



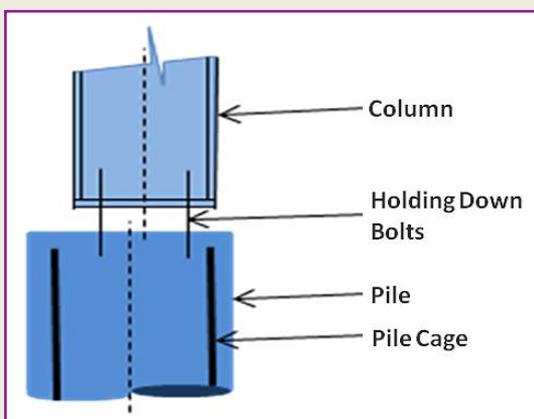
MONOPILES

Monopiles can be constructed to allow holding down bolts to be cast into the wet pile head allowing steel frame columns to be connected directly to the pile.

BASIC TECHNIQUE

A Monopile is a type of deep foundation which uses a single pile to directly support the above ground load without the use of a pile cap.

Monopiles typically incorporate larger diameter cast in-situ piles (such as CFA and Rotary Bored Piles >750mm). However driven steel tube piling techniques have also been used.



In the design of the piles BBGE take into account piling tolerances and the structural tolerances to ensure that the connection and pile reinforcement do not clash.

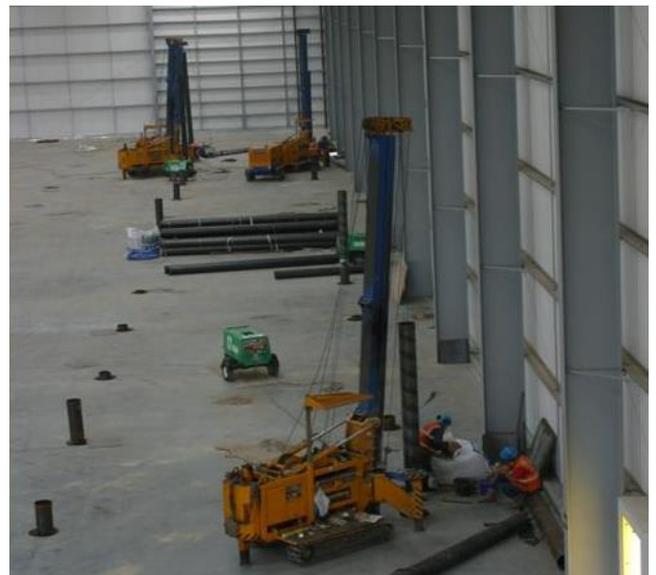
THE BENEFITS

- ✓ Structure can be built directly off the piles
- ✓ Pile trimming and pile caps not needed
- ✓ Speeds up construction
- ✓ Holding down bolts for steel frame can be installed directly into wet pile head
- ✓ Reinforcement starter cage used for concrete frames

ENGINEERING CHALLENGE

One of the major challenges for Monopile construction is to achieve a “right first time” construction. The large number of combinations of pile lengths, reinforcement cages, holding down bolt details, and starter bar details require careful management, scheduling and sequencing.

For monopiles BBGE has manufactured guide frames to ensure the tolerance of the finished pile heads are equal, in line and level to that used by the steel and concrete frame contractors. This level of tolerance is much tighter than that normally required for piling installation and so requires rigorous checking and signing off to ensure compliance and successful handover. It is important that the substructure is designed so that pile cut off levels are constant (and <300mm of piling platform level).



REDUCED PILE TRIMMING

Incorporating the steel structure directly into the piles, makes pile trimming and pile caps unnecessary. This provides savings with reduced excavation, concrete and reinforcement when compared to conventional pile cap schemes.

Also a shorter overall construction programme can be achieved as there is no intervening trade package between piling and frame contractors. Consequential benefits also include a reduction in the project carbon dioxide footprint and a safer working environment without deep excavations.

HOLDING DOWN BOLTS

The monopiling scheme is engineered so that the holding down bolts for the steel frame columns are installed directly into the wet concrete at the head of the piles.

The system can also be used for a building constructed using a concrete frame. Here the concrete frame reinforcement starter cage is plunged into the pile concrete. The introduction of in-situ concrete column starter bars in this way, as part of the pile construction process, marks a significant step forward.

STEEL TUBE MONOPILES

BBGE have experience in providing driven steel tube monopiles. The redevelopment of retail and industrial units often involve additional piles for mezzanine structures to increase storage and sales area for the client.

Using BBGE's low noise, low vibration bottom driven technique, we can provide a monopile foundation for each new stanchion base through the pre-cored existing slab. This avoids the need for a separate pile cap.

The driven piling system also has the benefit of producing zero spoil, a particular advantage on a brownfield site where potentially contaminated made ground is present. A bespoke connection detail can then be designed to incorporate the stanchion into the pile.



CONTACT US

Balfour Beatty Ground Engineering Pavilion B, Ashwood Park, Ashwood Way, Basingstoke RG23 8BG
T: 01256 400400 | W: www.bbge.com | E: info@bbge.com