

Radar Waveguide Solves Refinery Upgrade Issue

Case Study • 2001



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Challenge

The BP Lubricants refinery in Hamburg, Germany, has a large number of tanks storing crude, white oil and many other petrochemicals.

In 2000, the company wanted to upgrade the plant to state-of-the-art, non-contacting radar level measurement instruments. They wanted reliable, low maintenance technology that could be readily installed on the existing tank configurations. Desired accuracy was within 5 mm. Ultimately, the company wanted to standardize on a single technology and instrument to reduce costs.

Solution

The 14-metre high tanks have floating-roofs, and are equipped with 400 mm diameter stillpipes.

The company installed Milltronics® IQ Radar* instruments for a trial. In preliminary testing, the large diameter stillpipes generated a radar signal-bouncing (circulation) effect that reduced measurement accuracy. At the same time, radar instruments produced reliable readings when tested on the tanks' 150 mm diameter dip pipes that are used to manually check level for custody transfer. The solution was to install 50 mm diameter waveguides with the IQ Radar instruments mounted on the large stillpipes.

A waveguide antenna is a small diameter pipe that extends from the instrument to the bottom of the vessel. It guides the signal and eliminates signal spreading. This greatly improves the signal-to-noise ratio. In this case, the use of a DN 50 waveguide inside the existing large stillpipe eliminated the signal-bouncing effect and produced accurate, reliable measurement.

The waveguides were custom built by the Siemens Milltronics Configuration Centre which offers technical applications support. Each waveguide is 13.8 m long, built in three sections for easy handling, shipping, and assembly. The sections are bolted together on site.

A single piece this size would require a crane to install, as did the original stillpipes. Spacers keep the waveguide positioned correctly in the middle of the stillpipe.

Benefits

The custom built waveguides proved to be a practical solution that met BP's specifications and requirements.

This application was cost effective because it used the existing stillpipes and flanges without the need for major modifications to the tanks.

The IQ Radar instruments provide reliable measurement well within the desired specification of 5 mm accuracy.

In several phases, BP is now converting its storage tanks from mechanical servo gauge systems to radar technologies, and plans to connect the radar instruments to a future fieldbus system such as Profibus-PA or Modbus network.



Installing waveguides with IQ Radar instruments solved a difficult measurement problem for BP Lubricants in Hamburg without the need for costly modifications to the existing tanks or flanges.

*SITRANS LR 300 radar transmitter has replaced Milltronics IQ Radar instruments.