failure of your piles.

From our extensive on site testing by our geologist we utilize a minimum of 0.03 mm corrosion per annum for most sites.

The use of lesser rates of corrosion on most sites is unrealistic and can lead to premature failure causing excessive settlement.

Should you have concerns regarding the corrosion rate that is applicable for your site we are happy to conduct site specific Resistivity testing for a small fee.

When we conduct further geotechnical investigations we conduct a resistivity test along with pH testing of soil samples taken.

We have developed a computer program to specifically analyse the geotechnical structural interaction.

Every pile design includes a helix design analysis. We are happy to provide a detailed design analysis for your engineer to review.

A simple rule of thumb that Douglas Partners advocate is the review of the helix design and ensure that the Helix has an outstand ratio greater than 10. That is if the helix thickness is 12.0 mm the distance from the pile shaft to the outer edge of the helix should not exceed 120 mm.

Corrosion needs to be factored in. Therefore the 12.0 mm helix becomes 9.0 mm and using the outstand ratio computation means that the helix should not exceed 90 mm.

The above outstand ratio is a simple but effective means to review the minimum helix thickness required.

The following is from a paper written by P.J.Yttrup. *The structural strength of the helix can limit the base resistance that can be mobilized at the base of the pile. The ultimate base resistance of steel screw piles is governed by the simultaneous geotechnical and structural failure at the helix. Ground displacement occurs simultaneously with bending of the helix plate.*

## Helix Comparison example

**Pile with 350 x 12 Helix assuming No Corrosion. The pile will perform as required initially with no corrosion.**

**Using 0.03 mm pa corrosion over 50 years there will be 3.0 mm corrosion loss to the helix.**

**The 12.0 mm helix shall become 9.0 mm thick during the design life.**

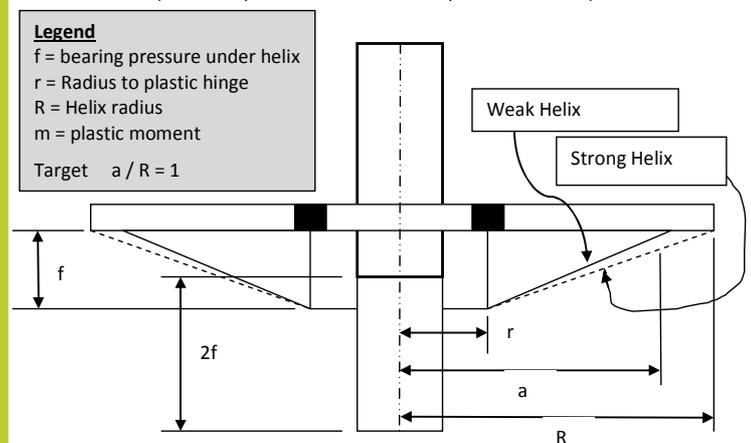
**The helix will fail. It is a weak helix.**

**The weak helix bending point will be 134.8 mm from the centre of the pile. That is in effect a 270 mm helix not a 350 mm helix. That is a massive 41.5 % loss of bearing capacity.**

**Therefore a thicker 16 mm helix needs to be specified.**

## Helix Diagram

(used with permission from P.J.Yttrup and Associates)



*For “strong” helix plates the base resistance is geotechnical, for a “weak” helix the plate yields and deforms plastically. The helix design is an important part of the screw pile design, and is different to other piles.*

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## Russell Heale Screw Piling

26 Hutchinson Street, Burleigh Heads QLD 4220

Phone: (07) 5593 7755 Fax: (07) 5593 7744

Email: [info@rheale.com.au](mailto:info@rheale.com.au)

QLD BSA: 19670 | NSW BSA: 34715C