

Cased CFA and Large Diameter Bored Piling

British Museum World Conservation and Exhibitions Centre

London, U.K.



Cased CFA and Large Diameter Rotary Bored Piling of Hard/Firm Secant wall and LDA Bearing piles

INTRODUCTION

Bachy Soletanche carried out the piling for the new World Conservation and Exhibitions Centre at the British Museum in London, working alongside the project manager, Mace.

The building will house state-of-the-art laboratories and science facilities, a dedicated gallery for special exhibitions, a collections management hub and world-class stores for the study collection.

To maximise the basement space, the new basement was designed as an irregular cruciform shape. Due to the very close proximity of existing neighbouring museum buildings, very stringent noise and vibration limits were specified for the pile installation to protect buildings and artefacts.

A hard/firm secant piled basement was designed to deliver the irregular and flexible shape required. An innovative combination of Cased CFA and Large Diameter Rotary was employed to deliver high production rates, a high verticality tolerance and reduced risk of causing distress to the adjacent structures containing National and International Treasures.



Boring of Cased CFA secant wall pile and cage insertion

CLIENT:	Trustees of the British Museum
PROJECT MANAGER:	Mace Ltd
CONSULTING ENGINEER:	Ramboll UK
DURATION OF WORKS	5 months

Scope of Works

330 lin.m. of 880mm diameter hard/firm Cased CFA and LDA secant piled wall, up to 27m deep

197no. 600, 750, & 900mm diameter bearing piles up to 30m. long

Soil Nail Sustainability Innovations



- ✓ Monitoring of noise and vibration to avoid damage to listed structure and national treasures sited close by.
- ✓ High productivity Cased CFA employed, reducing fuel used.



The basement was constructed with 330 linear metres of 880mm diameter hard/firm secant piles, with 13-16m long Female/Primary piles and 23-27m long Male/Secondary piles. 197no. 600mm, 750mm, and 900mm diameter load bearing piles up to 30m long were also installed to carry the column loads. The preliminary test pile proved that the observed pile capacity matched the predicted ultimate capacity.



Design

The Bachy Soletanche in-house design team worked out a way to reduce the number of bearing piles to deliver sustainability and cost savings, whilst still accommodating the permanent loadings, eccentric moments caused by the positional and verticality tolerances, hydrostatic uplift and temporary heave.

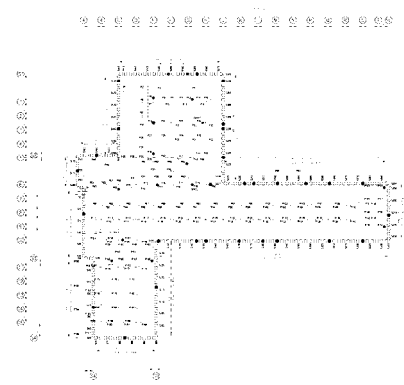
The wall pile design also needed to accommodate : higher than usual wall movement tolerance; the temporary propping sequence; surcharge loads imposed by adjacent properties; and tower crane loads. The Heavily reinforced cages were designed to allow the splicing of the lower B40 bars and the upper B25 bars.

Slab Connection

An additional innovation was the slab connection “box out” units, that were installed on the pile reinforcement cages, as an alternative to drilling and grouting dowel bars. So that when the wall and basement were excavated, the “box-out units” are exposed for connection to the floor slab reinforcements.



Compared to the traditional drilling and grouting method this delivers programme, noise and vibration, sustainability plus health and safety improvements, but require higher than normal installation skills to comply with the positional tolerances.



Noise & Vibration

Both Noise and Vibration monitoring were required by the client due to the close proximity of valuable, irreplaceable, national and international treasures, and the safety and comfort of the museum staff and visitors.



Noise and vibration monitoring was carried out by sister company Soldata, using two sets of Noise and Vibration monitoring instruments plus cameras. The results are then reported to all interested parties in real-time, via a web based in-house developed, reporting system. The cameras then give an indication of what may have triggered any alarms, should they occur.