

Job Report

Widening of the Elbe-Havel-Canal for "Europe" Class Ships.



Cargo traffic to and from Berlin is increasing steadily. These shipments are partially forwarded via waterways. In order to increase capacity to accommodate more traffic, the Port of Magdeburg will be converted into a waterway intersection.

The Midland Canal, which used to end here, will now be extended and crosses the Elbe River via an impressive bridge-trough construction, and then connected directly to the Elbe-Havel-Canal.

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Task

Since the canal has to accommodate modern inland ships such as the "Europe" class vessels, the canal has to be deepened to 4.10 m and widened to 55 m at the top and 25 m at the bottom respectively. Several Liebherr hydraulic excavators are scheduled for this project near the city of "Burg".



Solutions

Widening of the channel with the excavator from the canal bank.

The canal's shipping channel is to be widened in the vicinity of Parchau. At a width of 10 m and a depth of 2.5 m, topsoil and a sand-gravel mix is loaded into barges with a capacity of 450 t.

Ideally suitable for this type of work, the contractor "Bunte" from Papenburg utilises an R 974 B Litronic that is powered by a 317-kW/431 HP diesel engine. This powerful excavator features high digging forces, excellent bucket fill factor and fast cycle times. With an operating weight of approx. 79 t, the crawler excavator is equipped with a 7.2 m gooseneck boom, a 3.8 m stick and a 4.3 m³ backhoe bucket. The high digging and breakout forces are ideally matched to the Liebherr backhoe bucket geometry in order to optimise performance. The daily progress of the canal widening is approx. 20 m, depending upon the material condition and availability of barges.



Deepening of the canal

A Liebherr hydraulic excavator also carries out general excavation and grading of the canal floor to a depth of 4.10 m. Environmental protection is of utmost importance during all activities in connection with widening of the Elbe-Havel-Canal, and Liebherr excavators are equipped accordingly.

The marine contractor "Hirdes", a 100% subsidiary of "Boskalis" in the Netherlands, utilises a pontoon-mounted P 964 B Litronic from their "Binnen" branch offices in "Duisburg". This pontoon excavator upper is mounted on a 21 m long, 3-spud barge via an elastic mounting foundation. The shock mount element between excavator upper and pontoon absorbs all axial and radial forces as well as vibrations resulted from digging and swing movements.

In 1981 "Hirdes" mounted in their shipyard in "Duisburg" on this pontoon a Liebherr P 982 upper, including an elastic mounting foundation, and used it in applications on European rivers and canals until the early 2001. After well over 30 000 operating hours the excavator upper was replaced and "Hirdes" decided again in favour of Liebherr – because the marine specialists from Liebherr-France complied fully with the expectations of "Hirdes" regarding all technical requirements. The branch offices in Hamburg from "Hirdes" also opted for a Liebherr P 984 C for another pontoon project.

The attachment of the P 964 B consists of a 4.6 m gooseneck boom, 3.4 m stick and 4.0 m³ backhoe bucket, featuring sealed bearings at all pivot points. All hydraulic oil and lubricants are biologically degradable.



Deepening the shipping canal

Shortly before "Burg", the canal will currently not be widened, but only dredged to a depth of just 3.5 m. It is of utmost importance for such precision work that the excavator operator has constant control of the working depth and working area.

Marine contractor "Bohlen & Doyen" of Wiesmoor, uses a pontoon-mounted P 974 B Litronic for this job. The attachment consists of a 10.5 m gooseneck boom, 3.8 m stick and 4.0 m³ ditch-cleaning bucket with 4 m cutting width. Two attachment monitors for dredging applications are installed in the widened cab providing for the operator's continuous control of the working depth and working area. Using the graphically exhibited areas as displayed on the monitors, all excavator functions can be performed extremely sensitively and precisely via the electronic joystick controls.



Embankment construction

A canal embankment is to be graded at a ratio of 3:1. Excess material is cleared away to a depth of 4.1 m and loaded into barges.

An entire crawler excavator R 974 B Litronic, owned by the "Möbius" company in Hamburg, is placed on a pontoon. The machine features a 3 m³ ditch-cleaning bucket. Since the crawler excavator can be moved around on the pontoon, the pontoon itself must not be constantly relocated. The advantage of a complete machine with crawler undercarriage is, of course, that the hydraulic excavator can be utilised for any earth-moving jobs on land following completion of the waterway project.

Disposing of excavated material

500,000 m³ of excavated material are hauled by barges on the "Elbe" river to sites near the small town of "Rogätz". There, former gravel pits with direct access to the "Elbe" river are back-filled in order to create shallow lakes.

The barges are unloaded by the same P 964 B Litronic also utilised by the marine contractor "Hirdes" for the dredging of the canal. The excavator features a 4.0 m³ clamshell for this task.

The pontoon's hydraulically actuated spuds are powered by the excavator hydraulic system and operated by the excavator operator. Approximately 30 to 45 minutes are required for the unloading of one barge. Depending on the type of the excavated material, up to 16 barges are unloaded daily.