



*Just some of the crawler crawlers currently working on the temporary jetty to help construct HS2's CVV*

# HS2 - THE REALITY

A sizeable number of modern crawler cranes are helping construct the UK's HS2 high speed railway, Europe's largest construction project. Nick Johnson reports.

**Crawler cranes have long played an important part in the construction of major infrastructure projects. But the size and types of these machines has evolved significantly over the years. Back in the 1950s and early 1960s the universal rope operated excavator crane still reigned supreme. Multi-purpose machines such as the legendary Ruston Bucyrus 22-RB could be equipped with different front end equipment for different tasks. So, for primary excavation they were rigged as face shovels, backacters or skimmers whilst the alternative lifting boom facilitated dragline or grab operation or the hook for crane use.**

The creation of more efficient 360 degree hydraulic excavators during the 1960s largely took over primary digging work and the rope operated machines were developed into more dedicated, higher capacity cranes. Then, mechanical drives were replaced by hydraulics and as crane development progressed, telescopic cranes - and to some degree telehandlers - began to take over some of the lighter work and crawler crane usage moved more towards the heavy lifts.

## HS2 MOSTLY LATTICE

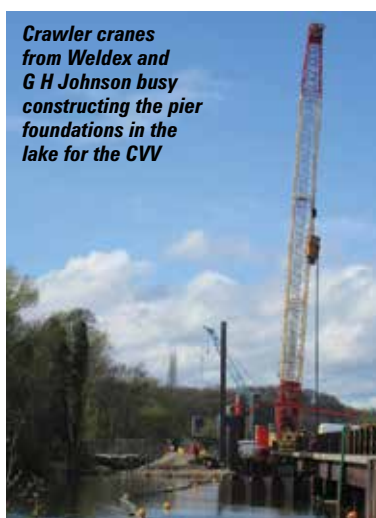
The arrival of crawler cranes with telescopic booms has provided a useful operational alternative to the traditional lattice boom machines for certain lifting work on civil engineering jobs. However, the majority of crawler cranes used on the HS2 project are lattice boomed, as can be seen by the profusion of different coloured booms on the skyline along the route of the first phase of the line from London to Birmingham.

Designed for trains to travel at up to 200mph from London to the country's second largest city, Phase One of the new railway line will be 230km long with four major stations - including Euston and Old Oak Common in London and Curzon Street in Birmingham - 42km of tunnels and more than 300 bridges and 70 viaducts.

The longest overhead structure will be the 3.4km long Colne Valley Viaduct (CVV) on the border between London and Buckinghamshire. Destined to become the UK's longest railway bridge it will carry the HS2 line over waterways - including the Grand Union Canal - four lakes, two roads and four footpaths. The contractor on this stretch of the line is Align JV - a consortium of Bouygues Traxaux Publics, Sir Robert McAlpine and VolkerFitzpatrick.



*A telecrawler*



*Crawler cranes from Weldex and G H Johnson busy constructing the pier foundations in the lake for the CVV*



**FROM BIM TO REALITY**

The September 2021 issue of C&A carried an article on BIM providing a digital insight into how the viaduct will be built. Now those computer-generated images are becoming reality as the temporary access jetties are constructed across the lakes and the first piers to carry the viaduct deck are rising up out of the ground.

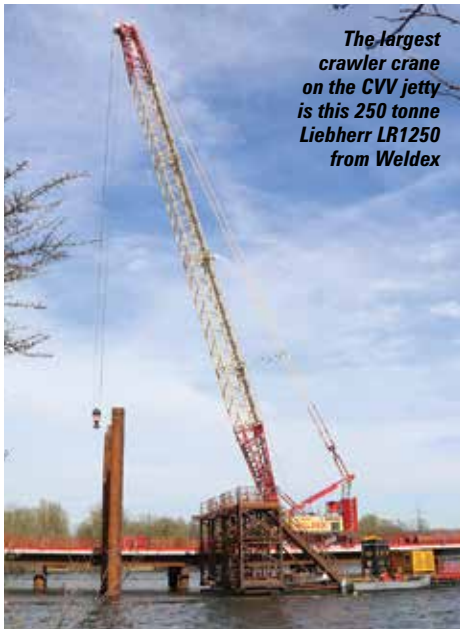


Crawler cranes from several prominent UK companies are helping assemble the jetties and assisting in the construction of the piers. The biggest units on the jetties are two, 250 tonne Liebherr LR1250s from Weldex. They are working alongside Kobelcos from Delden and G H Johnson. The G H Johnson machines include 135 tonne capacity CKE1350Gs and 80 tonne CKE800Gs.

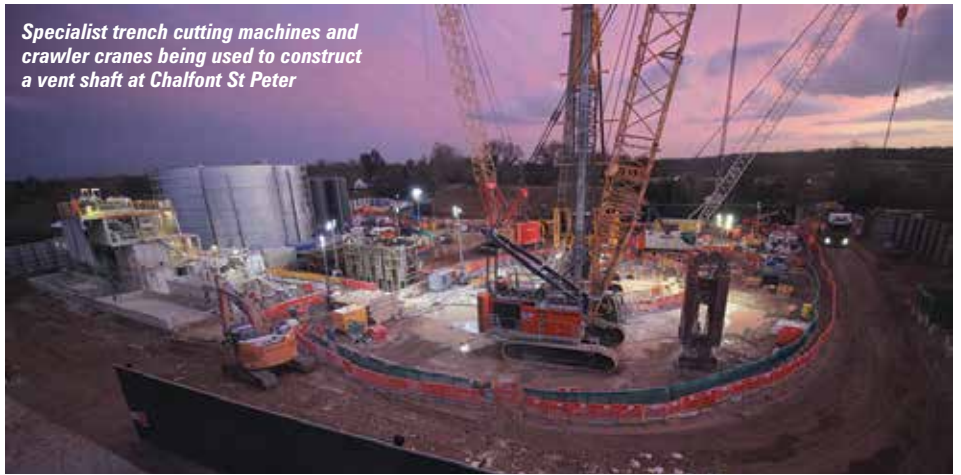
Two new 100 tonne Kobelco CK900Gs from Delden are assisting Align JV and its partner Kilnbridge to construct the first piers on land beside the A412 near Denham Green. A Delden 160 tonne Liebherr LR1160 crawler is also on site. This is the location where the impressive launching girder - dubbed the 'Traveller' - is being assembled and tested. Supplied by Italian company Deal, it is 160 metres long and will travel out over the newly constructed piers to install the precast deck sections that will weigh up to 133 tonnes.

**THE TUNNELS**

On both sides of the viaduct the HS2 rail line will travel through new tunnels dug out by TBMs (Tunnel Boring Machines). Crawler cranes are playing an important role assembling the TBMs and constructing the massive ventilation shafts



*The largest crawler crane on the CVV jetty is this 250 tonne Liebherr LR1250 from Weldex*



*Specialist trench cutting machines and crawler cranes being used to construct a vent shaft at Chalfont St Peter*



*Crawler cranes from Hawks Hire and NRC Plant at the Victoria Road site in Acton*

strategically located along the tunnel route.

Last year a 650 tonne Demag Superlift 3800 from Weldex was positioned at the Chiltern tunnel portal site close to the M25 in Buckinghamshire, where it helped assemble the two 2,000 tonne TBMs named Florence and Cecilia that are now busy digging the 16km HS2 tunnels under the Chilterns towards Amersham. The vent shafts are constructed with specialist trench cutting

machines, often utilising modified crawler crane bases supported by standard crawler mounted lifting cranes.

Two other TBMs are being assembled near West Ruislip station and these will construct some of the 26km of tunnels towards London. Work is progressing on the eight vent shafts and structures on this route including the one at Victoria Road in Acton where SCS JV - a consortium of Skanska, Costain and Strabag - is also building a crossover box that will let trains switch tracks on the way in and out of Old Oak Common station. Two more TBMs will also be installed here to dig tunnels out towards West Ruislip.

Crawler cranes used on the Victoria Road site in Acton include two from NRC - a 250 tonne HSC SCX2800-3 lattice and a 50 tonne Link Belt TCC500 telescopic - and a 300 tonne Liebherr LR1300 from Hawks Hire is also on site.

**FLEET EXPANSION FOR HS2**

The HS2 project has encouraged companies to expand their crawler crane fleets to meet increased demand. Delden Cranes specifically acquired its 250 tonne Liebherr LR1250 for HS2 work and BPH Equipment added three new 100 tonne Kobelco CKE900G-3 crawlers at the end of last year along with two new 135 tonne CKE1350G-2s.

The Kobelco CKE900G-3 is proving a particularly popular crane in the 100 tonne class.



*One of Delden Cranes' CK900G-3 helping to construct a land-based pier for the CVV*



**Kobelco CKE1350G-2s crawler cranes from BPH Equipment on the site of the new Old Oak Common station**



**The electric Liebherr LR1160 from Select Plant Hire in operation at HS2's Canterbury Road vent shaft site**

Last year the three new units from BPH Equipment went straight to work on the HS2 Old Oak Common site for BBVS - the Balfour Beatty, Vinci and Systra joint venture - on the £1 billion main station contract. Also on site are four BPH CKE1350-2s - which are playing a supporting role during the construction of the station box's 1.8km long, 25 metre high diaphragm walls while two were used for general lifting duties including lifting cages and piling rebar.

The two newest CKE1350-2s are equipped with Groeneveld automatic lubrication systems and safety equipment including an Orloco camera system with winch view and load zoom capabilities alongside a 360 degree camera system fitted by the SB3 joint venture of Soletanche Bachy and Balfour Beatty Ground Engineering. Balfour Beatty is now adding five more 100 tonne Kobelco CKE900G-3s to its fleet which are destined for HS2 work in the Midlands.

AGD Equipment has supplied a 45 tonne

Marchetti Orsa CW45.32 telescopic crawler on HS2 work in Ruislip - the fact that its facility is close to the HS2 route has been a plus.

**LOW RATES  
DESPITE HIGHER DEMAND**

The requirement of HS2 to use machinery with the latest generation of lower emission engines has been instrumental in hire companies buying new machines. However, some companies have said that despite the increased demand and requirement for cranes that meet the latest emissions standards, hire rates have not risen accordingly.

As well as specifying the use of Stage IV and Stage V compliant diesel engines, HS2 has been pioneering the deployment of electric crawler cranes. Following an initial trial at the Curzon Street Station site in Birmingham last year, Select Plant Hire has now supplied three emission-free electric Liebherr cranes to HS2 sites.

Expanded - a Laing O'Rourke specialist business working for BBVS - has taken two of the first battery powered electric crawler cranes - a 250 tonne LR1250E and a 160 tonne LR1160E - onto the Old Oak Common Station site. See page xxx for more details.

The third lattice boom electric Liebherr crawler crane - a 160 tonne LR1160E - has arrived at HS2's Canterbury Road vent shaft site managed by the SCS JV.

The use of electric crawler cranes is part of the HS2 projects stated aim to be net zero carbon from 2035, with the target of achieving diesel free sites by 2029. To achieve this, HS2 states that it is collaborating with the industry and its supply chain to accelerate innovation in low carbon technologies such as fully electric machinery, alternative fuels and renewable energy solutions. ■

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