

Reliable level measurement for barges – Part 1 Temposonics Level Plus® on ships

Marcel Idsinga, Managing Director at Instrument Technical Utilities (ITU), a supplier of measurement and control instrumentation, explains the challenges of inland water transport by barges in Europe. The company equips oil and chemical tankers with control systems using Temposonics transmitters to provide high accuracy level measurement. This is part 1 of a two-part article.

European inland water transport plays an important role in transporting oil and chemical products throughout Europe. A significant portion of the transportation is done by barges and maximizing usage of tanks as well as accurately tracking inventory are important factors in the economy of these barges. To maximize their profits, carriers and clients need easy to use, reliable, high-accuracy level measurement including a low costs of ownership and a low total installed costs.

Powerful cooperation

These targets are also of utmost importance to Instrument Technical Utilities (ITU), supplier of measurement and control instrumentation based in Waddinxveen (Netherlands), and global manufacturer Temposonics (Germany and USA). These companies have combined their level measurement know-how and provide complete tank management systems (measurement and evaluation) for Dutch oil and chemical tankers. Containing 10 to 18 tanks on average, the equipped inland waterway tankers are among the superior ones of their class. With 21 tanks and an overall volumetric capacity of 6.5 million liters, the motor tanker Commander II project equipped by the two companies is even bigger.

Safe measurement of the load volume

In the water transport business, high demands are made on level measurement. Extreme process conditions, temperature variations and load movements challenge sensors. For reliable measurement of the level inside the tank, independent of environmental factors and varying product parameters, ITU managing director Marcel Idsinga tested various technologies and level transmitters: “High inaccuracies of the level measurement cause expensive and long downtimes. For this reason, the liquid level must be monitored precisely, safely and without the need for maintenance. We have chosen a highly reliable solution: Level Plus® liquid level transmitters supplied by Temposonics.”



Fig. 1: Das Tankmotorschiff Commander II hat 21 Tanks und ein Gesamtfassungsvermögen von 6,5 Millionen Litern und wird von ITU und Temposonics ausgerüstet.

By doing so, ITU has made a purposeful decision in favour of a manufacturer with extensive experience in the field of liquid level measurement. Offering absolute, continuous measurement technology, Temposonics has been manufacturing liquid level transmitters for over 40 years. “We have chosen a partner who produces sophisticated and easy-to-handle sensors. Temposonics is the inventor and pioneer of magnetostrictive technology offering the know-how and providing on-site technical support,” is Marcel Idsinga’s comment on his decision.

Customer-specific software development

Installed on various inland tankers, the Level Plus® LP-Series transfer the tank level signals directly to the ITU-developed, Windows-compatible A.D.A.S. software for signal processing and visualization. The analog sensor versions are provided with 4...20 mA measuring circuitry and use the HART protocol for transmission, which permits a considerably increased accuracy of digital signal evaluation by the A.D.A.S. software.

Since ITU is also the software programmer, the company can take customer wishes into account flexibly and the software can be adapted to the specific requirements of the vessel, for example, the introduction of level data into a leakage and stability calculation. Moreover, the software is embedded into a Stahl Is1+ module for intrinsically safety and Hart, together with Rockwell Allen Bradley for control, offering the possibility to connect a variety of sensors without significant additional costs. For vessels carrying a large number of tanks, this feature is particularly rewarding.



Fig. 2: Level Plus® Transmitter auf der Commodore II.

Visualization, evaluation and calculation

Using the A.D.A.S. software, the operator has exact control of the loading and unloading process. Differences between the actually loaded volume and the specifications provided by the loader or the unloaded volume are detected. A load overview and a pump overview can be visualized and the intake speed is also displayed. To preclude load differences due to temperature variations, the software tracks the level or volume data back to a reference temperature (e.g. 15°C to ASTM54, and 20°C for chemical products) after entry of the product data.

A customized software module for leakage and stability calculation increases the safety for the crew, the vessel and the load. The module provides precise load planning based on the vessel construction for the operator as well as calculation of the maximum possible transport volume and of its distribution to the tanks. Sloptanks and deck cargo are included in the calculation. Summarizing the advantages, Managing Director Idsinga comments: "This calculation enables the operator to load the largest possible product volume, to make optimum use of free load capacities and to realize maximum profits."

For direct information, a local indicator at each tank visualizes the current filling level. Designed as a touchscreen, an additionally installed central display provides clear information on all tank levels and ensures convenient operation of the software.

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