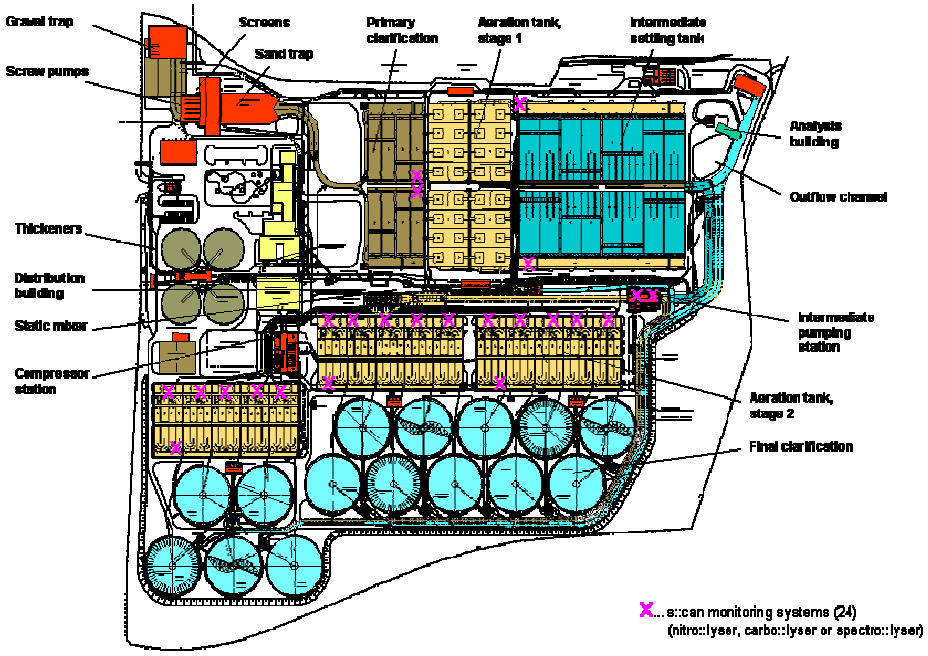
ECM Solutions for Waste Water Treatment Plants

Analytic solutions for waste water treatment pant help to increase effectivity of the process and significant saving of the cost of plant operation.

Large waste water treatment plants are mostly designed in accordance to below scheme

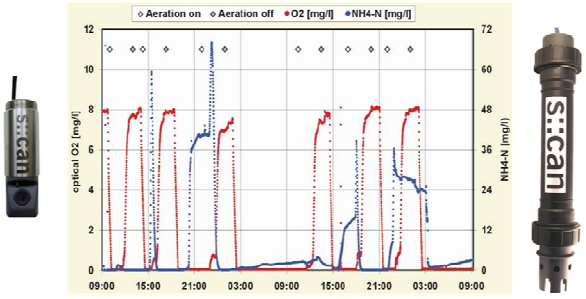


Smaller plants are often using Single Batch Reactor (SBR) design which is in fact a combination of several stages of large WWTP implemented in a single pool.

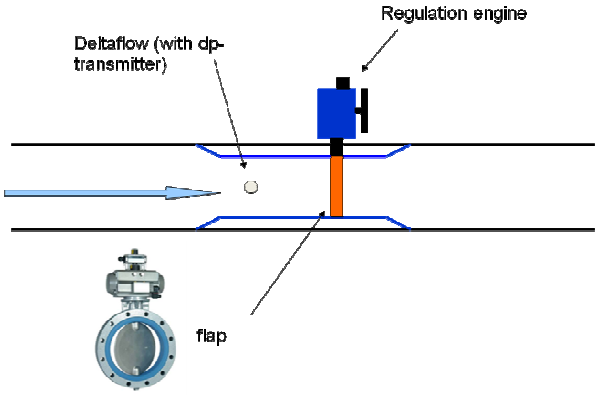
Main challenge is effective removal of phosphorus, ammonia and hydrocarbon compounds. Phosphorus compounds are reduced in anareobic treatment stages with a chemical after treatment. To control the concentration a Phosphate or Total Phosphorus analyzer is used.

In municipal WWTP-s there is usually a good balance of ammonia and hydrocarbon compounds. In this case a biologic stage providing nitrification is reducing ammonia and hydrocarbon compounds both. Ammonia is converted for nitrates (and nitrides). Activity of bacteria is controlled by aeration. Aeration is energy consuming and represents major part of WWTP operating costs. Proper application of analytic solutions allows to optimise aeration making plant operation significantly cheaper.

Below a real life example is shown. Increase of ammonia is launching aeration (to make bacteria consuming ammonia). Aeration is limited for 8mg/l concentration, since in this case this was the value above which effectivity of conversion would dimmish and operation would become expensive.
A combination of ammonia and oxygen monitors allow effective control of this process.



Instead of on-off mode of operation a more effective proportional control of aeration inlet may be applied. This is consisting from a flow meter and a regulated flap, as shown below.



The next step of treatment is denitrification - bacteria convert nitrates for nitrogen. There is certainly necessary to monitor concentration of nitrates.

In industrial waste water treatment plant either ammonia or hydrocarbon compounds may prevail. To ensure effectivity of biologic stages water composition must be balanced – ammonia and hydrocarbons must be certainly monitored to optimize this process.

Residue of waste water treatment is a sludge. This is usually solidified.

To treat the biologic sludge property level of sludge/water interface must be monitored.

Sludge density is also one of the important parameters.

For better solidification of the sludge floculants or coagulants may be added. Optimation of the dosing process may be controlled by streaming current monitors correlating quite well with zeta potential methods.

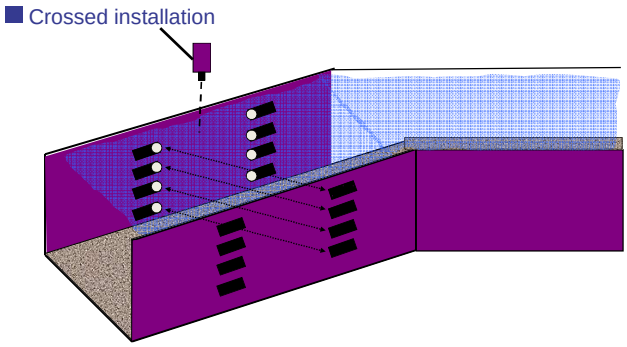
Outlet of the WWTP must be monitored for COD, TN (KJAELDAHL), TP and some other pollutants. The TN and TP analyzer is one instrument applying a highly effective wet oxidation.

For COD monitoring on WWTP outlet (and inlet) spectrometric analyzers are offering best price / performance ratio.

The treatment process requires multitude of pH, ORP, DO, TSS, turbidity, conductivity and other instruments linked to WWTP control system. ECM is providing digital sensors solution matching digital interfaces of the control systems.

Flow monitoring is essence of WWTP process control. New generation of clamp-on flowmeters and are optimal for monitorng of water and sludge flow in tubes.

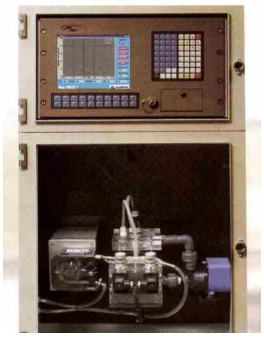
For accurate open chanel flow monitoring multilevel ultrasonic Instruments are representing the best available solution.



For simple open channel monitoring problem channel bottom or side mounted Doppler effect based devices offer a cost effective solution.

Anareobic stages of industrial WWTP have a very long retention time. Optimation of the process is performed by special analysers monitoring concentration of fetty acids and other compounds.

Industrial process may generate water pollution which could kill bacteria in the biologic stages. To prevent this respirometric toxicity analyzers provide a early warning to divert water streams with critical concentrations of pollutants and to prevent dramatic damages on treatment bacteria.



Product of anaerobic treatment stages is methane rich biogas. This can be utilised on different ways. It must be treated however (to reduce H2S content for instance) and often mixed to natural gas to meet specifications of burners or engines using the biogas as fuel.

It is important to take periodic samples for laboratory analysis following certified methods.
Portable and air conditioned stationary samplers are performing the sampling job executing time, flow or event driven sampling algorithms.

WWTP solutions are becoming important part of communal and industrial activities. Their operation is no easy, no cheap. ECM solutions are helping to optimise the complex process.

ECM ECO Monitoring, a.s., Nevädzová 5, 821 01 Bratislava, Slovak Republic

Phone: +421 2 4342 9417
+421 2 4342 7408
SK2020317244

E-mail: ecm@ecm.sk
http:// www.ecomonitoring.com
Fax: +421 2 4342 7465

Company Reg. No.: 17312094
VAT No.: