Press Release

HERRENKNECHT

X-large TBM Alice returns home after successful tunnel mission including 180° rotation in New Zealand

March 31, 2016
Auckland / Schwanau

One of the world's largest tunnel boring machines (TBM) has driven two 2.4-kilometer tunnel tubes for New Zealand's most ambitious "Waterview Connection" road-building project. Work on and by the machine was followed with public interest for almost three years, including a spectacular 180-degree about-turn. And now it's time to say farewell with disassembly work complete five months after the successful breakthrough. Core components of the machine with a diameter of 14.41 meters are now returning to the manufacturer, Herrenknecht, where they will be stored until required for use in new infrastructure projects.

_____ It's time for fans of Alice, the S-764 tunnel boring machine, to say farewell. The last components of its star, the Herrenknecht EPB Shield S-764 with a diameter of 14.41 meters, are to be transported away from the site in Auckland, New Zealand. Alice created the shell of a road tunnel for the major "Waterview Connection" project in the heart of the mega-city, which will link two of the most important state highways, while securing a firm place in people's hearts at the same time. Many New Zealanders followed the assembly, advance and disassembly of one of the world's largest tunnel boring machines via Twitter, YouTube and on Facebook.

Core components such as the main drive, erector and conveyor screw will arrive next week in southern Germany at Herrenknecht, the manufacturer, where the individual parts will be processed professionally and retained for use in future projects. Herrenknecht is an international market leader in the area of tunnel boring technology and has already delivered boring machines with large diameters for

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infrastructure projects to 63 countries, whereby the machines are specially coordinated to the respective project and geology.

Apart from the size and heterogeneous geology, particular project requirements in the development of Alice also included an extremely ambitious timeframe and the tight spatial conditions on the site: half-way along, following completion of the first tubes, the machine had to be turned through 180 degrees on an area of merely 25 x 39 meters right beside the highway. In view of the turning manoeuver, the TBM and its gantry had been designed to be short and compact right from the start. In addition, a second, shorter gantry was used for the first 300 meters after the turn until enough space had been created for the regular second gantry. The gantry for driving the tunnel floor was disconnected from the TBM to prevent interaction during downtimes. And representing a huge advantage in terms of time.

The gigantic boring machine, called after the main character in “Alice in Wonderland”, drove two tunnel routes, each with a length of 2.4 kilometers, in just under 21 months. With records of 28 meters a day and 130 meters a week, the international drilling team stayed well within the budget and on schedule. And the times calculated for turning the machine as well as assembly and disassembly were also maintained in full or even improved on in some cases.

Brett Giddon, Highway Manager at the New Zealand Transport Agency commissioning the project, was impressed: “Alice will leave behind a lasting legacy”, he claimed, on the occasion of the breakthrough on October 19, 2015. “The world-class tunnels she helped construct that will benefit Auckland and New Zealand for 100 years and more.”

More than 1,000 people took part in the official breakthrough celebrations. “Everything went to plan, it was a text book breakthrough”, enthuses Tunnel Manager, Chris Ashton. “Our team did real hard work pumping out the meters over various shifts and keeping Alice shipshape to complete its work to world-class standards”.

The “Waterview Connection” tunnel project is one of the largest infrastructure projects in New Zealand. It aims to close the gaping gap in the western section of Auckland’s beltway. With three traffic lanes each, the two road tunnel tubes will link the country's two main arteries, Highway 16 and Highway 20, making the 2.4-kilometer connection the longest road tunnel in New Zealand. During a visit in May 2014, Prime Minister John Key called the structure an impressive work of engineering skill. “It will be a fantastic bonus for the road network here in Auckland.” The tunnel represents a time-saving link between the city center and the international airport and is to be open for traffic by 2017 at the latest.

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Work on tunnel construction as well as assembly and disassembly of Alice can be viewed in numerous time-lapse videos on the client's YouTube channel.

More information and video clips on the project:

› **Press Release by the New Zealand Transport Agency**
“BREAKTHROUGH! Alice completes remarkable journey”
http://www.nzta.govt.nz/media-releases/breakthrough-alice-completes-remarkable-journey/

› **Project website:**
www.nzta.govt.nz/projects/waterviewconnection/

› **YouTube channel on the Waterview Connection project:**
https://www.youtube.com/channel/UC1YV14UsW0OJaRwZaqnd8Rw

› **TBM “Alice” on Facebook:**
www.facebook.com/AliceTBM

MACHINE DATA S-764
Machine type: EPB Shield
› Shield diameter: 14,410 mm
› Drive power: 8,400 kW
› Torque: 6,880 kNm

PROJECT DATA
Project
› Waterview Connection, Auckland, New Zealand
Contractor
› “Well-Connected Alliance” (New Zealand Transport Agency; Fletcher Construction Ltd.; McConnell Dowell Constructors Ltd.; Obayashi Corporation; Beca Infrastructure Ltd.; Parsons Brinckerhoff; Tonkin & Taylor Ltd.)
Geology
› Soft soils, heterogeneous soils, sandstone, siltstone (East Coast Bays Formation and Parnell Grit)
Advance length
› 2,396m und 2,430m

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Photos - X-large TBM Alice returns home after successful tunnel mission

Photo 1

At the end of September 2014, the cutting wheel of TBM "Alice" broke through the target shaft wall for the first time. A school pupil from South Auckland gave the Herrenknecht EPB Shield S-764 its name. The inspiration was the main character from the children's book "Alice in Wonderland". In it Alice follows a white rabbit through a tunnel into a fictional fantasy world.

Photo 2

Between October 2014 and January 2015, the machine with a diameter of 14.41 meters completed a rotation manoeuver in an area of merely 25 x 39 meters. The machine had been designed to be as short as possible right from the start.

Photo 3

Alice broke through into the target shaft on October 19, 2015 after driving 4,826 meters of new tunnel shell for Auckland's "Waterview Connection", one of New Zealand's largest infrastructure projects. It aims to close the gaping gap in the western section of Auckland's beltway.

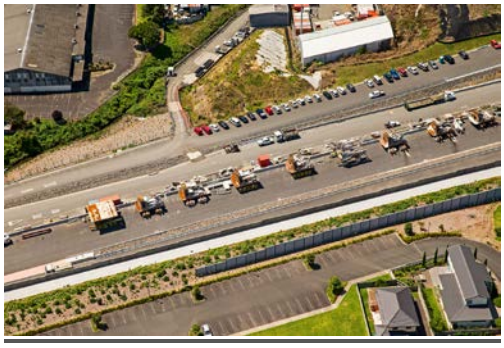

Photo 4

Weighing in at 3,200 tons, the S-764 tunnel boring machine is fully dismantled and the last components are transported away. Individual core components are to be shipped back to the manufacturer in Germany where they will be processed professionally and stored until required for use in other projects.

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For further information:
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Herrenknecht AG
Herrenknecht is the only company worldwide to deliver tunnel boring machines for all geologies and in all diameters – ranging from 0.10 to 19 meters. The product range comprises tailor-made machines for traffic, supply and disposal tunnels as well as additional equipment and service packages. Herrenknecht also manufactures drilling rigs for vertical and inclined shafts as well as deep drilling rigs.

In 2014, the Herrenknecht Group achieved total revenue of 1.082 billion euros. The Herrenknecht Group employs around 5,000 people worldwide, including more than 150 trainees. With over 75 domestic and overseas subsidiaries and associated companies working in related fields, Herrenknecht provides comprehensive services close to each project and customer.

› http://www.herrenknecht.com/en/references

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