

KEMROC cutter wheel Erwetor DMW 220

UNUSUAL APPLICATION ON THE DÜTE BRIDGE

Along the route of the A1 Autobahn near Osnabrück (Northern Germany), a 50 year old bridge had to be replaced with a new bridge. Due to the construction method used, demolition of the old bridge was not straight forward. The decision of UPEK GmbH, a leading demolition company, to use a KEMROC Erwetor DMW 220 cutter wheel mounted on a 50 ton excavator to separate the very sensitive concrete elements contributed to keeping the demolition of the Easterly lanes of the motorway on schedule.

Demolition of the Düte bridge was made more difficult for demolition specialists, UPEK GmbH, due to the very unusual method used to construct the bridge: Built in 1968, the 4-lane motorway bridge on the A1 near Osnabrück had eight pairs of supports holding up a single slab of concrete which was 280 m long and 35 m wide; made originally from one long, continuous pour. For this reason, the principal contractor for demolition, ground-works and construction, PORR Deutschland GmbH had to build a steel structure to support the old bridge before it could start cutting into the concrete deck. The intention being to cut the deck longitudinally into two halves so that one half could be removed and replaced with a new section before the second half was removed and construction of the second half of the new bridge could be completed. Passing under the old 300 m long and 18 m high bridge was not only the river Düte, but also a high-speed railway line, so certain demolition works could only be completed during operational breaks in the railway schedule. The countryside near the bridge is part of a nature reserve so the use of a long reach excavator to demolish the bridge from ground level was also not possible.

The subcontractor UPEK from Steinfeld (Lower Saxony) was responsible for the demolition of the eastern half of the bridge over the high-speed railway line and they chose to use the KEMROC cutter wheel Erwetor DMW 220 mounted on a 50 ton excavator for the delicate demolition work. The procedure was to locate the excavator on the 15 m wide half of the bridge deck to be demolished and to cut out segments of the deck approximately one square meter in size. After each square segment was cut, the excavator bucket was used to pull the segment backwards, onto the uncut bridge deck where it was reduced in size using a breaker or a shearer. As the concrete segment was supported on the bridge deck rather than being suspended in the air, the blow energy of the breaker was very effective in breaking them down into smaller pieces. Reducing them down in size using shearers was also very effective since the steel reinforcement had been cut by the wheel.



To demolish the eastern half of the Düte bridge near Osnabrück, the demolition company UPEK used a KEMROC DMW 220 cutter wheel for the sensitive work of cutting the bridge deck.



One square meter segments were cut out of the concrete bridge deck, pulled over onto the remaining decking and then broken down using traditional excavator attachments.

Optimistic Interim Report

By the end of May 2018, demolition of the bridge section that passed over the high speed railway line was completed and demolition of the superstructure using conventional methods had started. However, it was also planned to use the excavator with Erwetor cutter wheel to demolish the remaining 115 cm thick bridge heads and abutments. In his interim report, the General Manager, Mr Johannes Prues commented, "While cutting the 65 cm thick concrete road we achieved a cutting speed of 30 meters per hour which translated into one meter of road demolished per hour. Naturally, tool wear while cutting the heavily re-enforced concrete with contained 32 mm diameter tension bars, was enormous. However, we achieved the desired production rate for the difficult task in the very short time frame available due to the high-speed railway operating times."

For the demolition of the bridge heads and 80-120 cm abutments, using the KEMROC cutter wheels had some very important benefits. "The ability of the wheel to cut down to 100 cm depths made the demolition of some structures much easier than would have been possible with traditional cutting and sawing techniques. In addition, using the cutter wheel on the bridge heads and abutments solved another problem. These structures were also formed from a single pour of concrete and it was only the cutter wheel that made it possible to demolish the eastern half of the bridge without damaging the western half which remained operational. This would have been very difficult using hammers and shearers."

Problem Solver and Time Saver

Meanwhile, UPEK have tried the KEMROC cutter wheel in other, more conventional applications. UPEK, employing 30 people with over 50 machines in their fleet, are a leader in the Osnabrück area, specialising in demolition, ground works, recycling of building materials and heavy transport with occasional projects throughout northern Germany. According to the General Manager, "On some occasions, the cutter wheel has saved us significant amounts of time in the demolition of buildings and removal of basement walls compared to the use of other excavator attachments. The KEMROC cutter wheel has become an indispensable problem solver and time saver for our company. I purchased the machine after renting it for one month." ■

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Even in the tough concrete, filled with re-enforcement and tension bars, the cutter wheel achieved a demolition rate of one meter of road length per hour.