



LSBG Hamburg

Hamburg turns the tide with Hägglunds floodgate drives

Hydraulic power to protect the city

LSBG Hamburg is the authority responsible for the streets, bridges and waterways in the city of Hamburg, Germany. Among the city's most critical assets are its floodgates – especially those of the central Schaartor Lock (Schaartorschleuse). With new hydraulic drive systems, the lock's floodgates are entering a new era of reliability.

Hamburg's Schaartor Lock is situated where the Alster River joins the inland port of the Elbe River. Comprising east and west chambers with radial floodgates on both sides, the lock controls the level of the Alster and protects against tidal flooding from the Elbe. When all four of its gates are opened, 108 cubic meters of water pass through per second.

Built after a devastating flood in the 1960s, the lock is supported on the port side by miter gates. However, much of Hamburg is built between just four and six meters above sea level. Since the Elbe has a normal tide level of more than three to four meters, the city would disappear if these defenses should fail. Nonetheless, the lock has retained its decades-old design and – until recently – its drive technology.

HIGH TIME TO REMOVE RISKS

Thomas Renner, Head of Operations at LSBG Hamburg, was taken aback when he first saw how old the Schaartor Lock technology was. Yet because it had been working for 50 years,

there was no immediate push to renew it. That came a few years later, when issues arose in the east chamber. First the gates themselves were replaced, then problems set in with the flood-gate drive system.

Adding to the frustration was the drive's haphazard construction. The existing hydraulic drive had been a rushed replacement, installed when the original electromechanical drive had failed after just a few years. Unfortunately, all of its components had been crammed into the small space of the machine compartment. Given the mess of motors, pipes, oil and unenclosed equipment, Renner found it dangerous to send his team in for repairs – and felt that the drive had to be changed completely.

CREATING ROOM FOR A BETTER SOLUTION

LSBG Hamburg first considered an electromechanical drive, but it soon became clear that there was no space in the compartment for the drive equipment needed. Having a background in shipping, Renner turned to a familiar supplier



The Hägglunds motor was mounted on a new base within the existing construction.

in hydraulics. Renner had seen Hägglunds solutions on ship cranes and docking stations. So he contacted Bosch Rexroth and the Hägglunds representative in Hamburg, who assured him that a Hägglunds drive would be well suited to the lock.

One advantage in that solution was the ability to separate the hydraulic motor from the smaller electric motors and pumps that control its speed and direction. As a direct drive solution, only the hydraulic motor itself would be attached to the shaft. The supporting drive unit could be placed wherever convenient – in this case, on top of the lock.

Klaas Siemens, the company contracted to do the building, had not previously worked with Hägglunds hydraulic drive systems. Moreover, Germany had recently introduced new regulations for radial gates that impacted the

required power for the hydraulic system. With support from the Hägglunds team, however, all questions were resolved and the process of installing the drive was simple.

ROOM TO MOVE – AND PROBLEMS GONE

Once the old drive components had been removed, including all the cables and measurement systems, Klaas Siemens prepared a new concrete base and bracket. Afterwards, the motor was installed in the compartment and the drive unit was situated topside. With the supporting hydraulic system on top of the lock, there is now ample space in the compartment for maintenance and repairs.

Moreover, the new drive has been running flawlessly since the installation – with no punch list whatsoever. The service team is supporting LSBG Hamburg with maintenance and training,



The Hägglunds drive unit was placed on top of the compartment, at a practical distance from the motor itself.

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but this is in order to compensate for a current lack of manpower. By the end of the five-year service agreement, LSBG Hamburg expects to have enough experienced people to handle all maintenance needs.

MORE HÄGGLUNDS IN HAMBURG'S FUTURE

With things running smoothly in the Schaartor Lock's east chamber, LSBG Hamburg is now moving forward with additional renovations. These include working with Bosch Rexroth on an emergency hand pump, which will allow the

floodgate to be cranked past the self-closing point in the event that even the emergency power should fail.

In addition, the plans involve still more Hägglunds drive solutions. The Schaartor Lock's west chamber will receive its own hydraulic drive, for which the engineering process will begin this year. Another Hamburg lock, the Tiefstack Lock, will be replaced in around 10 years, and here the plan is to use Hägglunds drives as well. ●