Saving energy and reducing wear at Hydro Polymers

A case study from Emotron

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DEDICATED DRIVE

Martin Ljungqvist, the supervisor of the electrical department at Hydro Polymers, checking one of the flue gas fans in the boiler room which is controlled by Emotron variable speed drives.

Hydro Polymers in Stenungsund in Sweden manufactures PVC. Emotron variable speed drives and soft-starters are used to control the pumps, fans, blowers, mixers, mills and centrifuges used in the production process. The major benefits are lower energy consumption and a reduction in wear.

One of the world's most widely used plastics

Polyvinyl chloride or PVC was first manufactured in the USA in the 1920s. Today it is the world's second most widely used plastic with an annual production volume of more than 25 million tonnes. PVC's success is due to its flexibility and long service life. In the field of health care, PVC is the most popular material for gloves, tubing, blood bags and many other items. In the building industry it is used, for example, for pipes, cables, window frames and floor coverings.

Sweden's only PVC production facility

Hydro Polymers' PVC production plant is in Stenungsund, 50 km north of the Swedish city of Göteborg. This area has been the centre of Sweden's petrochemical industry since the 1960s, largely because it is also the site of the country's largest oil terminal and has excellent transport links. The PVC plant is the only one of its kind in Sweden and produces 210,000 tonnes of PVC every year. The company has 350 employees and an annual turnover of SEK 2 billion.

Cover photo: Pipework at Hydro Polymers in Stenungsund.

Multi-step chemical process

PVC production is a chemical process consisting of several stages. The first step involves the electrolysis of salt water to produce, amongst other things, chlorine gas and sodium hydroxidecaustic soda. The sodium hydroxidecaustic soda is sold, primarily to the pulp and paper industry. The chlorine gas is used in the next stage of the process where it reacts with ethylene and is transformed into vinyl chloride monomer (VCM). When the VCM molecules are linked together, a white power is produced.

Pumps, fans, blowers, mixers, mills and centrifuges,

Operator Gary Karvinen working on a sludge centrifuge in the waste water purification plant. The centrifuge is controlled by an Emotron variable speed drive, as are the blowers which oxygenate the waste water.

controlled by Emotron variable speed drives and soft-starters, are used in the process. Emotron supplied the company with complete cabinets with the help of a local panel builder and everything is located in a central control room.

Boiler room produces steam for the process

The plant's boiler room produces steam which is used in the production process. The room contains two large boilers and three fans, a flue gas fan, a combustion air fan and a flue gas recirculation fan, all of which are controlled by Emotron variable speed drives. The vector brake function of the variable speed drives removes the need for brake choppers and braking resistors to stop the machinery quickly and safely.

The PVC is dried and milled to a powder

Emotron MSF softstarters are used to control the pumps, mills and fans in the PVC production process. Emotron variable speed drives control the speed of the mixers in the reactors. The reactors are where the particles form and the speed is crucial to ensure that the products have the right properties. The next stage of the process involves drying the particles and, for some types of PVC, the particles are milled to create the end product which looks something like potato flour. After drying and milling the powder is transported to silos, where it is stored before being delivered to customers. "Where we have pumps running at slow speeds, the variable speed drives help to ensure that they operate as effectively and efficiently as possible," says Martin Ljungqvist.

Martin Ljungqvist is happy with the Emotron solution. "Controlling the speed of the pumps instead of throttling the valves brings major benefits for us. It saves energy and reduces the wear on the machinery."

Own purification plant processes waste water

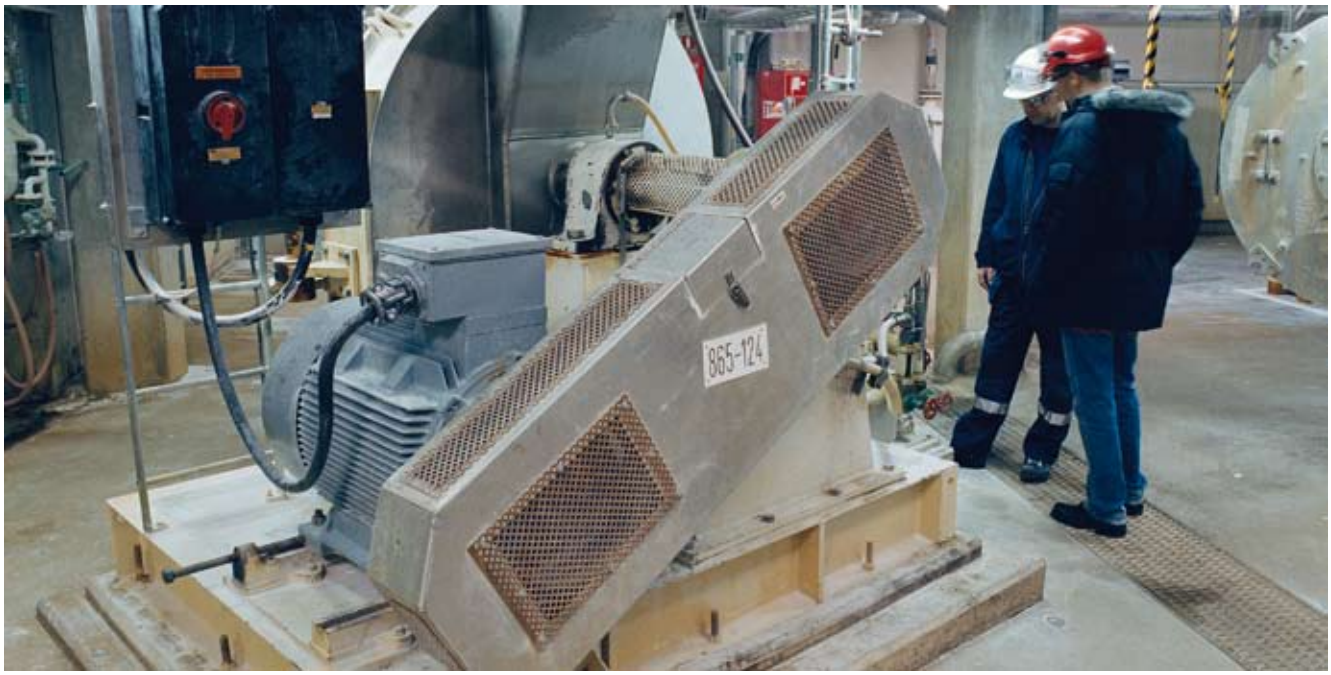
Emotron variable speed drives control the fans used to aerate and oxygenate the waste water in the company's purification plant. PVC residues in the waste water are recovered and sold to customers, in particular in the floor covering industry. A new centrifuge has recently been installed in the purification plant to process the sludge. It is also controlled by an Emotron variable speed drive.

Saving energy and reducing machinery wear

According to Martin Ljungqvist the variable speed drives offer major benefits.

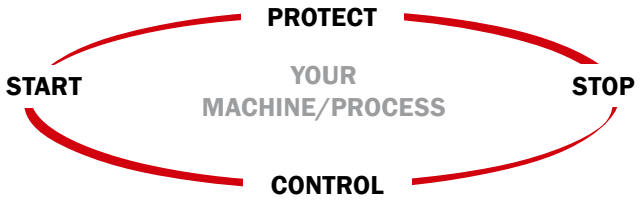
"The biggest advantages of controlling the speed rather than throttling the valves are that we save energy and reduce wear on the motors."

The number of variable speed drives will continue to grow as the plant's machinery is gradually replaced.



It is important that the grains of PVC powder are the right size. Any powder which needs more milling passes through a mill controlled by an Emotron variable speed drive. "We usually use the comparison with potato flour to describe how fine the powder should be," says Martin Ljungqvist.

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 • 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

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.

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.

Emotron is a Swedish company with manufacturing and development resources in Helsingborg, Sweden and in Bladel, the Netherlands. We have sales and service organisations in Sweden, Benelux and Germany, offices in China and Latin America, as well as a global network of distributors and service partners.

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