CUSTOMER VOICE

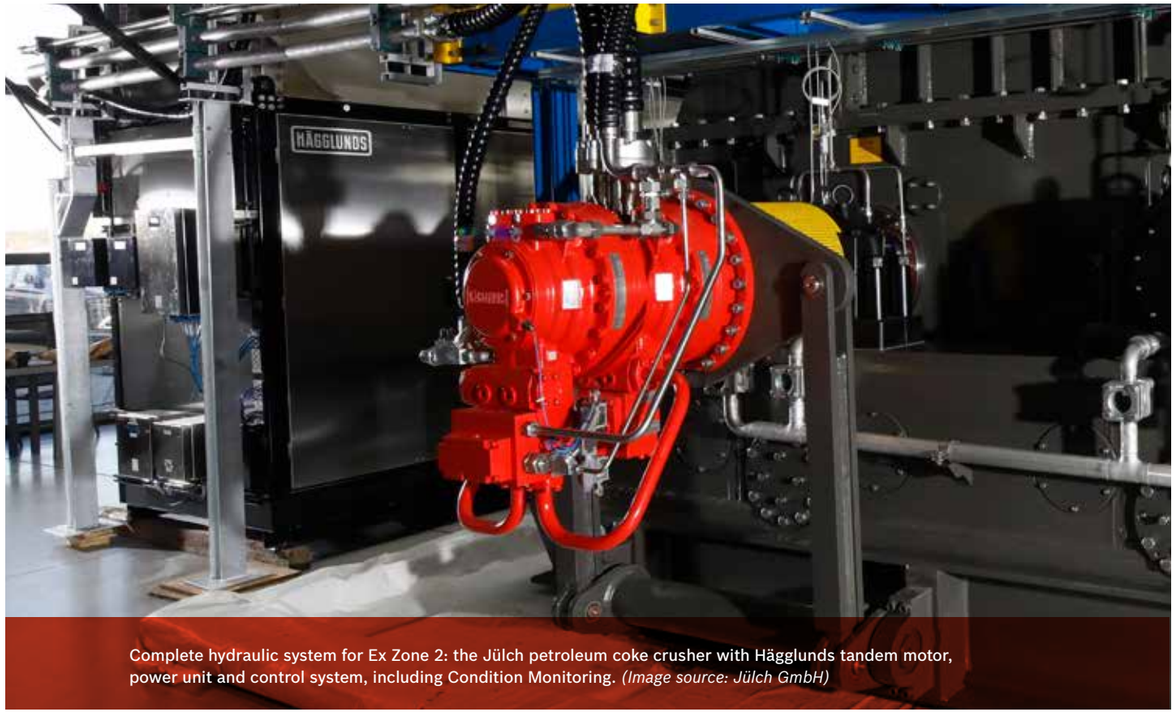
Customer Voice Jülch GmbH

Unmatched performance for tough recycling

HÄGGLUNDS

Powerful environmental protection at the refinery

To make shipping more eco-friendly, marine regulations have begun to prohibit the burning of crude oil residues in ship engines. This leaves it to refineries to recycle the residues, which is best done in a closed process where the petroleum coke first has to be crushed. Jülch GmbH has worked with Bosch Rexroth to devise a reliable solution for this demanding task.



Complete hydraulic system for Ex Zone 2: the Jülch petroleum coke crusher with Hägglunds tandem motor, power unit and control system, including Condition Monitoring. *(Image source: Jülch GmbH)*

Sometimes protecting the environment requires a special effort. For instance, when it comes to crushing chunks of petroleum coke up to one meter in size at a refinery, so that they can be transported for further processing and then made available to end customers. Jülch GmbH, a mechanical engineering company based near Karlsruhe, Germany, specializes in this crushing process and has carved out a market niche for itself with technological support and Hägglunds hydraulic drive systems from Bosch Rexroth.

KEEPING HARMFUL SUBSTANCES OUT OF THE AIR

Petroleum coke is a waste product resulting from the thermal cracking of crude oil. The crushers from Jülch GmbH must always be ready for use, as the tough, black mass hardens within a few hours. Once this happens, it can no longer be cut by water jet. The rollers inside the crushers break up the large chunks at a maximum of 70 revolutions per minute, after which the water-coke mixture is pumped into a container where the water is extracted. The finished, dry petroleum coke can then be loaded directly for onward transport.

Since the coke handling process is closed, even the last residues are returned to the value chain – rather than being burned in ship engines, as was the practice in the past. As a result, fewer toxins and greenhouse gases are released into the environment. Moreover, the eco-friendly process means no more harmful fine dusts are released at the refinery, which enhances the health protection for staff.

HYDRAULIC DRIVES PEERLESS

Jülch's expertise lies in reliably crushing the petroleum coke under the prevailing environmental conditions. "We can only achieve this using highly robust hydraulic drives that deliver extremely high forces, especially when starting up," explains Managing Director Felix Jülch. "Moreover, it is essential that the rollers process the batch completely. The petroleum coke would dry out otherwise and become as hard as concrete. That would mean it could no longer be cut and the refinery process would be brought to a standstill. Of course, this must not happen under any circumstances."

The fact that a hydraulic drive is the only feasible option has been clear to Jülch GmbH ever since an initial attempt at a solution using electric motors failed on account of the high loads and the dusty operating environment. The enormous energies require a drive that is every bit as durable as the machine itself, as shown by the findings from the early development phases. The robust construction of the crushers is exemplified by their walls, which are up to 80 mm thick, as well as by a total weight in excess of 60 metric tons – the rollers alone weighing in at 10 metric tons each.

JOINT DEVELOPMENT WITH BOSCH REXROTH USING HÄGGLUNDS DRIVES

For Felix Jülch, the reason for choosing Bosch Rexroth as the company's partner for the drives is obvious. "Our partner's Hägglunds radial piston motors offer us unmatched performance characteristics," he says. "Working in combination with Bosch Rexroth's distinctive solution expertise when it comes to heavy hydraulics, we were able to implement our machines while maintaining high quality and meet stringent demands with regard to the reliability of the system."

TANDEM MOTOR WITH HIGH STARTING TORQUE

Each crusher has two pairs of rollers, powered by a tandem drive that combines a Hägglunds CA radial piston motor in a nominal 210 size with a second one in a nominal 70 size. The smaller motor is switched on solely for starting, which increases the starting torque by over 40 percent. This allows the chunks of coke to be broken up safely, even if they become wedged after falling into the crusher.

Bosch Rexroth is the single source for the entire drive solution– including the control system, pumps and hydraulic supply. Because the machine operates in Ex Zone 2, all system

components are designed to be ATEX-compliant. In addition, Bosch Rexroth has provided support with the necessary documentation.

PREPARED TO RUN SMOOTHLY FOR AT LEAST 20 YEARS

Jülch GmbH's petroleum coke crushers are designed for a service life of at least 20 years. The first plant built in Germany has already been running for some time. There have been no stoppages, apart from the planned replacement of wear parts or the revolving exchange of individual motors for overhaul.

According to Felix Jülch, customers who have subsequently bought the machines for international refineries are also very pleased. The fact that each site has its own unique environmental conditions, such as very low temperatures in winter, is taken into account for each individual customer when designing the crusher. "We have been able to ensure smooth operation for every machine, thanks to the great support received from Bosch Rexroth and the good configurability of the Hägglunds control system." The machine builder has always been able to count on worldwide support during commissioning, too.

HIGH UPTIME THANKS TO CONDITION MONITORING

In order to avoid unplanned crusher downtime, the roller drive and power unit are monitored. Sensor data collected in the machine for speed, oil level, pressure and temperature are sent to the control room via an interface. If certain limit values are exceeded, the Condition Monitoring software triggers an alarm.

"If a motor has to be switched off – which has not happened to date – the system is dimensioned in such a way that the running batch can be finished with a single roller," explains Felix Jülch.

FIRM BASIS FOR PIONEERING PROJECTS

The petroleum coke crushers developed with Bosch Rexroth enable refinery operators worldwide to meet their environmental requirements more easily, making an active contribution to keep harmful substances out of the air. Interest in these systems – with their reliable Hägglunds drives – is correspondingly high.

Besides the technical solution, Felix Jülch says that the constructive cooperation at eye level and the Rexroth team's short response times are also crucial to the project's success. "We can rely on the commitment of our hydraulics partner, just as we can rely on the robustness of the hydraulics," he concludes. "Both form a solid foundation for further development." ●