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Pressure washing of heavy construction equipment

by Karl Steiner

Tunnel construction sites are inherently dirty, which makes building the world's longest tunnel through the Alps a cleaning job. When completed in the middle of the next decade, the Gotthard Base Tunnel – actually two parallel single-track rail tunnels – will be 57 km long, or three km longer than the current longest, the Seiken Tunnel in Japan. By levelling the grade and straightening the line through the Gotthard Pass between Switzerland and Italy, the new tunnel will allow for longer freight trains and very high speed passenger trains, cutting an hour off the 3.5-hour trip time between Zurich and Milan.

The C\$12.6 billion project run by AlpTransit Gotthard AG, a subsidiary of the Swiss Federal Railways, is so massive it employs four tunnel-boring machines (TBM) to gouge out sections of the 9.4-metre diameter tunnels. While the four TBMs are cutting through the mountain at a daily clip of 25 to 30 m, the rock in some areas is so fragile that the other half of the tunneling has to be done by blasting at a comparatively slow 6 to 10 m a day. Construction on the 153 km of tunnels, galleries and shafts began in 1996 and is over two thirds done with final project completion expected by 2017.

Pressure washers pushed to limit

By that time 24 million tonnes of rock, roughly the equivalent of about five Great Pyramids of Giza, will have been excavated, much of it used on site to make five million tonnes of concrete aggregate. Keeping the equipment, including the four 3,000-tonne TBMs clean is the job of



dozens of pressure washers in the tunnels and at each portal. Bright yellow Kärcher washers make a striking contrast in the grey and tawny world deep inside the Alps. Everything has to be washed – all external surfaces of the TBMs including the cutting discs as well as conveyors and concrete pumps, along with all manner of mobile equipment outside the tunnels where temperatures vary seasonably from hot to bone-chilling cold.

At two of the five construction zones, the choice of washers was determined by Locarno, Switzerland-based Frigerio & Co. for main contractor Consorzio TAT: “For special jobs in the tunnels we chose Kärcher washers because we needed highly productive and efficient machines, that were also reliable and economical, to clean the tunnel boring machines,” says Romeo Izzo of Frigerio.

Cold water washers used inside tunnel

Since it doesn't freeze deep inside the mountains, cold water pressure washers predominate inside the tunnels. They are very cost-effective and smaller than hot water machines. Upright electric washers don't, like on scissor lifts or telescopic boom lifts or scaffolding, which is why they are the machines of choice to clean the cutting discs of the TBMs.

A workhorse cold-water machine like the Kärcher HD 10/25 delivers up to 3,625 psi with a throughput of up to 265 gallons per hour. That's one of the most powerful upright washers Kärcher makes, part of its electric Super Class series. The HD 10/25 was designed to remove stubborn dirt, something it is particularly good at when coupled with a Kärcher dirt blaster or the



Above: The new Gotthard Base Tunnel runs two parallel single-track rail tubes through the Alps.

Left: Cleaning of giant TBM with Kärcher HD 10/25 cold water washer.

Below: Kärcher HDS 2000 Super

versatile touchless triple nozzle, which allows the operator to move from high impact to lower impact cleaning jobs without switching nozzles.

The Super Class washers are designed for long, uninterrupted work sessions. Each has a four-pole, long life, water-cooled motor and three-piston axial pump with brass cylinder head and ceramic pistons. Other features protect against breakdowns, such as fine mesh water filtering system and automatic shutoff in the event of leakage, over- or under-voltage or phase failure. The Super Class machines also feature an Easy Press, ergonomically-shaped trigger gun for easier handling and operating; servo control on the trigger gun for varying water throughput and pressure; and twist free hoses.

Super machines handle double workload

At the mountain portals where an even wider range of cleaning capabilities are required in temperatures that can dip well below freezing, hot water machines like the Kärcher HDS 2000 Super play a larger



role. This mobile mammoth is meant to be an alternative to a heavy-duty stationary washer, like those used in the mobile equipment departments of large smelters or foundries to remove extreme soiling from load moving devices.

This particular washer features a dual motor/pump/detergent feed system for simultaneous operation with two wands, and a double coil, low emission burner that can deliver water as hot as 265 degrees F. Its electronic changeover system can shut down each unit separately and its turbo nozzle can even blast off hardened concrete.

“In the yard, it's an advantage to be able to move a single machine to big jobs and have two operators working simultaneously,” says Josef Deutschmann, head of maintenance at the AGN-Amsteg site run by construction company Murer-Strabag.

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