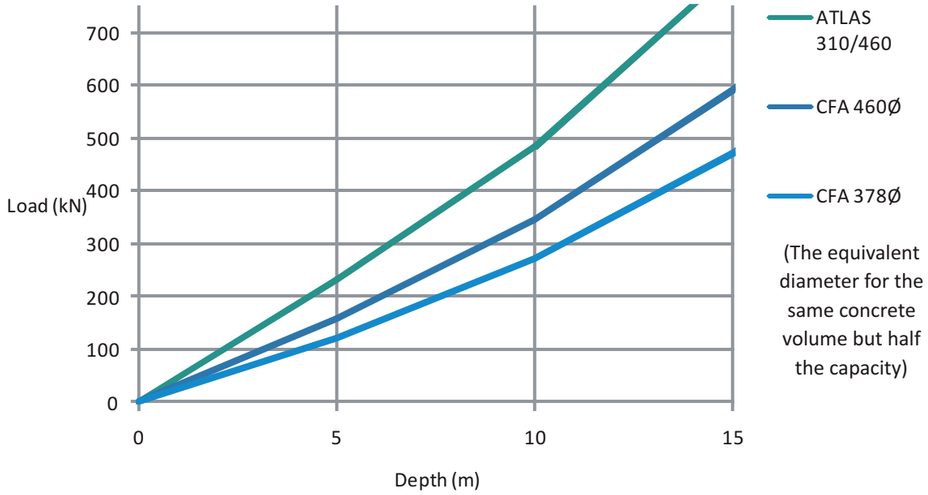
Load v Depth Comparison in Clay



(The equivalent diameter for the same concrete volume but half the capacity)

Standard Atlas Pile Sizes

mm

Core	Outer
310	460
360	510
410	560
460	610
510	660

Able Piling and Construction Ltd
Wangfield Nurseries , Wangfield Lane,
Curdridge, Southampton,
Hampshire. SO32 2DA
www.ablepiling.co.uk

Tel. : 01489 797600
Fax : 01489 796989
E-mail : office@ablepiling.co.uk

Regional Office: Cardiff - Tel: 02920 263651 Fax : 02920 263700

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Atlas Screw Piles

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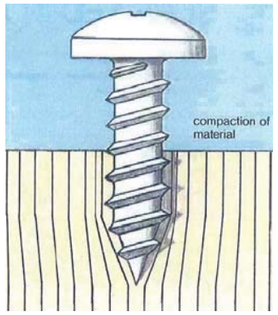
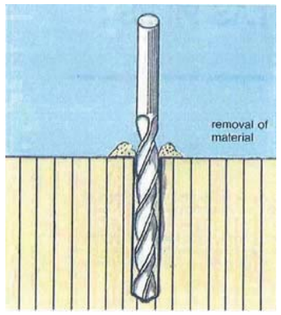
The Target - Move towards the ideal pile





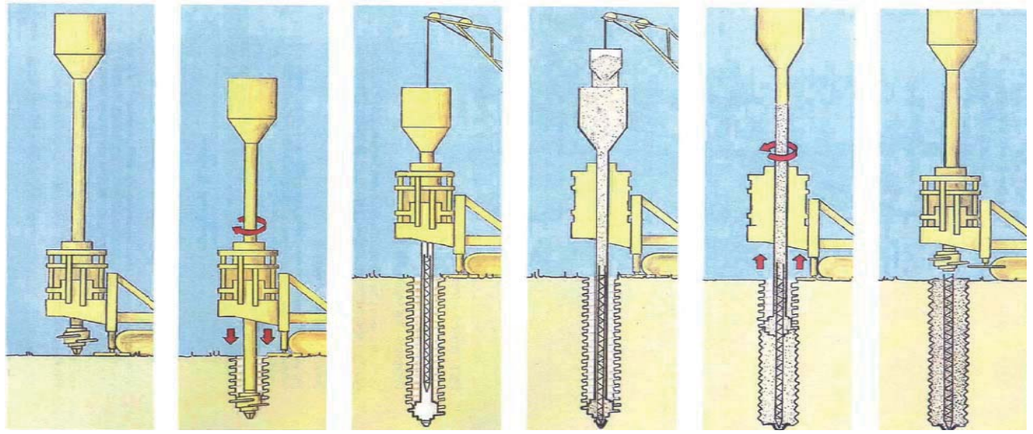
- **Negligible / No spoil produced**
- **Gain the highest capacity from the soil by lateral compaction**
- **Minimal vibration**
- **Minimal noise**
- **Minimise material requirement**
- **Ability to place full length reinforcement**

The development of the ATLAS pile system combined with the production of the dedicated ATLAS piling rigs has enabled the 6 requirements to be met.

The ATLAS pile when completed maintains virtues more similar to a driven cast in place pile than a bored or augered pile, but without the installation disadvantages of noise and vibration.

The ATLAS auger displaces the soil laterally; the auger's penetration compares to a screw penetrating timber as opposed to drilling when material is removed.

The ATLAS process



Position the rig and fit a lost head

Auger to the design depth applying torque and continuous thrust

If required, place the reinforcement cage

Charge with concrete

Extract under controlled pull to rotation

Complete by placing reinforcement as necessary

Pre-fabricated reinforcement cages can be placed within the Kelly bar prior to extraction should the design requirement necessitate. This overcomes the CFA pile's integral problem of difficulties in placing long reinforcement cages.

A concreted pile — **No** spoil to dispose of.

5. The pushing of solid contaminants down into an aquifer during pile driving.

The ATLAS auger head displaces the ground laterally. University research projects (Sheffield 2007) have shown the ATLAS head to be the most efficient auger system. After a very small number of rotations, after passing through the contaminants, the head will be wiped clean (under the pressure of the penetration or extraction).

The ATLAS pile is thus the least likely of any system to carry any contaminants (in any direction).

6. Contamination of ground water and, subsequently, surface waters by wet concrete, cement paste or grout.

Should there be a flow of ground water sufficient to wash out the wet concrete then no cast in place piling system can be used. In comparison with the majority of pile types the ATLAS system does not utilise a concrete pump to place the concrete. Wash out of the pump and the waste involved is thus not necessary. The ATLAS rig does require a wash out of the Kelly bar and skips but the water required is much less than a pumping system. We recommend (to our clients / principal and main contractors) that designated wash outs areas and equipment be used on all sites to minimise risk.

The ATLAS pile can only be improved upon by a steel or pre-cast pile, (which have disadvantages in scenarios 1, 2 and 5).

Summary

For the majority of situations the ATLAS pile has significant benefits over other piling techniques, therefore :

ATLAS piles are the preferred choice

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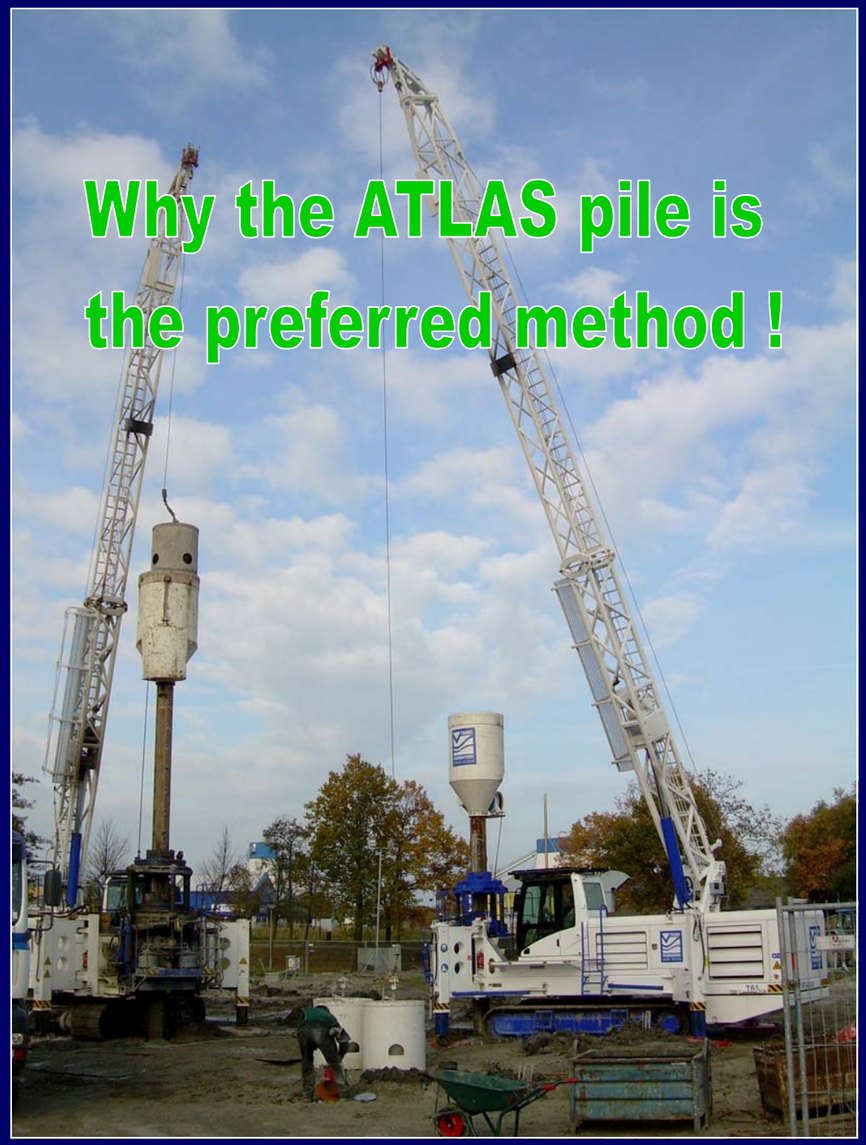
Piling into contaminated sites

Why the ATLAS pile is the preferred method !



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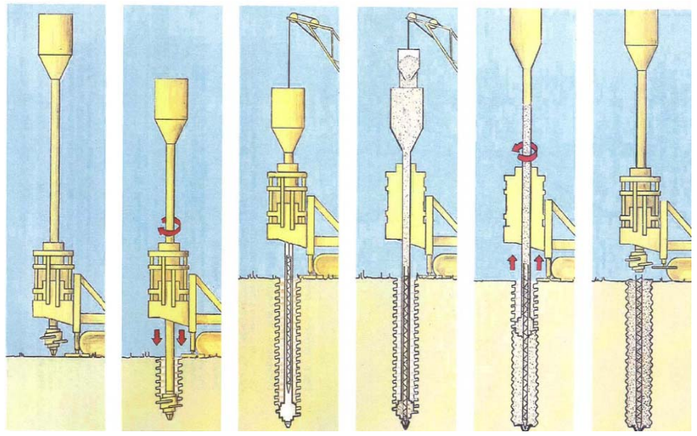
The ATLAS process



a) Position the rig and fit a lost head

b) Auger to the design depth applying torque and continuous thrust

c) If required, place a central reinforcement cage

d) Charge with concrete

e) Extract under controlled pull to rotation

f) Complete by placing a reinforcement cage as necessary

Background

The Environment Agency (2001) report "Piling and Penetrative Ground Improvement Methods of Land affected by Contamination : Guidance on pollution Prevention NC/99/73" is summarized within "Piling into contaminated sites." This document follows the context of this later document as below :

The ATLAS screw displacement pile is a specific cast-in-place pile within the generic piling method "Displacement Piles".

The Hazard Identification of potential environmental impacts will need to be identified on a site specific basis. Each site will have different potential links between the Source, Pathway and Receptor (S-P-R). In this document we assume that piling is required and that the type of piling is under debate so as to minimize any risks.

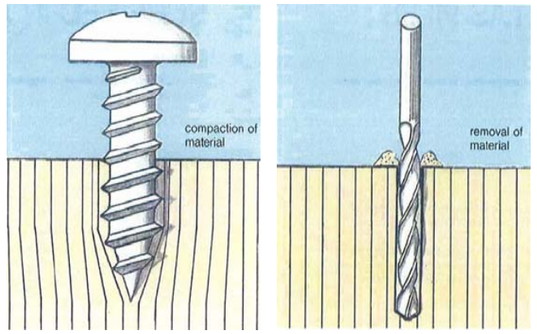
Six possible pollution scenarios have been identified and described, representing situations where the Environment Agency is concerned that piling or penetrative ground improvement operations have a potential to cause pollution.

The six scenarios considered are as follows :

1. Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer;
2. Creation of preferential pathways, through a low permeability surface layer, to allow upward migration of landfill gas, soil gas or contaminant vapours to the surface;
3. Direct contact of site workers and others with contaminated soil arisings which have been brought to the surface;
4. Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration);

5. The driving of solid contaminants down into an aquifer during pile driving;
6. Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.

The Target - Move towards the ideal pile



The ATLAS pile is formed by forcing a displacement auger into the ground using a hollow "Kelly" bar. The ATLAS auger displaces the soil laterally; the augers penetration compares to a screw penetrating timber as opposed to drilling when material is removed.
(See diagram)

The unique screw shaped shaft is formed by controlled extraction of the auger.

Why the ATLAS pile provides minimum risk ?

1. Is a Preferential Pathway created through an aquitard to allow the contamination of an aquifer ?

The ATLAS pile gains the maximum load bearing capacity from the ground due to its displacement technique. Pile lengths are generally shorter than with other techniques. Pile capacity can be maintained by increasing the pile diameter to ensure the required load is carried at a pile toe level above the potential point where the pile may create a Pathway between Source and Receptor.

The ATLAS pile displaces the ground laterally prior to casting the pile directly against the ground. The ground resists the compaction and thus a tight seal is achieved between it and the (impermeable) concrete, assisted by a flanged profile. At no time is there an open hole for any mobile leachate to enter.

2. Is a Preferential Pathway created through a surface layer to allow the migration of a gas to the surface ?

The ATLAS pile displaces the ground laterally prior to casting the pile directly against the ground. Pile lengths are generally shorter than with other techniques. The ground resists the compaction and thus a tight seal is achieved between it and the (impermeable) concrete, assisted by the flanged profile. During the formation of the pile there will be a short period of time when gas will be able to migrate. Should this scenario occur safety measures may be necessary to ensure the risk to the piling team is negligible (use of PPE etc.)

Should a piled solution be necessary then the ATLAS pile does not have greater risks than other piling methods.

3. Direct contact of site workers and others with contaminated soil arisings that have been brought to the surface.

The ATLAS pile brings a negligible amount of material to the surface. What is lifted is normally a small amount of the piling working platform (crushed rubble, concrete or stone).

As no spoil is created there is no risk, no requirement to manage the spoil or dispose of it.

4. Direct contact of the piles with contaminated soil or leachate.

The ATLAS pile can be cast with a concrete mix suitable for the contaminant (in most cases)

Only the most extreme cases require a pile formed out of a material other than concrete. ATLAS piles are thus suitable.