

TOC MONITORING AT AIRPORTS

Recently, many press articles have referred to the need to measure the quality of surface water at airports, especially during the winter when aircraft are sprayed with Glycol. The antifreeze agent ultimately collects in the surface water sewer and causes an oxygen demand at the site discharge.

Airports are now tightly regulated by environmental legislation and must comply with consents enforced by the Environment Agency. Consequently, the need to reliably monitor, alarm and control surface water discharge, on a continuous basis, has become a recent priority for many established airports. The regional airports are also rapidly expanding their facilities to meet the increased passenger traffic and have thus needed to consider installation of instrumentation.

Birmingham International Airport's Environmental Unit approached Pollution and Process Monitoring Ltd. (PPM) during summer 2000 in order to install and commission a continuous water quality monitoring system which controls surface water discharge to either foul sewer or to a local water course. The Protoc Total Organic Carbon (TOC) instrument from PPM was designed to give a fast response to dissolved organic pollution (better than five minutes for a 90% response) and was fitted with a sample preparation system to remove suspended material which would otherwise increase the risk of analyser failure.

Since installation, the analyser configuration has been proved to be reliable in operation, with the minimum of site intervention required. Indeed, even the routine maintenance has been fulfilled under a service contract provided by PPM.

Various claims and approaches made by manufacturers of alternative instruments, prompted Birmingham International Airport to carry out independent tests to establish comparative performance of the Protoc TOC and a surrogate BOD unit. The response too, and recovery from, simulated events would determine the suitability of the test methodology to alarm pollution episodes with a view to controlling the site discharge. A scientist from an independent laboratory conducted the witnessed trial and concluded that the Protoc TOC analyser outperformed the BOD system which appeared difficult to commission and slow to respond.

The investigation also raises many other issues regarding the operation and design of the surrogate BOD systems. Sample toxicity can arrest the activity of the biomass and cause the instrument to under report BOD. There is no way of providing a system alarm to indicate this condition and therefore controlling on this parameter is dangerous.

Conversely, the Protoc TOC analyser is unaffected by toxicity and has a utility alarm to indicate instrument failure, should it occur. Additionally, the instrument carries out a daily automatic calibration validating the reported measurements. Further to this, the option to introduce discrete samples into the analyser is available providing a convenient method for analysing spot sample and "check solutions". Since BOD analysers are inherently slow to respond, sample injection is not a realistic proposition.

With regards to the issue of maintenance, the installation at Birmingham International Airport supports PPM's claim that if correctly installed with the correct sample acquisition and sample preparation units, the instruments are reliable and require the minimum of support. Indeed the introduction of automatic chemical cleaning minimises biological and oil residue build up which on BOD systems is left unchecked.

Above all, the choice of a suitable technique to measure contaminated surface water is dictated by the need to respond quickly to pollution events. TOC as a parameter is fast, reproducible and widely used throughout the waste-water industry.

It appears that many other regional airports will now follow Birmingham International Airport and choose TOC instrumentation. Indeed, Newcastle Regional Airport has confirmed its intention to purchase a number of TOC analysers while the MoD has also selected Protoc TOC instrumentation at two airfields discharging surface water.

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