

Refinery sets its sights on radar



Imposing skyline: with around 5,000 employees, Grupa Lotos operates Poland's second largest refinery in Gdansk.

The successful integration of a Endress+Hauser tank gauging system encouraged Grupa Lotos to introduce more radar level devices.

"We are very happy with the entire Endress+Hauser relationship, both in terms of the equipment and the quality of service and support," says Jacek Sznigir, instrumentation engineer at Grupa Lotos S.A., the only Polish company producing crude oil from the Baltic Sea. The fuel, sold at roughly 400 gas stations across Poland, is only one of many mineral oil products that are refined at the company's four processing plants. The most important location is Gdansk: its 10.5 million tons annual production capacity also includes motor oils, grease lubricants and bitumen.

The Gdansk refinery installed a new level measurement system between 2010 and 2012. Endress+Hauser was tasked with retrofitting 47 storage tanks that hold semi-products and base oils. "The order

called for increasing the operational safety of the tanks, installing a central control system, and general tightening up and streamlining of the control and level measurement processes," explains Mariusz Szwaigryk, level product manager at Endress+Hauser Poland. "The customer asked us to minimize changes to the technical infrastructure and to use the existing tank process connections and cabling."

Outdated system Prior to the retrofit, level measurements were performed by float gauges attached inside 25-year-old stilling wells. Apart from being error-prone, this measurement system also required costly maintenance. After years of operation, the inner walls of the carbonized steel pipes exhibited traces of corrosion and residue build-up. In addition, measurement

accuracy was well below that provided by radar sensors, which deviate one millimeter at the most. "We asked several reputable companies for quotes. Endress+Hauser was the only company that met our high expectations in terms of technology and cost," says Jacek Sznigir.

The substances processed in the refinery also place high demands on the system. Semi-products such as mineral oils and liquid fractions, as well as the base oils, are high-viscosity heavy hydrocarbons that are stored at temperatures between 40 and 120 degrees Celsius. When handling these substances, refineries must adhere to strict international regulations which vary widely between products. The authorities emphasize safety and environmental factors (leak detection, overfill protection).



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The initial test The valuable liquids are stored in tanks in two separate areas of the Gdansk refinery. Nearly 12 meters high, the tanks hold 3,500 or 5,000 cubic meters of liquid. In 2010 Endress+Hauser Poland received an order to equip 14 of the storage tanks with Micropilot S FMR532 non-contact, radar-based level sensors in a stilling well application. "An important aspect for the customer was that the radar sensor comes with a 10-point certification," explains Mariusz Szwaigryk. Prior to installation, Endress+Hauser provided proof that the measurement instrument meets all relevant requirements and standards. "The high level of professional support from Endress+Hauser was evident as early as the planning and test phases," says Jacek Sznigir. "We also received valuable support during commissioning and were trained after the project was complete."

The radar sensors are equipped with Teflon-coated planar antennas and an additional horn antenna. This ensures a high degree of corrosion resistance and provides an accurate way to capture the sensor signal, regardless of seasonal changes in ambient temperature. "The non-contact measurement method means the instrument is nearly maintenance free. For the most part, there is no servicing, cleaning, drying or calibration," says Mariusz Szwaigryk. To measure the average temperatures of liquid hydrocarbons and the vapor zone, the tanks were also fitted with Prothermo NMT532 precision sensors. To safeguard the tanks against overfill, the Liquiphant M FTL51 point level switch with extension tube was deployed as an additional safety precaution.

A tank side monitor collects and displays the information from the sensors in the storage tanks. The unit also allows remote configuration and



Everything from a single source: Endress+Hauser was entrusted with total monitoring of the 47 storage tanks.

monitoring of the sensors from a safe distance, ensuring intrinsically safe 24V DC power for all instruments. "This safety increase on site was a second key argument in for our customer," points out Mariusz Szwaigryk. The data is transmitted to the high-level control system. "Data transmission between the old and new systems is smooth and reliable," confirms Jacek Sznigir.

The rewards of labor After two years, the project shifted to the second phase. The remaining 33 tanks in an additional pumping station were equipped in the same manner and then enhanced with the Cerabar M PMC51 digital pressure transmitter for measuring the pressure of nitrogen, which serves as a protective gas inside the tank. "The tank side monitor has proven to be very reliable and allowed us to easily integrate the additional tasks," explains Jacek Sznigir. With this solution, the refinery can visualize and remotely retrieve all the level

data it needs. Endress+Hauser will also be performing annual preventive maintenance as part of a service agreement.

After three years of operation, the customer is more than satisfied with the solution. Since gaining experience with the radar equipment, the refinery has expanded the technology to other parts of the plant, replacing diverse level measuring devices to ensure a high degree of corrosion resistance and precise capture of the level data. "We were able to improve gauging accuracy and system availability, and reduce the cost of routine maintenance at the same time," says Jacek Sznigir, who adds: "With this solution, our technicians no longer have to deal with tank gauging on a daily basis because the Endress+Hauser system is completely reliable!"

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