

STRIVING FOR PERFECTION

CIDRA'S MANAGING DIRECTOR OF PACIFIC RIM OPERATIONS, SHARES WITH THE BUNKER BULLETIN BENEFITS WHICH SONARTRAC, A CLAMP-ON ENTRAINED AIR DETECTION SENSOR, BRINGS TO THE BUNKERING SECTOR.

BY DR. MICHAEL M. MURPHY

FISCAL ACCURACY has been an important discussion point within the marine bunkering industry and stakeholders have been striving to improve on this through the implementation of advanced metering technologies, including coriolis for mass flow.

Accuracy of measurement is dependent on external variables which include temperature, viscosity, and density. Density, in particular can be influenced through the inclusion of undesirable contaminants and non-oil entrants, which can include air – particularly entrained air.

Air is both a menace and a benefit to the industry – cappuccino (sometimes

called coca cola) effects, or higher than usual air content, has been reported in some geographies which may arise, not necessarily from deliberate acts, but from operational effects such as tank stripping, tank switching, residual air in pumps and pipelines. Conversely, the introduction of air may also be used beneficially for essential oil blending processes.

Dynamic air detection, or better still, air measurement could provide a corrective benefit for mass-flow, as well as potentially providing an alarm capability during operations.

A pre-agreed percentage of entrained air in bunker fuel could be settled upon

between the receiving ship and the bunker provider during fuelling operations. This threshold could enable a watch keeper to make decisions and warn the officer-of-the-watch of high air levels detected over certain durations that warrant attention; or in extreme cases instruct the barge to cease the bunker transfer.

The alarm can then be entered into logbooks, and the integrated data can provide an accurate gas volume fraction measurement (GVF) of actual air that has passed through the mass flow metering solution. This provides a potential correction solution, as well as a point of record for further reference. Improved



corrections can only add to the 'fiscal purity' of the mass flow measurement, and provide bunker suppliers an accuracy differentiator.

ENABLING ACCURATE AIR DETECTION & MEASUREMENT

CiDRA's SONARtrac enables air detection, alarm and measurement, and utilises an external sensor band which is clamped securely around the external surface of a pipeline – pipe materials that can be supported include carbon or stainless steel, fiberglass, PVC and HDPE, and linings such as rubber, urethane, Teflon, and others.

The sensor band is enclosed within a weatherproof and ATEX certified environmental enclosure which can support external pipeline surface

to 20%, and with no moving parts, or contact with the oil, SONARtrac does this with assured repeatability.

Weighing only 10 kg, the SONARtrac sensor unit is easily transported to the measurement point, and its compact size enables its placement and installation in difficult to access locations, or where pipelines may be densely packed – for example at the manifold. Further, SONARtrac can be installed in less than one hour, which also includes the installation and programming of the Transmitter.

The Transmitter may be installed local to the sensor head or in a deck house, blending cabin or control room – connection to the sensor head is via an ATEX approved cable and electrical plug/socket assembly, with one free end available for splicing into the Transmitter enclosure. Programming the

Transmitter is enabled within the protective casing, through a simple step by step menu. Self test and diagnosis is performed after switch-on or reset.

Data from bunker operations can be displayed locally or remotely, as well as stored within the Transmitter itself for later retrieval – this can be a preference during custody transfers to maintain client security. This data can be also be collected and certified by 3rd party survey companies, and provide a verified and calibrated point of record to support a dispute should a transactional query be raised.

CLOSER TO FISCAL PURITY

Entrained, and/or entrapped air can be regarded as the bunkering industry's 'Achilles heel'. Mass flow technology can reduce the uncertainty with custody transfers, but acceptable accuracy can remain dependent on variables, including these air effects.

Getting to fiscal purity requires complementary technology to overcome this problem, and CiDRA's SONARtrac tackles this sometimes challenging obstacle. Employing well established physical principles. SONARtrac enables accurate and repeatable GVF air measurements and does so completely external to the pipeline and fluid being measured.

SONARtrac has already been successfully deployed and operated in a range of other markets that require accurate and dependable air (or gas) detection amongst aggressive and erosive fluids, which includes the chemical and mining/processing industries - the latter being particularly challenging as this is a three phase erosive slurry of gas (usually air), liquids and solids. With no moving parts and no contact with the fluid being measured, there is simply nothing to wear out with SONARtrac. This unique characteristic assures long-term measurement reliability and repeatability.

Operationally, SONARtrac is externally clamped to the pipeline, which means not only swift installation, but that there are no deck or pipeline modifications required, tank cleaning for 'hot work', nor costly dockside time for installation which is a benefit for both barge and ship owners. This simple installation capability is an attractive characteristic with this measurement solution.

Using SONARtrac for air detection and measurement elegantly compliments mass flow, and this important data will enhance the accuracy of custody transfer as well as provide operational assurance to those in the bunker transaction.

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USING SONARTRAC FOR AIR DETECTION AND MEASUREMENT ELEGANTLY COMPLIMENTS MASS FLOW

temperatures up to 100°C. The enclosure is then connected to a digital signal processor, called a 'Transmitter', which captures and displays the data. The Transmitter can be interconnected into other data management systems using standard interface protocols, including MODBUS, Foundation Field Bus, and PROFIBUS.

The SONARtrac unit works by exploiting the high sensitivity of the speed of sound (SOS) to the gas content in liquids. For example, at typical bunkering pressures, the SOS in a liquid decreases by a factor of more than 10 for change in GVF from 0% to 1% by volume. GVF can be measured accurately over a dynamic range of 0.01%