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Level measurement myth busting in the environmental market

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A common myth that crops up now and again tells us that newer is always better. And why not, with that new device's shiny bells and whistles—and warnings that we're missing out if we're not early adopters of the latest and greatest.

But, like knowing you shouldn't swat flies with a sledgehammer, choosing the right tool for the job is one of the most important tasks of any successful process engineer.

And so we bring you some of the most common beliefs currently being sold about radar in the environmental market. Radar has its place, of course, but here we take a look at the applications in which ultrasonics—even decades after its introduction—remains your preferred choice in water and wastewater treatment.

Myth #1: Radar better handles outdoor conditions like wind and rain.

Wastewater treatment instrumentation deals with the realities of the outdoors, day in and day out.

Some people believe wind and rain can give ultrasonics a hard time—in the case of wind, reducing the amplitude of the return echo signal by a

small amount. Which true, to a certain extent: radar frequencies being what they are, the technology is unaffected by wind.

But that's not the full story. In fact, rain will actually have a similar effect on both ultrasonics and radar—however, this effect is insignificant over the short distances involved in environmental applications like in open channels.



A fully-potted encapsulated ultrasonic transducer, like any from the Siemens Echomax family, have no moving parts and are totally enclosed, protecting the entire transmitter from hazardous conditions and environmental forces.

The same is true on very windy days—the speed of sound will change slightly, but for these water and wastewater applications, ultrasonic technology has significantly more signal than what is required and the ranges are very short, so the effect is, again, insignificant.

And since we're talking about dirty outdoor applications in the pre-treatment stages of a wastewater facility, it's worth mentioning ultrasonic transducers' self-cleaning faces, which literally shake themselves clean of moisture, dirt and buildup in your application.

Combined with intelligent echo processing software, ultrasonics ensure that wet and dirty process conditions don't affect measurement performance.

Myth #2: Radar performs better over the long distances in the environmental market.

With measuring ranges well over 300 feet, high-frequency radar transmitters absolutely outpace ultrasonics in tall silos.

Tall silos which, well, don't really exist in most environmental applications. With most wastewater facilities' applications maxing out at around 30 to 40 feet, radar's distance prowess is simply not needed.

In fact, for applications like wet wells, the problem isn't likely to be that water is too far away from the measurement device, but too close.

With storm events dumping major amounts of rain in a short period of time, flooding is a reality for many wastewater treatment applications. When water submerges a radar device, it could report a high level or a lower level, making it unreliable and leaving plant technicians to guess whether the device itself is malfunctioning or if the problem is being caused by flooding conditions.

However, with the use of an inexpensive ultrasonic submergence shield, even when the transducer is submerged, it'll keep the pumps running. The shield creates an air pocket in front of the transducer face when it is submerged. The controller senses this condition and recognizes it as flooding, continuing to run pumps to remove the extra water from the wet well.



With the numerous obstructions in this wet well, including a ladder, pipes, and chains, accurate and reliable level measurement can be quite challenging.

Myth #3: Radar devices are more sophisticated.

Compared to a rather plain-looking bell-shaped ultrasonic transducer, sure—that radar transmitter has a lot going on under its housing. And it's an all-in-one device, too, with sensor and processing electronics contained in a single unit, saving wiring time and cost compared to transducer-plus-controller ultrasonics systems.

But in harsh mechanical and environmental applications, do you necessarily want those sophisticated electronics exposed to nasty process conditions?

That plain-looking ultrasonic transducer, by comparison, is fully sealed, isolating its electronics from vapour and ingress. And the highly intelligent ultrasonic controller can be installed away from the dirty, confined space of a wet well, for example, in a controlled and easily accessible area.

Not to mention, of course, that all those radar bells and whistles come with an equally elevated price tag. With a purchase price and cost of own-



A submergence shield installed on a transducer ensures that even when the transducer is submerged, it'll keep the pumps running.

ership approximately five times less than radar, ultrasonics technology does everything the environmental industry needs it to do at a fraction of the cost.

And in terms of intelligence, some may point to ultrasonics' trouble with obstructions in a wet well like pipes, ladders, or agitators, indicating radar as a better option.

In actuality, a radar transmitter's beam angle of 12-30 degrees would still likely have troubles in constricted wet wells. Whereas a 15 meter transducer's narrow 6-degree beam angle combines with Sonic Intelligence echo processing software to ignore false echoes generated by obstructions.

Myth #4: Radar can deal with foam better.

Nope. Here radar is neither better nor worse—while wet foam will reflect signals, dry foam will absorb both ultrasonic and radar signals.

So no clear winner here, when it comes to foam, first try to minimize it and second, consult a competent technical level expert for recommendations on selecting the right level measurement technology that will work with the particular type of foam present.



Ultrasonic transducers have a self-cleaning face, which literally shakes itself clean of dirt and buildup.

Ultrasonics field notes

But don't just take our word on the strengths that ultrasonics brings to the environmental market. Let's take a look:

Taking the uncertainty out of pump control

With a population of more than 800,000 residents, the growing city of Edmonton, Alberta, Canada requires modern, efficient wastewater treatment. With the installation of SITRANS LUT400 ultrasonic level controller from Siemens, Edmonton's pumping stations now have a more reliable and accurate system for pump control.

Because of application challenges like the wet well's narrow construction and the many obstructions in it, operators could not install the ultrasonic transducer in an optimal location. The transducer's beam was therefore reflected off the obstructions, adding to the measurement difficulties.

But since Siemens Echomax transducers have a narrow beam angle, they are particularly suitable for this narrow well. Using SITRANS LUT400's auto false echo suppression feature, the false signals from obstructions were eliminated from the signal processing

Measuring level in wastewater treatment effluent flume

- Recent growth in a southeastern US housing market near a protected wetlands area required the installation of a new package treatment plant. However, the chlorine residu-

al in the wastewater discharge required strict limits that could not be attained from manual control of the sodium hypochlorite metering pumps.

- A Siemens Probe LU transmitter provides dependable measurement in this application and is immune to problems caused by suspended solids, corrosives, grease, or silt in the effluent.
- Easy to use and providing a high level of accuracy for this demanding application, the Probe LU became the key component of the hypochlorite dosing system.

Seeing through the myths

At the end of the day, a one-device-suits-all approach to level measurement is simply not a wise idea in any industry. Whether it's a result of an instrumentation company's limited portfolio or an insistence on radar's higher price point, a push-radar-at-all-costs approach is confusing to customers and a source of misinformation in the industry.

That being said, ultrasonics may not be the perfect choice in every single application—and it is here that a level portfolio featuring radar or pressure transmitters comes in handy.

But knowing the truth behind the myths being touted by instrumentation dealers is always a good thing, in the environmental industry and beyond.

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