

Case Study falch GmbH / Held & Francke Bau- gesellschaft m.b.H. & Co. KG

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Bridge Reconstruction on the Brenner Autobahn: Maintenance Repairs on Reinforced Concrete Using 3 falch High-Pressure Water Jet Systems

Categories

1. Special techniques for plant maintenance repairs
2. Equipment and spare parts

Market Sector

Construction Industry

Brief Description

- Technology and machines for concrete maintenance and cleaning purposes.
- High-pressure water jet technology for maintenance repairs on a motorway bridge of the Brenner autobahn.
- Treatment and exposure of damaged surface area of the bridge structure without injuring the concrete reinforcement by using special techniques and a special jet streaming technology.

Task

Design, delivery, and service of 3 high-pressure water jet systems used by a specialist construction company for maintenance repairs on a motorway bridge of the Brenner autobahn.

Preparation

Luegbrücke, a bridge commissioned between 1965 and 1968, with an overall length of 1837 meters, was for a long time the longest motorway bridge in Austria. Strong mechanical stress inflicted by heavy traffic on the Brenner autobahn and atmospheric conditions necessitated a general overhaul. Construction company Held & Franke, ordered to repair the bridge and implement corrosion prevention measures, required high-pressure water jet systems for removal of certain edificial top layers and for the exposure of the reinforced concrete structure beneath.

Implementation

Construction company Held & Francke Bauges.m.b.H. had been using high-pressure water jet systems designed by falch GmbH since the year 2001. For maintenance repairs on Lueg bridge they decided to employ 3 of these machines made by falch GmbH:

All in all it took two years to complete the works. From November 2003 until November 2005 the general overhaul of Luegbrücke was accomplished by Held & Franke. The maintenance works included structural steelwork and concrete maintenance repairs on pylons and support structures as well as protection against corrosion. Three of falch's high-pressure water jet systems were employed simultaneously for two years on the Brenner autobahn bridge. An area of approximately 13.000 m² was worked on with the help of these high-pressure water jet systems. This meant removing an up to two cm thick layer of bitumen and synthetic resin from the tarmac. Also, tensioning ropes and reinforced concrete had to be exposed and reconditioned. In November 2005 all maintenance repairs had been completed and all lanes were opened up for traffic.

The tough bitumen layer and the resin layer below were removed by using the speed-controlled rotor nozzle *falch pointspeed* at 2500 bar operating pressure. Due to the continuous speed-control directly at the nozzle it was possible to attain much better streaming results in comparison to other jet systems: an increase of 20 per cent larger cleaning area was attained.



2 years of continuous service by falch machines

Approximately 450 m² bitumen tar was removed each day using one high-pressure water jet system. Part of the tar removal was done by employing a *falch scater 25*. Performance here reached 65 m² per hour.



falch scater 25 in operation

Tenacious bitumen and resin layers were removed completely. At the same time the concrete layer was keyed for a new surface coating. There was not alternative to using this procedure says site manager Franz-Wolfgang Hribernik: „High-pressure water jetting was for us the only technique applicable.“ Shot peening or sand blasting would not have worked on a tough, elastical surface. Removal of concrete certainly would have worked by employing a compressed air hammer. Only it would have taken much longer and could've possibly cracked lower concrete layers damaging the reinforced concrete.



falch-nozzle technology uses 2500 bar and removes tar and resin without any problem

Another task was exposing the bridge's tensioning ropes and concrete reinforcements. Using a newly developed nozzle technology – the *falch hyjet-method* – all tensioning ropes and concrete reinforcements were exposed. Concrete and reinforcing bars had to be removed breadthwise by 15 cm and by a depth of about 4 cm. Approximately 80 running metres were processed according to this method, the highest performance reaching 123 running metres per hour. Franz-Wolfgang Hribernik concludes: „We are

highly pleased with falch high-pressure water jet systems and also with the service provided by falch itself. Construction site service was great. Whenever we had questions or problems we were immediately supported by falch headquarters or by falch's local service partners.“

Customer's Benefit

- Time saving and cost-efficient technology for the removal of tenacious, elastic layers.
- Continuously adjustable speed controlling directly at the nozzle enables much better blasting results in comparison to other jet systems and increases area performance by 20% with regard to conventional systems.
- *falch hyjet-technique* enables conserving exposure of concrete reinforcement.

Ordering Party

Held & Francke Baugesellschaft m.b.H. & Co. KG is a subsidiary of family-owned Habau Group founded in 1913. Habau is Austria's the fifth largest construction company, active in civil engineering, in pipeline construction and prefabricated parts production as well as plant engineering for customers from the foods, automotive, paper & pulp, timber, chemicals, gas and petrochemical sectors. Habau also works for local and national authorities. Next to road construction Held & Francke also is engaged in construction works for power stations, tunnels, underground engineering, sewage treatment plants, pipeline construction and other building works. Held & Francke employs a staff of 700 in several branch offices. Since the year 2001 Held & Francke has been using high-pressure jet water technology made by falch.

Internet: <http://www.habau.at>

Contractor

falch GmbH, founded in 1986, designs, produces and globally distributes high pressure cleaners, jet water machines, and accessories such as protective equipment. The falch equipment includes high pressure water jet systems from 2 to 120 kw, 100 to 2500 bar, water quantities from 600 to 7000 l/h. These machines are e.g. available with separate heating modules or as combination units for use of hot water. Customers using falch machines within the maintenance branch come from industry, the trades and services sectors.

Internet: <http://www.falch.com>

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Maintain 2006

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