New propellers result in greater efficiency

TOPIC:
Biological treatment

LOCATION:
Switzerland

COMPANY:
Abwasserverband Altenrhein

NEW PROPELLERS FOR GRUNDFOS AMG MIXERS RESULT IN GREATER EFFICIENCY AND REDUCED COSTS FOR SWISS WASTEWATER TREATMENT FACILITY.

Biological treatment at a wastewater treatment plant requires carefully-managed flow velocity. At the Altenrhein wastewater treatment plant in Switzerland, Grundfos replaced existing propellers on the treatment plant's 12 AMG mixers with new, higher efficiency propellers. These new propellers have a much higher thrust-topower ratio and greater energy efficiency. The costs involved in the replacement are projected to be recovered in just 1½ years.

THE SITUATION

The Abwasserverband Altenrhein is one of the leading wastewater treatment plants in the eastern part of Switzerland. The plant is constantly optimising their installations, setting an example for effective wastewater treatment. Experience gained at the plant is shared through participation in various groups and committees.

The customer was very interested in the new higher efficiency propellers available from Grundfos for AMG mixers and ordered 12 pieces 1.5 kW propellers to replace their old 3.0 kW propellers. Before the propellers were changed, the power consumption of the old propellers and the generated flow velocity were measured.

The Altenrhein wastewater treatment plant has been using 3.0 kW Grundfos mixers for many years now. They were keen to try the new propellers from Grundfos, as they could expect an increase in their economic efficiency by reducing the power consumption of the mixers which would result in lower electricity

bills. There are six biological treatment tanks each with two AMG mixers at the Altenrhein wastewater treatment plant.

THE GRUNDFOS SOLUTION

Grundfos delivered 12 pieces of our new AMG50 1.5kW (diameter 550mm) Propellers. These propellers replaced the existing 3.0 kW propellers (diameter 470mm) in the biological treatment tanks. Grundfos exchanged the propellers, and there was no need for a customised solution.

The results from the measurements taken before and after the replacement of the propellers show that the flow velocity stays about the same as before with the old propeller but the power consumption of the mixers was decreased significantly.

This data also made it possible to calculate how much money the customer can save every year by using more efficient propellers. Also the period of amortisation was calculated, showing how long it takes until the investment by the Altenrhein wastewater treatment plant is paid back.

THE OUTCOME

The mixers in the biological treatment tanks at the Altenrhein wastewater treatment plant now operate with increased efficiency. The power consumption has decreased but the flow velocities remain about the same as before.

The efficiency increase could have been even higher, if the customer had decided to use a smaller (weaker) motor for the AMG mixers, in addition to the high-efficiency propellers. This is because the AMG mixers used by the Altenrhein wastewater treatment plant are rated 3.0 kW, which matches the old 3.0 kW propellers. The new propellers are designed for 1.5 kW mixers, meaning that the mixers are now operating below the optimal duty point. However, the decision was made to only replace the propellers, in order to save costs.

The flow velocity was measured at the position where the highest risk of sedimentation in the tank can be expected. The results prove that the flow velocities generated by the new propellers are high enough to avoid the risk of sedimentation in this area.

No problems occurred with the replacement whatsoever, and the payback time of the propellers is projected to be about 1½ years, which still has to be confirmed. After that time the Altenrhein wastewater treatment plant will start to save money due to the reduced power consumption of the mixers.

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