

KEMROC DMW 130 cutter wheel removes temporary tunnel invert

A CLEAN BREAK IN THE TRIMBERG TUNNEL

Construction of the A44 motorway makes progress

Difficult geological conditions encountered during the excavation of the Trimberg Tunnel, a section of the new German A44 Kassel – Herleshausen motorway, resulted in the contractor having to stabilize the tunnel invert temporarily by installing a shotcrete layer. A KEMROC DMW 130 cutter wheel mounted on a 23 t excavator proved itself when used later on to remove the temporary structure. The concrete could be separated cleanly from the rock substrate and be recycled as a valuable construction material.

Construction of the new German A44 motorway, linking the A7 motorway near Kassel to the A4 motorway near Herleshausen, involves several types of engineering work which makes it a truly challenging infrastructure project. This includes the excavation of the 600 m long twin tube Trimberg Tunnel using traditional tunneling methods in a location with a long history of mining. The tunnelling contractors at the HOCHTIEF / Züblin Consortium had to contend with difficult geological conditions; subsidence and loose boulders were encountered in both tunnel tubes for a length of 250 m in the predominantly sandstone rock. For these reasons, the client, DEGES specified that the base of the excavated tunnel should be stabilized using a temporary layer made from shotcrete.

Breakthrough of the North Tube of the Trimberg Tunnel took place in April 2019 and thereafter the contractor started removal of the temporary base layer. A 23 t excavator fitted with a KEMROC DMW 130 cutter wheel was purchased specifically for this project and finally proved to be a good investment.

Cutting Cleanly Though Rock and Concrete

The KEMROC DMW cutter wheels have double hydraulic motors and there are four sizes in the range to suit excavators from 14 to 60 t operating weight. The two high-torque hydraulic motors provide high levels of drive power and cutting force. As a result, the machines develop high productivity levels, even in hard rock and heavily reinforced concrete. The manufacturer, KEMROC, offers a range of wheels with dimensions to suit cutting depth to 1,000 mm and width of 400 mm.

For the demolition project in the Trimberg Tunnel, a DMW 130_600_130 cutting wheel (nominal power 130 kW) was chosen with 130 mm cutting width and 600 mm cutting



The HOCHTIEF / Züblin contractor demolishing a temporary tunnel invert support made from shotcrete using a KEMROC cutter wheel in the Trimberg Tunnel.



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depth. With this size wheel, the contractor achieved a remarkable cutting performance of 15 – 20 m/h. Using a cutter wheel also enabled the contractor to use a very efficient demolition process. The first step was to use the wheel to cut out a section approx. 2 x 2 m. This section was detached from the bedrock using a wheel loader or excavator. The detached concrete was then loaded into a dumper and transported to a processing plant at the tunnel portal. From there it was taken off site by a waste disposal company as recycled material.

In autumn 2019, demolition of the temporary concrete base in the north tube of the Trimberg tunnel was completed. Later on, work was completed before the end of the year also in the south tube. And here, too, the KEMROC cutter was used for the required demolition work. According to DEGES, a total of 125,000 m³ of concrete have been removed from the two tunnel tubes in this tunnelling project. Dipl.-Ing. Björn Döppner, site manager at consortium partner Züblin, confirmed that the amount of shotcrete removed from the site after demolition was well within expected levels: "By using the cutter wheel, we could remove the shotcrete without contaminating it with bedrock. This would not have been possible if we had used a breaker or drilling and blasting as our demolition method. This saved our client considerable disposal costs. Using the cutter wheel requires a certain degree of sensitivity in the excavator operator. But, unlike using a breaker, the work is pleasantly vibration-free for man and machine." ■



The cutter wheel in close-up. The DMW 130 cutting wheel achieves a cutting rate of around 15 – 20 m/h in shotcrete.

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