

A Triple Batch Reactor control and telemetry system for the Robin Hood International Airport

The ease and speed of implementing the control algorithms using 'Fusion' allowed the project team to meet their 'fast track' time and cost deadlines.



Head office engineering support over GSM

Controlstar Systems Ltd has provided the control unit and SCADA for the wastewater plant at the new Robin Hood International Airport at Doncaster. This was a 'fast track' project based on a full SCADA and a single Controlstar®. The Controlstar controls the high efficiency wastewater plant which not only handles the waste water from the facilities but also substantial volumes of run off from the runways. The dosing requirements imposed by this combination of wastewater created special design problems.

The plant is designed to accept domestic sewage from the terminal and housing units within the site boundary, aircraft toilet waste, and retained runway and apron runoff containing de-icer. The runoff is intercepted and diverted to a large capacity lagoon if the TOC exceeds the discharge limit. The contents of this lagoon are pumped to the inlet sump of the treatment plant where it is mixed with the domestic sewage and aircraft toilet waste.

The Sequencing Batch Reactor (SBR) system comprises of three bio-oxidation batch reactors, aerated by fine bubble diffusers, with floating arm decanters.

The reactors operate in true batch mode: only one reactor is on-line at any time. When the duty reactor is full, the inlet to the next reactor opens, and the previous duty unit is closed.

The aeration process is DO controlled by feedback loop set to maintain a pre-set DO concentration by controlling the duty blower speed using a PID controller, which is a standard Controlstar® function block.

The treated effluent is transferred to two Rapid Gravity Carbon Filters where both solid material and dissolved organics are removed. Filtered effluent is discharged from the filters to a wash water tank, which provides a reservoir of clean water for use in backwashing the filters when the filter head loss exceeds the pre-set value. Clean water overflows the wash water reservoir direct to the attenuation lagoon and on into the watercourse. The Controlstar® controls all the monitoring of the level and the operation of the valves and the pumps.

The ancillaries to the plant, the service water pressure, feed pumps, and flow monitoring is all controlled and recorded by the Controlstar®. The plant functions automatically with a minimum of operator input. The control system of a single Controlstar together with Input Output modules provides all the PLC, functions for the plant, and directly supports a local Controlstar SCADA that is situated in the plant operative's office.

The Controlstar® is also linked by mobile phone (GSM) back to the engineering support centre near Brooklands in Kent. A full display and record of the plant activity is available to the supporting organisation, and both controls and plant optimisation can be carried out remotely.



Initial Software testing



Panel and local SCADA



The operation of all the reactors is handled by a single Controlstar®, which operates all the valves, aeration, and decanting of the reactors.



The Controlstar® and I/O