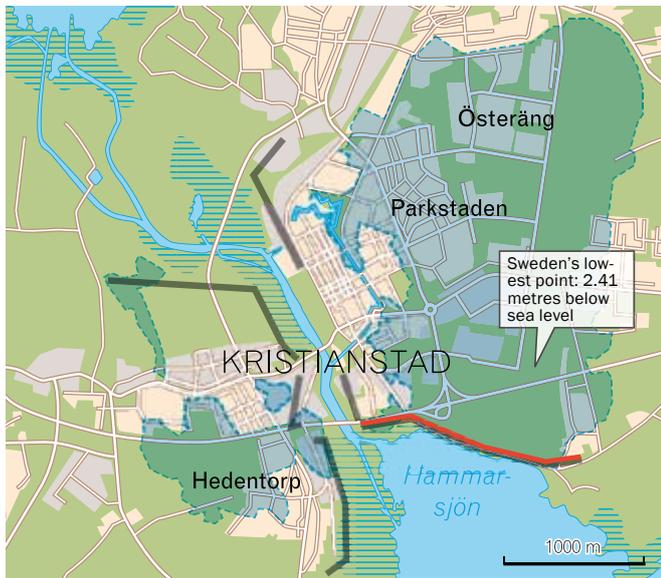


Pumps and dykes protect Kristianstad against flooding

A case study from Emotron





— Existing dyke — Dyke under construction/in planning stages
 Wetlands Areas of the city that would be flooded without dykes

Climate change and its consequences are a matter of growing concern. Melting glaciers are raising the sea level and precipitation is increasing. Kristianstad is surrounded by water, and Sweden's lowest point (2.41 metres below sea level) is in this area. To protect the city from flooding, around €22 million will be invested in dykes and pump stations over the next five years to 2011.

The threat of flooding

Kristianstad lies two metres below sea level and is surrounded by water. The city is largely built on seabed that was reclaimed in the 1860s. Nearby flows the River Helge, which is linked to a canal system passing through the city and discharges into Lake Hammarsjön. The river has a large catchment area and flows slowly through a flat landscape. All this combines to create a high risk of flooding.

Kristianstad faced a serious threat at the beginning of 2002, when large quantities of rain and meltwater resulted in record high water levels. The River Helge reached 2.15 metres above sea level, compared with the average figure of 0.38 metres. It was obvious that the old dykes would not hold. There was a risk that the hospital would be flooded, supplies of electricity, heat and water cut off and schools and homes put under water.

Dykes and pumps to protect the city

The Rescue Service and the municipality's C4 Teknik water and sewage department fought the water for six weeks. Pumps were operating at high pressure and a pressure bank was built in record time to reinforce the dyke. It was completed just as the waves began to wash over the edge. The rescue action was successful: only one park was submerged.

Cover picture: Södra Dämmet (the South Dam) is one of the pump stations that forms part of Kristianstad's investment in flood defences.



In 2002 Kristianstad was threatened with being flooded, but this was prevented thanks to a great deal of hard work. The municipality is now investing in flood defence works and pump stations to protect the city.

Photo: Kristianstad municipality
 Graphics: Gunvor Ekström
 Source: The Swedish Tourist Association's periodical Turist, 2/2006

Longer-term measures are now being taken. In view of climate change, the municipality is playing safe by protecting itself against water flows three times as great as those in 2002. A total of €22 million is being invested in flood defence works and pump stations up to 2011. Funds have been sought from the Swedish Rescue Services Agency, which can contribute up to 80% of this amount.

"We currently have five dyke pump stations in operation, with a total capacity of 14,000 litres per second," says Lennart Hermansen, Works Manager at C4 Teknik. "Their job will be to pump water from the canal out into the River Helge when there is a risk of flooding."

Systems thinking yields the best solution

Södra Dämmet is one of the pump stations, and a total of



At Södra Dämmet, water from the canal system is pumped out into the River Helge if the level gets too high. Left to right: Calle Croona (Salesperson at Emotron), Patrik Almlöf (Project Manager with Malmberg Water) and Lennart Hermansen (Works Manager at C4 Teknik).



"We're installing more and more variable speed controls in our plants," says Works Manager Lennart Hermansen (right). "It cuts down energy consumption as well as maintenance costs."

The solution in Södra Dämmet is based on Emotron FDU variable speed drives and has been developed by Malmberg Water, with Patrik Almlöf (left) as Project Manager.

SEK 15 million has been invested in it. Malmberg Water has supplied all the mechanical equipment, such as pumps, pipes, sluice gates and grilles. The company has also carried out the construction and installation of these. Project Manager Patrik Almlöf stresses the importance of systems thinking in coming up with a solution:

"To find the most cost-effective control, you need to take account of what the pump curve looks like and what the load variations are. In this case, the Emotron FDU variable speed drive was chosen. This means we also know we will get reliable delivery and good technical support."

Emotron FDU controls the pumps

The canal system is intended to maintain a water level of 0.6-0.9 metres above sea level. When the water reaches 0.9 metres, the Emotron FDU variable speed drive starts one of three submersible pumps, each with a capacity of 1,000 litres per second. When the first pump has reached its capacity limit, the next one will start.

A range of measures has been employed for extra reliability. There are change-over switches so that all pumps can be started directly, and they can also be operated manually. The pressure sensor is backed up by a rocker, and a mobile reserve power plant can be connected. GSM technology is used for remote monitoring.

Energy saving paid for investment

The plan was to install softstarters to reduce the start current. Speed control was not needed. In the end, the chosen solution was three 75 kW variable speed drives. The option of reducing both start current and power was decisive. By lowering the frequency, the current was reduced from 100 A to 50 A, while capacity only fell from 1,000 litres to 800 litres per second. Energy consumption has been reduced and operation is optimized at all times.

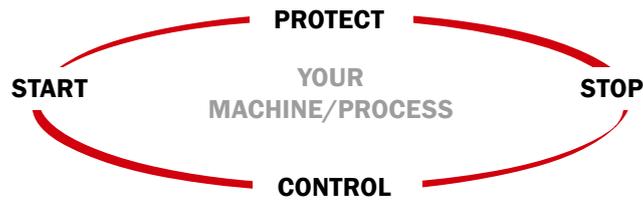
"We are finding more and more advantages with the variable speed drives," says Lennart Hermansen. "It was a more expensive solution than we'd planned initially, but it's paid for itself through the energy we save."

Use of variable speed controls spreading

C4 Teknik is now introducing variable speed control in more plants to increase the efficiency of monitoring and alarm functions, thereby reducing the need for manual supervision. This also levels out the load in sewage treatment plants with large variation in demands, reducing wear on equipment. Water treatment works are next in line.

"There'll never again be a water treatment works without variable speed control," says Lennart. "We avoid water hammer that cause pipe damage and leaks. The reduced maintenance and longer pump lifetime more than compensate for the higher cost of investment. And the customers get more even water pressure in their pipes."

A dedicated product portfolio



Emotron's product portfolio meets all levels of need for machines and processes driven by electrical motors. You will always find the optimum solution for your specific situation. When choosing Emotron, you will also benefit from cost-efficient installation and commissioning

through built-in functionality that is otherwise provided by additional equipment. You will also find intuitive user and process interfaces with the possibility of communicating critical parameters to other parts of your process, using analogue, digital, serial or fieldbus communication.

PROTECT



Emotron Shaft Power Monitors

when you wish to protect your application from over- and underload situations

START • PROTECT • CONTROL • STOP



Emotron Variable Speed Drives Emotron Compact Drives

when you wish to protect your application from over- and underload situations, optimize the start and stop sequences of your application, as well as be in full control of your process values – flow, pressure, speed, torque, etc.

START • PROTECT • STOP



Emotron Softstarters

when you wish to protect your application from over- and underload situations, as well as to optimize the start and stop sequences of your application



Dedicated drive

Emotron focuses on solutions for starting, protecting, controlling and stopping machines and processes driven by electric motors.

Our drive is to create measurable benefits for our customers and their customers to achieve their and our business goals, thus creating a win-win relationship for all parties involved with Emotron.

We have been developing our product portfolio during over 30 years towards carefully selected applications.

As a result we have built up specialist competence and can therefore offer our customers the optimum solution for their specific application needs.

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