KEMROC DMW cutter wheel

ECONOMICAL DEMOLITION OF WEIR WALL

A disused weir in Stadtilm (Thuringia, Germany) was demolished to allow fish to pass through this section of the Ilm River again. To break down the massive weir wall, demolition contractor, JeFra Bauservice GmbH & Co. KG used a KEMROC DMW 220 cutter wheel on a 32-ton hydraulic excavator. This made it possible to dismantle the concrete body precisely, economically and without harmful vibration.

By late 2024, migrating fish will have free passage again when the weir system in Stadtilm, Thuringia (Germany), is dismantled. The weir was used to generate energy by a leather factory based on the left bank of the Ilm. By the early 1960s, the use of hydropower was discontinued. Strictly speaking, dismantling of the weir began in 2017, when some major components including a bridge were cleared. This year, the aim was to remove the enormous weir wall as well. The contract for this was awarded to JeFra Bauservice GmbH & Co. KG based in Drei Gleichen in the district of Gotha. A KEMROC DMW 220 cutter wheel on a 32-t excavator, supported by a 30-t excavator with hammer and sorting grapple, became the equipment of choice for this project.

River Application

KEMROC's DMW range of cutter wheels are a logical addition to the usual choice of excavator attachments such as hammers and shears used for most demolition projects. Cutter attachments have benefits when refurbishing existing concrete structures where hammers or pulverisers could damage other remaining structures due to excessive vibration. The DMW range comprises models in four sizes for carriers from 14 to 60 t operating weight. With several cutting wheel options and a variety of cutter teeth, KEMROC's cutter wheels can be used in a wide range of applications with cutting depths of up to 1,000 mm. In addition, models in the DMW range from KEMROC are "water-tight" to depths of 30 m and are therefore suitable for trenching and demolition projects under water.

Demolishing the massive concrete weir wall in Stadtilm posed a challenge for the people at JeFra Bauservice. The structure was an overflow weir with a solid concrete weir wall, over which water flowed down into the downstream basin. Due to the dimensions of the weir wall – 25 m long and 2 m high – and its composition of unreinforced concrete

In Stadtilm, Thuringia, an approximately 25 m long weir system was demolished to make the Ilm River passable again for fish.

Using a KEMROC cutter wheel on a 32-t excavator, the massive concrete weir wall was cut into individual segments.

interspersed with wooden structures, it was decided that the DMW 220 cutter wheel with a cutting depth of 1,000 mm would be the most suitable model. Another important factor influencing the decision to use the cutter wheel, as Jens Frank, Managing Director of JeFra Bauservice, explains: “The weir system was directly integrated into bank reinforcement on both sides of the river. Vibration from an excavator using a hammer attachment could result in damage to the adjacent buildings. An associated firm of consultants set limits for the values of vibration before work started and they have measured and recorded them during the demolition process.”

Demolition work on the weir wall was carried out over a two-week period in July and August 2024. Demolishing the 2 m tall weir wall was completed using the excavator with cutter wheel on two levels. The demolition process was carried out as follows: At predetermined intervals the operator of the large excavator cuts through the weir wall which effectively prevents the transmission of any vibration in the direction of the riverbank. The smaller excavator then breaks free the individual segments of the wall and transports them to the riverbank for transport away from the job site.

Despite some interruptions due to heavy rainfall, the work was completed on schedule. “Our plan worked,” sums up the contractor, “and according to the values measured by the consultant’s office, we always remained far below the limit values set for vibration.”

Ecological hydraulic engineering

Overflow weirs like the one at Stadtilm with its two-metre-high drop are insurmountable barriers for aquatic life: they interrupt passage along the river – bad for fish and other wildlife whose life cycle requires free movement in the water. Jens Görlach, a graduate fisheries engineer from the Thuringian State Office for Environment, Mining and Nature Conservation, confirms: “Fish in this body of water have never passed upstream beyond this weir.” After the old concrete structure has been removed however, they should find it so much easier, he adds: “We are replacing the weir with a so-called bottom slide to overcome the difference in height of the riverbed by building a relatively flat gradient over a length of about 100 m. An arrangement of stone bars across the entire width of the riverbed creates a number of basins through which the fish can swim upstream.”

Throughout Germany, regarding flowing water, ecological over economic aspects are once again coming to the fore, including the provision of appropriate living conditions for fish and other aquatic life as in Stadtilm. That project, co-financed by the European Union, serves the ecological development of water bodies and is part of the Thuringian state programme for water protection. According to Jens Görlach, after completion of the work, two thirds of the current 35 state-owned weir systems have already been converted or demolished. There are currently still a good dozen of such weir systems to be dismantled

Close-up view of the KEMROC cutter wheel. It is designed to remove as much material from the concrete structure as is necessary for a clean cut.

A second, smaller excavator plus hammer and bucket, broke out the individual concrete segments and transported them to the riverbank.

or demolished. “With similar conditions, the use of a cutter wheel can also make sense in those locations,” expects demolition contractor Jens Frank. The master mason and state-certified structural and civil engineer is confident that he will be able to continue to bid successfully for similar, difficult construction projects in the future: “We have already had several applications which were successfully completed with the help of KEMROC attachments, and we trust that we will continue to find suitable solutions for special challenges together with the specialists from this manufacturer in the future.” ▮

Video from the construction site:
https://projector.kemroc.net/web/?id=EJGcfdRldTaQxaZHOnGi

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