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## Controlled Underwater Demolition

SMALL, HYDRAULIC DEMOLITION TOOLS ARE ECONOMIC AND SAFE

***Blumberg/Falkenhagen.*** In quite an unusual demolition project the professionals of the TAI Taucher-, Atemschutz-, Industrierarbeiten GmbH (Diving, Respiratory Protection and Industrial Works) could impressively demonstrate the efficiency and advantages of the DARDA Splitting Cylinder C 12 N and the Combi-Shears HCS 6 C: In a large underwater building pit (20 x 20 metres) old concrete structures were recovered from a water depth of 8 metres by means of these handheld demolition tools.

The concrete foundation piles with a length of 2.5 metres and a diameter of 1 metre as well as the remains of the reinforced foundation had to be removed as "gently" as possible. Vibrations or concussions might have caused damages to buildings directly adjacent.

Almost more critical was the evaluation of the "economic factor" – time is money, even more so with special, unconventional demolitions. For this reason other demolition techniques which had also been discussed were quickly rejected: these were pneumatic demolition hammers (they suffer from a loss of power of 0.1 bar per metre water depth), hydraulic demolition hammers as well as wire sawing. They were too time-consuming and therefore not economic. And due to the on-site conditions other heavy demolition tools were out of question anyway.

### Optimum Tool Mix

A coordinated solution of hand-held demolition tools, consisting of a core drill, a hydraulic Splitting Cylinder of DARDA GmbH, Blumberg, and DARDA Combi-Shears HCS 6 C soon proved to be ideal.

A diver started by carrying out horizontal core drills at the predetermined breaking points of the concrete parts to be demolished. After that he inserted the wedge set of the splitting cylinder, consisting of a wedge and two counter wedges, into the drill-hole. During the hydraulic operation the wedge pushes itself against the counter wedges, pressing them harder and harder against the inner wall of the drill-hole. By the enormously efficient splitting force achieved of 3,507 kN (358 tons) the DARDA Splitting Cylinder C 12 N, weighing not more than 31 kg, splits concrete and reinforced concrete within seconds.



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Connected to the hydraulic power unit at the surface via long hydraulic hoses the Splitter broke the concrete structures in the building pit exactly at the height of the boring. Furthermore, it widened the material until the reinforcing rods either broke or were exposed.

## **Versatile, Fast and Safe**

The remains of the foundations with steel reinforcements from 6 to 12 mm were then tackled by the small and light (14 kg) hydraulic Combi-Shears HCS 6 C of DARDA. With its shear set and a cutting force of 214 kN this device can easily cut steel reinforcements and round iron with a diameter of up to 18 mm. When opening the shear set a high breaking force is achieved by which concrete parts split up before can further be widened. With the help of the HCS 6 C the diver could cut through irons not broken yet and, if possible, further push the concrete apart to gain better access to the reinforcements. Positive side-effect: the HCS 6 C Combi-Shears proved to be significantly faster and safer than the severance of reinforcements with hydraulic angle grinders. Due to the rotation of the tool and the bad view under water this technique cannot be recommended. Likewise, the burning through of reinforced irons is complex, quite ineffective and relatively unsafe.

After each splitting and severing process a truck-mounted crane lifted the demolition parts secured before safely from the deep water, recovering a total of 30 cubic metres of concrete and reinforced concrete.

On land the concrete parts could then be further crushed for transportation with the Splitter and the Combi-Shears.

Including all preparatory and follow-up work the demolition was finished within just two working days (16 working hours). This was only possible in so short a time because the demolition professionals of the TAI GmbH in Falkenhagen competently applied the tools best suitable for this task.

The company confirmed that by using the hydraulic DARDA Splitter they could not only achieve a significant reduction of time, but that in terms of safety and handling especially in the case of underwater demolitions there are no competitive alternatives to controlled splitting.

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In the underwater building pit old concrete piles were demolished 8 m below the water surface.



A diver working fast and safely with the DARDA combi-shears HCS 6 C.

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