

ON TOP OF THE WORLD WITH CONTROL TECHNIQUES' DRIVES IN WASTEWATER TREATMENT PLANT

One of Switzerland's most prestigious ski resort, situated on Mount Titlis, has recently installed a state-of-the-art wastewater treatment plant, utilising ultra-filtration, with high performance biological treatment in order to save space and Control Techniques AC drives to provide the required high, controlled flows and energy efficiency.

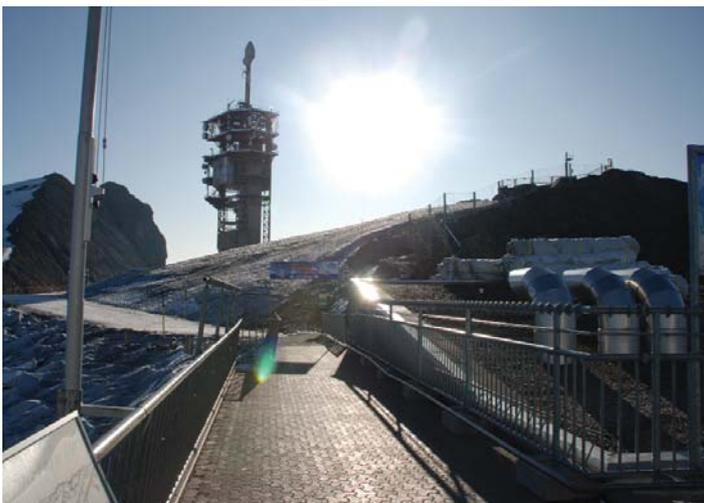
Titlis Rotair is one of the major cable car companies in Switzerland. On the peak of the 3,000-metre high Mount Titlis, Titlis Rotair has built a complex of four restaurants, different souvenir shops and a glacier cave to cater for the influx of thousands of tourists as well as winter sports enthusiasts. On a normal day visitor numbers are around 2,000 – on a public holiday, this can easily exceed 4,000!

It's hardly surprising that there is a logistics problem with the 'facilities'; the restaurants and other toilets in the development producing a massive 20,000 litres of sewage per day. The choices are to build a pipeline down the mountain, or to treat the sewage on site. The latter is clearly



preferable, both economically and environmentally, with the additional benefit that the cleaned water can be re-used for flushing toilets or simply run into the glacier.

VP-Hottinger AG, experts in wastewater treatment plants, were brought in to advise on the most efficient and compact solution for this considerable task. Because space on site is severely limited, VP-Hottinger recommended that a high performance plant, using ultra-filtration, with fast decomposition was the answer. Ultra-filtration produces biomass with a solids ratio five times that of a conventional plant, reducing the sizes of the treatment tanks –



KEY BENEFITS

- EFFICIENT & COMPACT SOLUTION
- FULLY AUTOMATED PLANT REQUIRING MINIMAL ATTENTION & MAINTENANCE
- ENVIRONMENTALLY FRIENDLY SYSTEM
- OUTSTANDING RELIABILITY



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20,000 litres buffer tank, 8,000 litre de-nitrification tank and 12,000 litres for the nitrification tank. All of the other processes – de-greasing, pre-filtration, oxidising and ultra-filtration – are closely sited together.

There was a clear need for variable speed drives to give close control of the pumps on the system, in particular a requirement to maintain a defined pressure level and flow through the ultra-filtration process and to provide the means for full automation of the plant.

In addition, controlling flow to meet the differing hour by hour demand not only saves energy, but also extends the life cycle of the components of the plant if pumps are not operating at full speed or cycling on and off, creating shock loads. Extending of plant life is particularly important for this plant, situated as it is at an elevation of 3,000-metres and only accessible by cable car. Minimising of costly maintenance was a key consideration in the selection of the variable speed drives.

VP-Hottinger selected six Commander SK drives from Control Techniques' Swiss Drive Centre in Zurich to provide the critical flow control.

A 37 kW Commander SK is responsible for the pump control for the flow through the membrane of the ultra-filtration unit. It maintains a flow rate of 150 m³/hr at a pressure of 4 bar, with adjustment of the pressure difference between 0.8 and 1.5 bar being a matter of changing parameters on the touch-control screen. The difference in pressures controls the flow through the membrane itself. The controlled acceleration from start helps to extend the life of the control leakage shaft seal.

The other Commander SK AC drives, 1.1 to 4 kW, control the flow through the biological and filtration units of the plant which, because of very high bacteria levels and the ability to handle solids levels of 1.5% (compared with a typical 0.3% on a conventional plant) has a capacity around five times that of a similarly sized conventional sewage treatment plant.

The programming for the plant aims to come to a constant value of all key parameters – flow, pressure and oxygen concentration. This is achieved using PID control within the drives. The use of intelligent variable speed drives has enabled VP-Hottinger to design a fully automatic plant that requires minimal attention and maintenance. One of the crucial control factors is the automatic increase in drive frequency as the membrane becomes blocked with solids and flow decreases.

The filtrate, clear salty water without any particulate matter, bacteria or nitrogen is re-used for flushing the toilets, with any excess being run off into the glacier.

The Commander SK range is renowned for its reliability. Commander SK offers a market-leading power to weight ratio, being around a third smaller than most equivalent drives, yet packs in amazing versatility. It is easy to fit, set up and use, with all the 10 parameters most users need being accessible from the display keypad, which is included as standard. Very important for this application is its energy-saving efficiency and its state-of-the-art manufacturing standards which are responsible for its outstanding reliability.

VP-Hottinger is an engineering company that specialises in turn-key filtration projects, from initial consultation and laboratory-scale experiments, defining of the process, design and plant construction. Its plants are found in water and wastewater treatment, in agriculture, in manufacturing and process industries, the food and beverage industries and in pharmaceuticals and biotechnology.



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