Forbes Marshall

Trusted Partners.
Innovative Solutions.

Effective Energy Management with on line Aquamax

Is your Waste Water treatment Wasting your money??

Efficient Aeration Control to optimize the process and reduce operating costs.

In today's energy conscious world, Industry looks for new innovative solutions for conservation. A very major use of energy in a waste water treatment facility is for the operation of mechanical systems designed to introduce oxygen into the wastewater. This oxygen is necessary for biological treatment of carbonaceous matter (secondary treatment) and for oxidation of ammonia into nitrite and nitrate (nitrification). Transfer of oxygen can be accomplished by several methods. One method is the delivery of air through a network of pipes and diffusers located at the bottom of treatment basins (diffused aeration). Another method is the high speed operation of brushes, paddles and/or other mechanical arms at or near the surface of the wastewater (mechanical mixing).

Some treatment facilities do not have the capability of adjusting the aeration rate in response to changes in demand. At these locations, the amount of aeration supplied to the process is always designed to be in excess of the expected demand. This results in energy costs that are well in excess of the minimum required for the treatment.

Improper aeration can also have negative effects on sludge characteristics and on anaerobic and facultative processes such as denitrification and phosphorous removal.

If improved treatment is required or if peak treatment demand at times exceeds the original design capacity, these plants may experience poor process performance during certain periods, poor energy performance during other periods and composite performance approaching or exceeding permit requirements.

Aeration control can be divided into two broad subjects:

I) Measurement of process variables to provide information for control adjustments and

ii) Implementation of the aeration control adjustments.

Measurement of Process Variable

LAB Measurement

- Measurement after few hours.
- Manual error while measuring in the Lab.
- No control over aeration process.
- Results in excess / insufficient DO level due to which bacteria can die / septic condition.
- Continuous aeration leading to wastage of electrical energy.

Aquamax System

- Continuous measurement and control of water parameters in Aeration Basin.
- Uniform and universally standard measurement techniques give repetitive results.
- Consistent measurement results in smooth operation of aeration system.
- Possible to control precise DO level with the help of control over aeration speed.
- May also help to keep BOD / COD values in control
- The above results in substantial energy conservation and an attractive payback of the system.

The Solution and Implementation

Implementation of aeration control strategies will depend on the type of aeration systems in use at the plant and also on the capabilities these systems offer for control. Most controls for mechanical aerators and blowers involve the use of variable frequency drives. A variable frequency drive adjusts the speed of electric motors by modulating the power being delivered. Motor speed can thereby be matched to the amount of work demanded. Systems with variable frequency control can provide a "soft start", thus avoiding high torque, current surges as well as stress on the motor systems. Control of diffused aeration systems will depend on the type of blower and strategy for the coordination of multiple blowers. Blower types include constant speed centrifugal blowers, usually controlled by modulating air inlet valves or inlet guide vanes. Positive displacement (rotary lobe) blowers are controlled using a VFD to modulate the output.

Multiple blowers are coordinated by providing either parallel control (which simultaneously adjusts the output of all blowers following addition or deletion) or cascaded control (which adjusts the output of individual blowers to a minimum or maximum output before adding or deleting the next blower needed to satisfy the overall aeration demand).

Aeration control implementation often requires custom software based on the specific processes, control strategy, aeration systems and safety factors that apply to a specific treatment facility.

The most popular of these parameters is Dissolved Oxygen. Many operators believe that the objective of the treatment process, is the creation of surplus dissolved oxygen in the effluent from the aeration basin. Actually, maintaining surplus oxygen in the effluent at an arbitrarily high set point is merely a convenient way to ensure that the wastewater has been fully nitrified (all ammonia has been converted to oxidized nitrogen), which can occur only after a substantial reduction in the carbonaceous demand has occurred. But this is at the expense of delivering more oxygen than is actually demanded by the process. The difference between the oxygen required to achieve process objectives and the oxygen delivered to meet a "target" set point represents a pool of energy savings that can be captured by using appropriate measurements within the process.

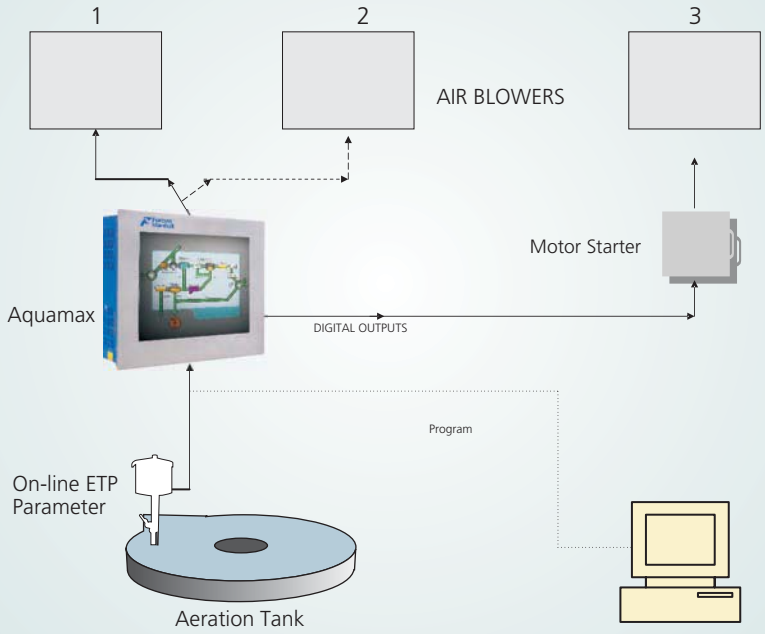
Aquamax: Measuring · Monitoring · Controlling

Insufficient attention to sewage or industrial waste water treatment results in pollution and related problems. However with an increase in awareness, Industry, people living in the vicinity of polluting industries, and government authorities are more vigilant about the quality of water being discharged by industries. In the last decade, stringent quality standards are being applied to plant effluents, both by regulatory authorities as well as by plant management who are concerned about the environment. This in turn has resulted in a focus on the biological activity in a treatment plant, particularly the aeration basin. Dissolved Oxygen is the most critical parameter for the Aeration System or the Activated Sludge Process.

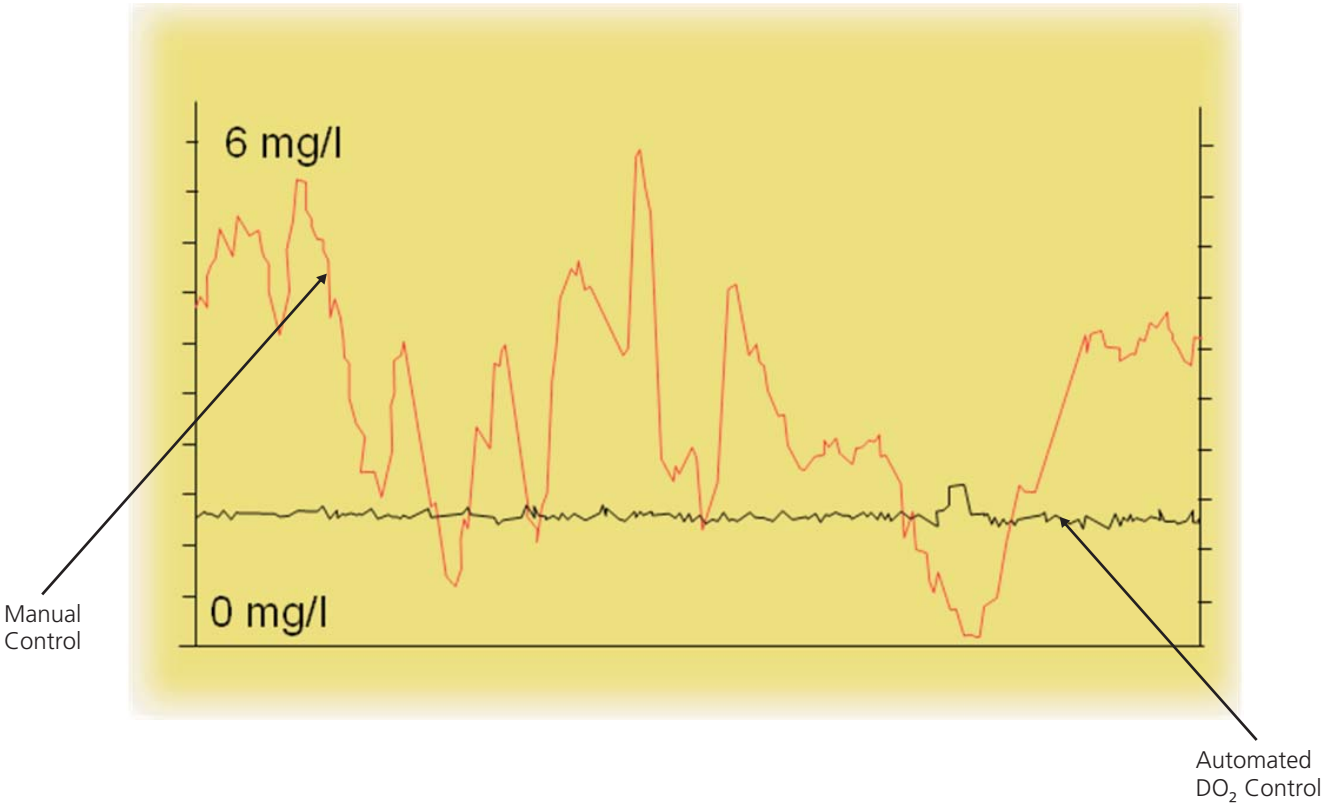
Aquamax has an intelligent algorithm which controls blower operation such that it optimizes DO Variation on account of change in load either in terms of influent quantity or even the composition of effluent.

Optimized and lower operation of blower indirectly increases the life of blower and its rotor as an added advantage.

AQUAMAX AUTOMATIC AERATION CONTROL SYSTEM



High Degree of process control & Efficiency with Aquamax System



The Aquamax Pays For Itself In Less Than Two Years

The Aquamax can result in payback of complete system within 2 years of continuous operation.

www.forbesmarshall.com

Forbes Marshall Pvt. Ltd.
A-34/35, MIDC, Industrial Estate, 'H' Block, Pimpri, Pune - 411 018. India.
Tel.: 91(0)20 - 27442020
Fax: 91(0)20 - 27442040 E-mail: pasales@forbesmarshall.com

Domestic:
Ahmedabad, Alibag, Bangalore, Bhopal / Indore, Chandigarh, Chennai, Coimbatore, Delhi, Hyderabad, Jamshedpur, Kolkata, Mumbai, Nagpur, Navi Mumbai, Surat, Trichy, Vadodara, Visakhapatanam

International Operations: exp@forbesmarshall.com
Bangladesh, Canada, Egypt, Indonesia, Iran, Kenya, Malaysia, Nepal, Sri Lanka, Thailand, U.A.E. (Instrumentation) (Boilers & Boiler Accessories)USA,

Forbes Marshall
Trusted Partners.
Innovative Solutions.