

Instrumentation Aids In Doing More with Less

By John Volbeda

The harsh reality of today's governmental and economic climate is that industry is faced with increased regulation at a time when budgets are being cut for a second and third time. This has created a financial dynamic that affects operational performance as smaller and/or less experienced staffs must perform increasingly technical or time-consuming tasks.

In order to survive these difficult times, plant management must find new ways to streamline operations, cut costs and reduce the workload that often accompanies regulatory compliance. As processing plants look for ways to maintain productivity and profitability without sacrificing their ability to maintain optimal water and wastewater treatment capabilities, increased attention is being paid to the instrumentation used for liquid analysis.

Fortunately, liquid analysis instrumentation technology is maturing to a state whereby equipment and systems can begin to lighten the load on plant personnel. Significant improvements are being seen in four key areas: ease of use; increased sensor life; intelligent systems; and packaged solutions.

Ease of Use

When evaluating instrumentation that will be used in a plant environment, it is important to keep in mind the experience and technical education of the people responsible for installing and operating the analysis systems. Equally important is the turnover of a plant's personnel – the more often new employees must be introduced to a facility's operations, the more important it is to keep training as simple and straightforward as possible.

It seems fairly obvious that an easy-to-use instrument is better than one that is overly complex. However, plants with old equipment or long-entrenched methods may not realize that today's liquid analysis systems can include features that provide a wide range of benefits that can reduce human error, and secure improvements in accuracy, productivity and speed, all of which can impact the ability to do more with less.

There are many features to look for when considering the ease with which employees can learn about and use instrumentation. Topping the list is the

intuitive nature of a piece of equipment's operation. For maximum efficiency, employees shouldn't need to read a technical manual cover to cover. Instead, simple jargon-free prompts should walk workers through both the initial setup and ongoing use of the instrument. Equally helpful are multiple-language capabilities that accommodate multicultural workforces and global operations.

Maintenance is perhaps the single

biggest problem faced by plant personnel. Wastewater treatment is by definition an unclean environment, and cleaning and replacing sensors that are placed in the process is potentially time consuming and messy. Plants need to find analysis solutions that reduce the frequency and complexity of sensor replacement. Self-cleaning sensors go a long way in this regard.

In dissolved oxygen measurements — often used in aeration basins — membrane-based sensors are sometimes available with auto-cleaning capability. These and other features like quick-release sensor cables and ruggedized design help reduce the amount of sensor handling. For very challenging environments with oils or grease, non-membrane, open-electrode sensors offer a very real option. Since membranes can become coated, these membrane-free sensors eliminate one big problem, plus a self-cleaning feature, using an actual grinding stone, polishes the electrodes and virtually eliminates cleaning and maintenance.

In chlorine measurements, the need for reagents may add a step that can be costly in both materials and man-hours. Occasionally, chlorine analyzers may be available that require no reagents be used. Look for them when replacing chlorine instruments.

Increased Sensor Life

The issues of sensor maintenance are particularly critical in applications that require pH measurement, as pH sensors typically must operate in tough environments and historically require frequent maintenance and replacement. Fortunately,



Ball Float Assembly Including Mounted DO Sensor

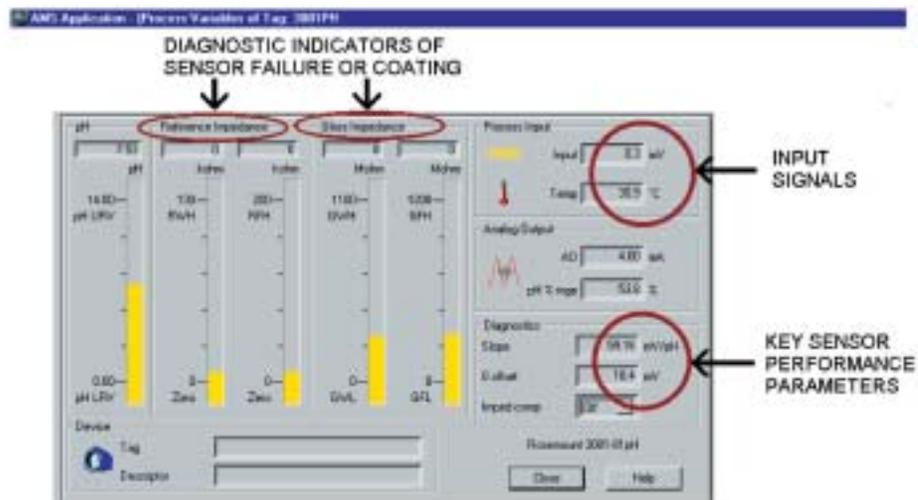
process water and wastewater plants now have a choice of a number of truly long-life sensors that increase the number of sensor replacements from weeks to months and months to years.

Another aspect of sensor life that plant management must be concerned about is the disruption and cost associated with unscheduled maintenance and emergency sensor replacement. Some operations work around this by changing sensors before they really need to be replaced — a costly practice to say the least. Relatively new on the scene are pH instruments featuring predictive diagnostics. With this technology, plant personnel receive easy-to-read feedback on the operating condition and remaining life of pH sensors, so that maintenance schedules and replacement can be planned based on real versus theoretical information, saving time and money.

Intelligent Systems

As predictive diagnostic instruments demonstrate, today's leading instrumentation has more built-in intelligence and value-added features. Built-in components range from dedicated fault alarms that use visual displays or auditory alarms to alert workers of an instrumentation problem to on-board barometric pressure measurement systems that automatically provide barometric pressure readings necessary for dissolved oxygen measurement.

Another time-saving area in liquid analysis instrumentation is the advent of systems that can perform both measurement and analysis. For example conductivity instruments now routinely provide the ratio between two measurements — percentage of passage and percentage of rejection — by performing a mathematical equation to indicate percentage of efficiency. This built-in capa-



bility eliminates the need for manual calculation, which results in increased accuracy and efficiency.

Of course, the extension of the “intelligent” systems concept lies in Asset Management Systems that communicate through HART and Foundation™ Fieldbus protocols. In response to the increasing use of automation in all types of industrial plants and enterprises, more and more liquid analysis systems are being offered that are compatible with these protocols. From a central location, operators can both monitor and control their analytical systems requiring far fewer trips to the devices in order to make adjustments. This type of automation also makes it possible to centralize the more experienced instrument technicians at the Asset Management System while delegating routine tasks to other plant personnel.

Packaged Solutions

More and more processing plants are realizing benefits from packaged solutions that combine analyzers, sensors and built-in communication software for a total turnkey solution. These solutions take all of the guesswork out of

specifying and buying process water and wastewater analysis instrumentation, making it easier for someone new to plant management or a person in purchasing to make sound buying decisions.

Similarly, many plants find that there are long-term benefits to buying instrumentation from a company that provides a wide range of analysis solutions. Among the advantages associated with this concept is the fact that economies of scale can apply to maintenance and other product life cycle considerations. Training and system setup can also be expedited when systems used throughout a plant have similar user-interface features. [WWW](#)

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