

Building flood defenses to stand the test of time

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Sulzer's design expertise ensures protection of Danish town till 2110

Looking ahead at rising sea levels, water utilities in low-lying areas need to be planning how to handle increased risks of flooding. In Denmark, defenses in the Ringkøbing Fjord have been bolstered by the installation of two new pumping stations, which have been designed and equipped by Sulzer. The new facilities will help to protect the town and the surrounding countryside for the next 40 years and far beyond.

Having been reclaimed from the sea, the land surrounding Ringkøbing in west Denmark is protected by a series of dikes and a sea lock, which have successfully kept the water at bay. However, projections for the average water level in the area expect it to rise by 600 mm by 2060, which has led the local water utility, Ringkøbing-Skjern Forsyning A/S, to implement a large-scale development of the drainage and flood defense systems.

Designing for the future

To ensure the continued reliability of the drainage system, a project was proposed to build two pumping stations that would be capable of maintaining the water levels even during periods of heavy rainfall. The scheme also needed to be designed in such a way that it could be upgraded in the future when the sea lock would need to be permanently closed.

Once the basic design concept had been established, a technical evaluation was completed to determine the most suitable supplier to partner with the water utility. With its extensive range of highly reliable pumps and decades of design experience, Sulzer was selected as the Tier 1 construction partner and appointed to deliver the two pumping stations.

Based on the outline for the scheme and the projected figures supplied, Sulzer specified the pumps and designed the pipework to deliver the most efficient and reliable system that would handle the forecasted water levels until 2060. At this point, the lock will be permanently closed and the pumping stations upgraded to enable them to operate as the only means of drainage in the area.

Virtual planning

To support both the water utility and the contractors working on site, Sulzer created a virtual reality simulation of the pumping stations. This enabled those involved in the project to see exactly how the scheme would work and how the equipment would be arranged. It was especially useful for the contractors installing the concrete work that would make up the collection and discharge areas for the water.

Kasper Frederiksen, Project Leader for Sulzer, commented: “The design and layout of the inlet pipework for the pumps is very important; it has a considerable influence on the performance and reliability of the equipment. Our engineers were able to show a visualization of the completed project, which not only illustrated how the facility would fit into the landscape, but also where all the equipment would be located inside.”

Each pumping station was designed with a base load pump to handle the day-to-day drainage water and three or four peak load pumps, which operate in a

duty/assist/standby arrangement. The Ringkøbing and Skælbækker stations will have a pumping capacity of 1'582 l/s and 2'254 l/s respectively.

Built to last

For this project, Sulzer specified its VUPX vertical column pump for the peak load task and the XFP submersible for the base load. Each pump design has been fine-tuned for this application and has proven performance in thousands of installations around the world. Their build specifications include IE3 motors, which provide reliable and energy efficient operation.

Manufactured with double mechanical seals, stainless steel components and long-life, heavy-duty bearings, these pumps are designed for extended periods of reliable operation between maintenance intervals. All nine Sulzer pumps were delivered according to the build schedule and the overall project was completed on time.

Kasper concluded: "This project has run very smoothly, and we have delivered all of our customer's expectations. The new pumping stations have very little visual impact on the surrounding area but their performance during periods of heavy rainfall will ensure that the same environment will be unaffected by flooding for decades to come. In fact, the design includes plans for an upgrade within the same space that will ensure the town and its surroundings will be protected until 2110.

Image captions:

Image 1: Defenses in the Ringkøbing Fjord have been bolstered by the installation of two new pumping stations, which have been designed and equipped by Sulzer. The new facilities will help to protect the town and the surrounding countryside for the next 40 years.

Image 2: Defenses in the Ringkøbing Fjord have been bolstered by the installation of two new pumping stations, which have been designed and equipped by Sulzer. The new facilities will help to protect the town and the surrounding countryside for the next 40 years.

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