LIEBHERR

Press information

Liebherr R 944 C Tunnel crawler excavators provide tunnelling power in "Stuttgart-Ulm" rail project

- Protective devices on tunnel excavators to guard against mechanical and thermal damage
- Special cab with ergonomic design and high level of operating comfort
- Liebherr fleet with several tunnel excavators in use

Stuttgart (Germany), October 2014 – In the "Stuttgart-Ulm" infrastructure project, a total of nine Liebherr tunnel excavators are being used for drilling work. The ARGE "Tunnel Cannstatt", for example, is currently running two Liebherr R 944 C Tunnel models and also an R 924 Compact Tunnel model to construct the mainline railway in Bad Cannstatt. A third R 944 C Tunnel model is to join them later.

The basic Liebherr R 944 C Tunnel crawler excavator is precisely engineered ex-factory for the tough operating conditions experienced during tunnelling. The equipment comprising a swivel arm with double 45° swivel bearing and a 4.5 m telescopic boom has a heavy duty design. This means, for example, that hoses and lines on the equipment are routed along the side and the hydraulic cylinders are specially positioned so as to protect them against falling rocks.

Liebherr offers the R 944 C Tunnel crawler excavator with an operating weight of about 44 tonnes with two swivel arms of differing lengths of either 3.07 m or 3.70 m. Due to the operating conditions on-site, ARGE "Tunnel Cannstatt" has opted for the short swivel arm version. The short version is designed for a tunnel height of up to 7.0 m and is thereby very precisely adapted to the local conditions. With this highest possible tunnel height, the excavator achieves a tunnelling path of 1.6 m. The maximum tunnelling path of 2.1 m with this equipment version means that a tunnel height of 5.4 m can be achieved. The Liebherr R 944 C Tunnel crawler excavator with short swivel arm offers a maximum tear-out force of 164 kN and a maximum break-out force of 191 kN.

The Liebherr tunnel excavators are used in Stuttgart for direct excavator tunnelling. Thanks to the high tunnelling force of the R 944 C Tunnel, they work in most cases with an excavator bucket. If the rock is harder, a hammer or a milling machine is used. For direct tunnelling, the tunnel excavator requires a high hydraulic output. The R 944 C Tunnel model from Liebherr is therefore equipped as standard with high pressure hydraulics to enable this.

A 6-cylinder inline engine from Liebherr, which complies with the stage III / tier 3 emissions standard, powers the R 944 C Tunnel model. The diesel engine with turbocharger and intercooler returns 190 kW / 258 HP at 1,800 revolutions per minute. ARGE "Tunnel Cannstatt" also chose to have the optional diesel particulate filter installed.

During development of the tunnel excavators, Liebherr placed particular importance on the safety of the driver. The special heavy duty cab is distinguished by an ergonomic design and a high level of operating comfort. It comes as standard with protective devices in accordance with FOPS, FGPS and ROPS. The Liebherr R 944 C tunnel excavators used in the "Stuttgart 21" project are also equipped with video monitoring for the rear area.

Special tunnelling equipment from Liebherr in use from Ulm to Stuttgart

There are currently three Liebherr R 944 C Tunnel crawler excavators in use in Stuttgart-Bad Cannstatt for the "intermediate north heading". This is the central point from which the tunnel is being dug from and to Bad Cannstatt, both in the direction of the main railway station and up to the Ehmannstrasse. The tunnels feed into the Feuerbach–Bad-Cannstatt tunnel and, with that, planning approval section 1.5, which is part of the "Stuttgart 21" infrastructure project.

The "Bad Cannstatt" tunnel comprises two single-track tunnels which are created almost entirely by conventional tunnelling methods and have a length of 3,507 m. Unlike the "intermediate north heading" (Feuerbach tunnel), the rail does not run horizontally through the mountain here but follows a vertical 26 m deep shaft instead. It lies in the same plane as the tunnel. Tunnelling for it began in the middle of February

2014. This intermediate heading is intended to keep any negative side effects for the public as minimal as possible: It is right next to the logistics area so that the rubble can be removed directly and transported away by rail without using public roads.

The fleet of Liebherr equipment deployed by ARGE "Tunnel Cannstatt" includes not only three type R 944 C tunnel excavators and an R 924 Compact Tunnel excavator but also three type L 556 Tunnel wheel loaders and an L 566 Tunnel wheel loader.

In the overall "Stuttgart-Ulm" project, many other items of special tunnelling equipment from Liebherr are currently being used. Working on the ARGE "tunnel intermediate heading" are four further R 944 Tunnel models, supported by four L 580 Tunnel wheel loaders. The ARGE "Atcost" also has an R 944 Tunnel in use. Furthermore, various other Liebherr tunnel excavators and wheel loaders are deployed on the ARGE "Feuerbach" tunnel.

On completion of the project, the tunnel excavators will have created about two thirds of the overall 64 km of newly-formed tunnel and passage routes in shotcrete design.

"Stuttgart–Ulm" rail project

The "Stuttgart-Ulm" rail project comprises two sub-projects: "Stuttgart 21" and the new "Wendlingen–Ulm" route. These involve the reconstruction of the Stuttgart rail junction, construction of the rapid Wendlingen–Ulm route, a comprehensive town construction project and the expansion and new construction of various railway stations. Both projects are divided into seven planning approval sections. Commissioning is planned for December 2021.

Captions

liebherr-crawler-excavator-r944c-tunnel-stuttgart-1.jpg
In the Stuttgart 21 construction project, a total of eight Liebherr R 944 C Tunnel crawler excavators are tunnelling using the shotcrete method.

liebherr-crawler-excavator-r944c-tunnel-stuttgart-2.jpg
With its 3.07 m long swing arm, the Liebherr R 944 C Tunnel crawler excavator has a maximum tear-out force of 164 kN and a maximum break-out force of 191 kN.

liebherr-wheelloader-l566-tunnel-stuttgart.jpg
While tunnelling in the ARGE "Tunnel Cannstatt", the R 944 C tunnel excavators are supported by three Liebherr L 556 Tunnel wheel loaders.

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