

# Cementation

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# SKANSKA

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## CFA

### Continuous Flight Auger Piles

#### Application

Well suited to soft and/or water bearing ground where deep casings or bentonite suspension would otherwise be required.

Diameters generally within the range of 450mm to 1200mm with maximum depths normally up to 29 metres. Used for bearing piles and contiguous, interlocking and secant piled walls.

Integral enlarged heads can be formed.

#### Advantages

- Quietest known form of piling
- Virtually vibration free
- All rigs fully instrumented
- Quick and economical
- Limited headroom rigs available

#### Patents

UK Patent No. 2303868  
UK (Div) Patent No. 2328700  
UK Patent No. 2362665  
UK Patent No. 2358211  
UK Patent No. 2355750  
UK Patent No. 2362912  
UK Patent No. 2356659  
UK Patent No. 2334543  
Australia Patent No. 714365  
USA Patent No. 6116819  
USA Patent No. 6168350  
Canada Patent No. 2228518  
Europe Pub No. 0937825  
Europe Patent No. 0842329  
(Belgium, France, Germany, Ireland, Netherlands, Spain)

#### Trademarks

AUTO-CFA®  
CFA-TC®  
CFA-PL®  
CFA-LC®  
CCFA®  
CEM®

The Continuous Flight Auger (CFA) process is virtually vibration free and one of the quietest forms of piling, making it ideal for environmentally sensitive areas. The method enables piles to be formed in water-bearing strata, without the need for casing or bentonite. It is suitable for constructing piles in most strata: gravels, sands, silts, clays and soft rocks and in mixtures of strata.

The original CFA technique allowed for placing a mortar fill. In 1981 Cementation Skanska was the first to extend the process to allow for structural concrete provision and introduced this to the UK in that same year.

#### Construction Process

CFA piles are formed by drilling to the required depth using a hollow stem continuous flight auger. After reaching the designed depth, a high slump concrete is then pumped through the hollow stem. While the concrete is being pumped, the auger is withdrawn at a controlled rate, removing the soil and forming a shaft of fluid concrete extending to ground level. A reinforcing cage is then inserted into the fluid concrete. Reinforcing cages with lengths up to 12 metres are common; greater lengths can be installed with the assistance of cage vibrators.

The Company has a large fleet of CFA rigs. Pile diameters range from 450mm to 1200mm, and depths of 30 metres or more are possible giving load capacities up to 7500kN. Several patented refinements are available related to the use of casings (CFA-TC®, CFA-PL® and use in low cut-off piles (CFA-LC®).

#### Instrumentation

To maintain the highest standard of pile construction, we have undertaken considerable research and development into instrumentation. This has resulted in sophisticated computerised equipment, "AUTO-CFA®", to monitor, control and record the CFA pile installation. A computer, positioned in the cab directly in front of the operator, continuously displays the boring and concreting parameters. During the drilling phase, the depth of the auger, speed of rotation and



penetration rate are displayed. Subsequently, during the concreting phase a continuous record of concrete pressure and rate of pumping is shown; the display is presented in a manner that highlights under-supply and over-supply of concrete, compared with the target value.

On completion of a pile, a computer printout can be generated for viewing. The full data of pile construction details are stored in a data logger module, which is returned at regular intervals to our Head Office. The data is then analysed by a separate program, as a further check on the integrity of each pile.

#### Low Headroom

Some rigs in the fleet can be converted to operate in low headroom modes, of 8m, 11.5m and 14m clearance. The depths and diameters which can

be achieved in low headroom vary, and require discussion of the Client's individual requirements.

### **Bored Pile Wall**

Temporary and permanent bored pile walls can be constructed using the CFA technique. They can be designed to function as a simple or a propped cantilever and also to support vertical loads.

The three main types of bored pile walls which are commonly constructed are: Contiguous, Interlocking and Secant.

The selection of a particular type of bored pile wall will depend on the soil and loading conditions.

