

Petrochemical Plant Automates Tank Farm with Non-Contacting Radar and Wireless Monitoring System

RESULTS

- Improved tank management
- Decreased safety and environmental risks
- Reduced operating costs
- Reduced energy costs



APPLICATION

Petroleum storage tanks

APPLICATION CHARACTERISTICS

Total of 47 tanks sizes ranging from 3 m to 13 m tall and varying diameters; contents may vary from day to day

CUSTOMER

Petrochemical Plant in India

CHALLENGE

A petrochemical plant struggled to monitor their tank farm of 47 remote raw storage tanks. The Technical Director recognized this challenge and sought to find an automated method to measure, retrieve, and record tank data. This plant uses several different petroleum products in their mixing process as they prepare finished product to sell. Raw materials are taken directly from the storage tanks and put into the mixer for further processing. If tank data is not monitored, they risk running the tanks dry, resulting in a process shutdown. In addition, tank data reports are required daily by their city office situated 22 km (13.7 miles) from the site office.

Previously this customer relied on hand dipping the level measurement. Anytime they would top-off or empty the tank, a skilled worker would go out to the tank and manually track the level measurement with a dip stick. This task was required at least twice daily per tank, and it was performed by a limited number of skilled technicians. In order to automate the inventory monitoring system, they were faced with an expensive and labor intensive project, since there was no preexisting power or signal wiring.

Without a reliable level measurement, this customer experienced many negative business impacts. A manual method of obtaining tank levels meant that tank data could not be tracked real time and filling and emptying schedules could not be optimized. Not only was the hand dip method time consuming, but it was not very accurate, leading to incorrect tank volumes. Additionally, the skill technicians that would manually hand-dip the level measurement were exposed to safety risks

The automated radar measurement provided a better tank monitoring, enabling optimization of filling and emptying schedule.

LINK NAME	DAILY	WEEKLY	MONTHLY	QUARTERLY	YEARLY
BS 1	SHOW REPORT				
BS 2	SHOW REPORT				
BS 3	SHOW REPORT				
BS 4	SHOW REPORT				
BS 5	SHOW REPORT				
BS 6	SHOW REPORT				
BS 7	SHOW REPORT				
BS 8	SHOW REPORT				
BS 9	SHOW REPORT				
BS 10	SHOW REPORT				
BS 11	SHOW REPORT				

Screen captures of SCADA system showing inventory monitoring of tank farm and ability to generate inventory reports.

from climbing the tank and opening the tank hatch. This was especially troublesome during inclement weather.

SOLUTION

To address these challenges, the Technical Director worked with an SVL Engineering Services (P) Ltd to implement an online wireless monitoring system. They wanted to trial it on eleven tanks, so the system consisted of eleven Rosemount 5402 Non-Contacting Radar devices and a complete wireless network. The radar devices provide reliable level measurement and accommodate varying process fluids without contacting the process. In addition, the measure and learn feature of the 5400 made commissioning of the units for each tank fast and easy. To provide power to the devices, they installed CIGS Thin film Solar Panels with backup batteries that mounted on top of the tank, near the Radar.

A Smart Wireless THUM Adapter is attached to each Radar device to send wireless data to a Wireless Gateway. The Gateway is mounted on the top of the control room terrace, and the Ethernet cable is connected to the office LAN in server room. They defined a dedicated IP address to the Gateway so they can access the same in site office for monitoring purposes. Lastly, they used a SCADA system to log data continuously and generate shift wise, daily, weekly, monthly, quarterly, and yearly material consumption reports for each tank. The SCADA system also generates low level and high level alarms customized for individual tanks.

By installing the combination of reliable level and wireless measurement technology, the customer experienced many positive business outcomes. With the automated Radar level measurements, they were better able to monitor tank data at the site office thereby filling only when necessary. This also eliminated the time spent on logging data and developing reports. They reduced operating costs and safety risks associated with manual level measurements. Lastly, they reduced energy costs by only driving to tanks when absolutely necessary.



Rosemount 5402 combined with Smart Wireless THUM Adapter.

RESOURCES

Emerson Process Management Chemical Industry

<http://www2.emersonprocess.com/EN-US/INDUSTRIES/CHEMICAL/Pages/index.aspx>

Rosemount 5400 Series - Superior 2-wire Radar Level Transmitters

<http://www2.emersonprocess.com/en-US/brands/rosemount/Level/Non-contacting-Radar/5400-Series/Pages/index.aspx>

Smart Wireless THUM™ Adapter

<http://www2.emersonprocess.com/en-US/brands/rosemount/Wireless/THUM-Adapter/Pages/index.aspx>

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