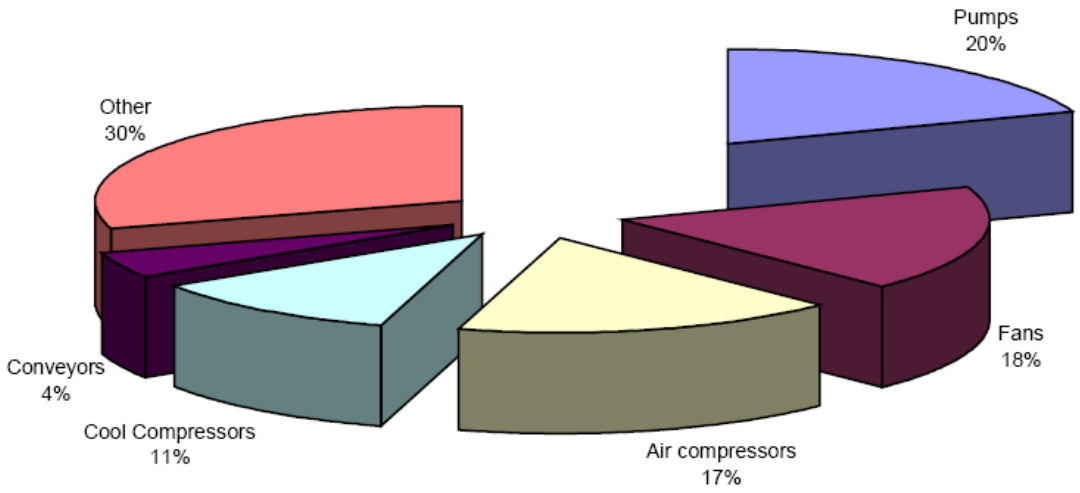
Retroflo
REVOLUTIONARY PUMP CONTROL

PRESS RELEASE

IMPROVING EFFICIENCIES IN SEWAGE PUMPING SYSTEMS

DECEMEBER 2009

Pumps account for an estimated 4 to 5 percent of the world's total electricity consumption. Potential for energy conservation exists through reduced speed operation, utilising Variable Speed Drives (VSDs). However, operating sewage pumps at reduced speed increases potential for blockages, reducing machine reliability. This article explores reliability issues experienced when VSDs are used for speed sewage pumping, principally the problem of excessive pump blockages and includes information about a solution now on the market.



Typical split of motor energy consumption, by application – Study for improving the energy efficiency of pumps, performed for the European Commission – Feb 2001.

Pump Blockages

The solids-handling capability of a pump is greatest when it is operating close to its maximum speed. Consequently, when VSDs are used to control sewage pumps over a range of speeds the pumps pick up debris, which affects performance and efficiency.

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Detecting Pump Blockages

Through continuous monitoring of pump drive motor operating characteristics, and comparisons with stored benchmark data, potential pump blockages can be detected. The successful detection of blockages relies on the ability to differentiate between genuine fluctuations due to changes in pump speed and level and abnormal fluctuations due to a potential blockage.

Pump Operating Profile

The stored benchmark data is an operating profile for each pump. Each profile provides an understanding of the how the pump *should* operate at each level, at each pump speed, and any combination of the two. Any deviation from the stored values may be indicative of a potential pump blockage.

Correcting Pump Blockages

When a pump blockage is detected corrective action is automatically initiated, which consists of operating the pump in the reverse direction at a pre-determined speed for a pre-determined duration.

Implementation

The Retroflo RPC_2000 was specifically designed to control pumping stations as a whole, rather than just the individual components within. The new system may be implemented in the form of a retrofit software solution for existing installations.

Case Study 1

The RPC_2000 is installed at a site where VSDs exist and excessive pump blockages have been experienced. The original pumps and infrastructure remain; additional new software was simply installed alongside the existing Programmable Logic Controller (PLC). Calculated energy, cost and CO2 reductions indicate minimum savings of 11.63%, 0.6 pence and 0.0272Kg CO2 per m^3 pumped were achieved at selected test points as a result of the trial. For all possible calculable test points an average 10.9% reduction per m^3 pumped is calculated. Potential overall energy savings, calculable on a station-by-station basis, are immense.

Case Study 2

Scottish Water's Charlotte Street Pumping Station in Fife is a good example of Retroflo technology solving the issues of a particularly problematic station. Situated as the last pumping station before the treatment works in Kirkcaldy's sewerage network, the station handles large flows and is subject to frequent blockages, causing overflows that have encroached public areas and threatened the water quality of surrounding blue flag beaches. The Retroflo RPC_2000 was installed at Scottish Water's Charlotte Street Pumping Station on June 1st 2009 and in its first three months of operation performed 47successful Pre-Blockage Detection routines, all of which returned the pumps to optimum performance. During this period there were no recorded blockages and therefore no maintenance call-outs.

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