

# Drilling and widening

The specialist American drill rig manufacturer E-Z Drill, together with its sole European concessionaire Castellan Group, designed, built and delivered to site in just two weeks a special tailor-made drill for use on a major M25 motorway widening project. It was brought in specifically to drill holes into the two sides of the existing Berry Lane viaduct, just south of junction 18 at Rickmansworth, Hertfordshire, to accept tie bars to link into new reinforced-concrete pier heads and an extended cast-in-situ reinforced-concrete bridge deck. *Concrete* report.

The seven-span, 260m-long Berry Lane viaduct is a key structure on the M25 widening between junction 16 (with the M40) and junction 23 (with the A1) at South Mimms. The widening is part of a £6.2 billion project that will be designed, built, financed, operated and maintained for the Highways Agency under a 30-year concession by Connect Plus, a consortium of Skanska, Balfour Beatty, Atkins and Egis Projects. The project also involves the Skanska/Balfour Beatty construction joint venture widening the M25 between junction 27 with the M11 and junction 30 with the A13 at Thurrock, and refurbishing the A1(M) Hatfield Tunnel. All work is scheduled for completion ahead of the 2012 London Olympic Games.

## Purpose-built drill

Specialist drilling and sawing contractor A J Willcock (Holeformers) worked as subcontractor for Skanska/Balfour Beatty on the Berry Lane viaduct. The company used its purpose-built E-Z Drill 210B-42DD to drill hundreds of horizontal holes of varying diameters and depths into the exposed sloping edges of the existing bridge deck and pier heads. Operating from scaffold working platforms the company, using a combination of 1.2m and 2.4m long extension drill rods with the E-Z Drill 210B-42DD, drilled 32mm, 40mm and 57mm diameter holes to depths of 750mm, 1.5m and 2.85m into the existing reinforced concrete to accept new steel tie bars, which were glued in position with epoxy grout.

The compact, wheel-mounted 210B-42DD pneumatic drill uses a compressed air powered Consolidated Pneumatic CP32 rock drill mounted in an extended frame, increasing the rig stroke to 1050mm from the standard drill's 450mm. An air motor, with an automatic brake, controls the chain drive drill feed system and the whole rig is powered by a 200ft<sup>3</sup>/min, (5.6m<sup>3</sup>/min) 100psi (690kN/m<sup>2</sup>) compressor. The rig is supported

*Top: Widening the M25 at the Berry Lane viaduct.*

*Centre: The special tailor-made drill was designed, built and delivered to site in only two weeks specifically to drill holes into the two sides of the existing M25 Berry Lane viaduct.*

*Right: A J Willcock (Holeformers) is using a combination of 1.2m and 2.4m-long extension drill rods with the E-Z Drill 210B-42DD to drill 32mm, 40mm and 57mm diameter holes to depths of 750mm, 1.5m and 2.85m into the existing reinforced concrete to accept new steel tie bars.*







*Right: The purpose-built 210B-42DD is drilling hundreds of horizontal holes of varying diameters and depths into the exposed sloping edges of the existing bridge deck and pier heads.*

*Centre and bottom: Cutting the asphalt-covered concrete carriageway and drilling into the edge of the carriageway to accept dowel bars that formed the key for the additional carriageway widening.*



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in a four-legged frame mounted on wheels. It can be adjusted to accommodate the different heights of the holes from the working platform and quickly and easily moved from one hole to the next.

**Built and shipped in two weeks**

“I sat down with Castellán and told them what we needed and within two weeks the drill had been built and shipped from E-Z Drill in the US and was on site drilling holes,” says A J Willcock proprietor Andrew Willcock. “It’s the only one of its type in the UK and is doing a great job and there is no risk of any hand–arm vibration being transferred to the operator, who can use it all day long. I’m convinced it’s the only machine that would enable us to work in the confined areas on the viaduct and comply with the very tight programme. Back-up has also been very good as every time I’ve needed some technical advice we’ve had excellent service from Castellán and E-Z Drill.”

When drilling was complete Skanska/Balfour Beatty followed on fixing and gluing the tie bars into the existing pier heads and bridge deck on the clockwise carriageway. After first casting and extending the new reinforced-concrete pier heads, each supported on a pair of new vertical columns, the adjacent pier tops were then linked and spanned with three 24m longitudinal side-by-side precast concrete beams. The new widened section of bridge deck was then cast in-situ on top of the beams and bonded to the existing deck and overlaid with an asphalt base and wearing course ready for traffic. Once complete, work moved across to the viaduct’s anti-clockwise carriageway for the entire identical process to be repeated. It was completed last year.

**Two other drill rigs**

In addition to working on the Berry Lane viaduct A J Willcock (Holeformers) bought two other standard E-Z Drill rigs for use on widening a section of the M25 pavement between junctions 16 and 19 and 27 to 28 for Skanska/Balfour Beatty. The company used the rigs, drilling over 80,000 holes 250mm and 300mm deep horizontally into the exposed vertical edges of the M25 pavement slab. The holes will accept 20mm-diameter tie bars glued in position with epoxy grout for keying on the new sections of concrete widening to the motorway’s existing carriageways. ●