

GROUND *breaker*

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Looking back at 2010 we have been presented with many challenges due to a combination of concurrent circumstances:

- the recession in the Construction Industry.
- construction of central London's first new station upgrade for London Underground.
- an avalanche of bidding on Crossrail projects.
- realising all but one of our accreditation targets.

Our journey to date has taken us from new arrival in the UK market in 2007, to performing all of our core competencies during 2008 and 2009 on major Brownfield sites, to performing extremely complex mega projects in the most difficult inner city locations in 2010.

This has been possible due to the incredible dedication and loyalty shown by all levels of

our staff, along with the belief placed in us by our clients.

As we continue our progression I offer sincere thanks to you all and look forward to maintaining our relationship into the future.

Michael Jones
Managing Director
BAUER Technologies

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Interserve Project Services,
Kier Build.*

THE TOTTENHAM COURT ROAD STATION UPGRADE PROJECT:

Challenge of a New Scale for Bauer Technologies

INTRODUCTION TO THE PROJECT AND THE TEAM

In December 2009, BAUER Keller JV were awarded the contract to perform the foundation works at the Tottenham Court Road Station Upgrade project for London Underground.

The success of the £250m Tottenham Court Road Station Upgrade project in Central London is reliant upon achieving significant feats of engineering, many of which involve some of the most technically challenging operations currently being undertaken in Europe.

BAUER Keller's challenge commenced in March 2010 when the majority of the project team arrived on site. From the 15th floor of the Centre Point Building, we had an incredible view of London and its sights but it also brought home the difficulties that we would be facing over the coming months: very limited space on site considering the size of machinery required to

build some of the most complex piles, significant traffic congestion and generally a logistical nightmare due to the one way systems in the area and ongoing enabling works for Crossrail.

BAUER Keller's works will continue until August 2011. The Joint Venture between BAUER Technologies and Keller allows both parties to concentrate on their strengths with BAUER carrying out rotary piling and diaphragm wall works and Keller taking care of CFA piling and mini-piling works.

The works comprise approximately 590m of retaining walls, 7nr large diameter complex rotary



BG40 with 2.4m Diameter Casing, TCR Project



By Yvonne Ainsworth –
Project Manager, TCR Project

piles and 11nr plunge columns and is split into the following areas and techniques:

- Northern Line Escalator Box (NLEB): Secant wall
- Oversight Development (OSD) piles: 7nr large diameter rotary complex piles
- Falconberg Court (FBC): Secant wall
- Goslett Yard Box (GYB): Diaphragm wall (D-wall) and 11nr plunge columns

- Oxford Street Entrance and Ticket Hall (OSE/TH): Secant and contiguous wall and mini piles
- The Decline: Secant wall (connection between Goslett Yard Box and the Ticket Hall)

COMMENCEMENT OF The Works

After months of planning, preparation and paperwork, the construction phase commenced on 23rd April 2010 with the installation of the first secondary pile on the Northern Line Escalator Box. All secondaries consisted of 600mm CFA piles whereas all primary piles were constructed using 1180mm segmental casing and 1050mm tools.

In total, 90m of hard soft secant wall were successfully constructed on time and to budget.

Three large diameter rotary OSD piles were situated on the western side within the secant wall. The OSD piles were an extremely challenging part of this project.

RIISING TO THE CHALLENGE The OSD Piles

The OSD piles consist of 7nr complex large diameter rotary piles of varying lengths, diameters and degrees of difficulties. The largest casing diameter used was 2.43m and the largest bored diameter was 2.03m. The deepest pile was installed to a length of 64m under bentonite into the chalk.



The BAUER Crew on site, TCR Project



Four of the 7 OSD piles were constructed using a slip coated liner with bitumen coating to a depth of about 30m below ground level to eliminate the load transfer between the new Northern Line Escalator Box and these piles.

The remaining three piles required even greater protection as they were installed very close to the running Northern Line tunnels.

As part of the oversight development agreement, these piles had to be permanently cased to well past the axis of the tunnels, i.e. to 35m depth. These three piles also contained the bitumen coated liners.

BAUER's BG40 rig (the most powerful in the worldwide market) was used to construct the OSD piles. The photo opposite shows the BG40 working to the extent of its capabilities, in that despite its size. The drilling tool only just fitted over the permanent casing, with barely 2 inches to spare.

An oscillator (pictured bottom of page 3) was used on the OSD piles adjacent to the Northern Line tunnels to assist with the installation of the permanent casing. Unlike the other OSD piles, the casings had to be pushed into the ground 1m at a time and then drilled (again just 1m at a time).

The oscillator used was BAUER's BV2000, the biggest oscillator that can be attached to a piling rig, capable of exerting 2780kNm torque (compared to 390kNm torque from the BG40).

In addition to the logistical difficulties associated with the site location, one of the three permanently cased piles (CP05) is unique due to the proximity of the future escalator box construction.



D-Shaped Steel Cage for OSD Piles



BG40 Outside Centre Point House, London

The top half of the pile is D-shaped, with the flat section of the pile aligned parallel to the box structure, whilst the bottom half is a traditional circular pile.

The design of the the pile was governed by the proximity of the Northern Line Tunnel and the Escalator Box structure. The box at this location is 36m deep requiring the D-shape to extend over the same depth.

Directly beneath Charing Cross Road run the North and Southbound Northern Line London Underground tunnels. Our piling works required strictly controlled working periods, granted by concessions from London Underground. Our piling activities were just over 1m away from the tunnel wall. At critical depths of drilling, works could only be undertaken during engineering hours.

In order to comply with the strict tolerances dictated by the specification, the BAUER rope inclinometer equipment known as a 'Seil Neig' was used.

By combining:

- large diameter rotary bored piles
- permanent casings installed by oscillator
- bitumen coating to reduce skin friction

(which are all processes that BAUER have performed in various locations around the World) these piles are without doubt special. However, combine this with a very tight site in the close vicinity of live running tunnels and working so closely to the general public, plus the fact that part of the pile is not round but D-shaped, it certainly becomes one of the most complicated foundations ever built.

After nearly 4 months of intensive design of all temporary features such as

lifting points, trapping off points and beams, centre of gravity etc., the OSD piles were constructed successfully. The successful delivery required an incredible amount of planning, foresight, understanding of each element in the process and teamwork between the owner, main contractor, designer and specialist contractor.



Very Tight Central London Location

RETURN TO 'NORMALITY' The Next Sections of Work

Following on from the OSD piles we moved on to the next phase of the works on Falconberg Court. A combination of hard soft and hard firm secant pile wall was built, totalling approximately 135m of retaining wall in this section.

This work is expected to be complete by the beginning of January 2011.

During November 2010, the installation of the D-wall commenced. With a total depth of 41m, the 1m wide 152m long retaining structure will enable the installation of the Crossrail ticket hall. Geothermal loops will also be installed to ensure that any future developments above ground comply with current environmental requirements.



Diaphragm Wall Grab Breaking Ground on the First Panel on 8th November 2010

WHAT THE Future Holds

The preparation works for the remaining parts of the project are currently already under way. Our Technical team's next challenge will be the installation of the plunge

columns. In total, 11nr 2.4m diameter piles with columns up to 700mm x 700mm, 33.5 long, will be plunged. This work is currently scheduled to take place in March 2011.

"BAUER Keller have built 7 of the largest and most complicated piles in London, drawing on

their technical expertise they overcame immense logistical challenges working in the heart of the West End. In doing so they achieved what some competitors said was impossible."

Ralph Freeston
London Underground
Project Manager



Oscillator being used on the OSD Piles to Assist with the Installation of the Permanent Casing

GROUND *breaker*



BAUER CERTIFIED A QUALIFIED SUPPLIER With Link-Up QUALIFICATION SCHEME

After a comprehensive audit of its operations BAUER Technologies is pleased to announce that it has become a Qualified Supplier to the rail industry, under the Link-Up Qualification scheme.

Link-Up is the essential qualification process amongst the rail industry and is used extensively by procurement, engineering, safety and quality professionals as a measure of an organisation's competence to work across the rail network.

On achieving the award BAUER's Managing Director, Michael Jones, commented: *"The rail sector is extremely challenging, competitive and demanding, and the Link-Up Qualification puts us in a very strong position to compete for business. We are already involved in a number of high profile rail projects, including the Tottenham Court Road Station upgrade and hope to have a strong involvement on the Crossrail project; this accreditation establishes our credentials and competence to deliver to this sector"*.

The Link-Up Qualification Scheme is run by specialist



Pictured above from left to right:
Jim Finbow Health & Safety Manager, BAUER Technologies Ltd.
Michael Jones Managing Director, BAUER Technologies Ltd.

supplier management services communities together
organisation Achilles through a single, fair, open
Information Limited, which and transparent process.
brings supplier and supplier

And the winners are...



CHAMPAGNE WIN FOR Bovis Lend Lease

Pictured from left to right:
Michael Jones BAUER Technologies.
Geoff Harlick Bovis Lend Lease.

Michael Jones, MD of BAUER Technologies met with Geoff Harlick, Commercial Director for Bovis Lend Lease (Leyland, Lancashire office), to present him with a case of

champagne. Geoff was the lucky winner of BAUER's eighth prize draw, which was run at the London Waste Event in July 2010.



CHAMPAGNE FOR Interserve Project Services

Pictured from left to right:
Michael Jones BAUER Technologies.
John Ward Interserve Project Services.

Michael Jones, MD of BAUER Technologies, was delighted to travel to Interserve's offices in Uxbridge recently to present John Ward - Business Development Manager, with

a case of champagne as the winner of BAUER's 'Foundation Survey Report' prize draw, which was run at the Nuclear Event in Birmingham in July 2010.



CHAMPAGNE WIN FOR Kier Build

Pictured from left to right:
James Carpenter Kier Build.
Michael Jones BAUER Technologies.

Michael Jones, MD of BAUER Technologies, was pleased to meet James Carpenter, Construction Manager from Kier Build, to present him with a case of champagne. James visited us

at our Bishops Stortford offices just before Christmas, after being named as the lucky winner of our prize draw run at the Basements Event in London during October 2010.



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