

BP Oil Implements Rosemount 2160 Wireless Switches for Floating Roof Tilt Detection

RESULTS

- EU environmental regulations for floating roof safety met
- Increased personnel safety by eliminating manual inspections
- Implemented automation for better floating roof management



APPLICATION

Floating roof tilt detection

APPLICATION CHARACTERISTICS

Provide safe, efficient storage of volatile products with minimal vapor loss to the environment.

CUSTOMER

BP - one of the world's leading international oil and gas companies.

CHALLENGE

With the advent of new European Union (EU) safety and environmental directives, floating roof tanks must be made safer to avoid the risk of overfill. Overfills can be detrimental from an environmental perspective as well as to human safety. An overfill can be expensive in terms of both penalty fines and public relations.

One common problem with floating roofs is that they can tilt. This allows vapors and gases to escape from the gap on the uncovered side and creates a fire hazard. Once a roof starts to tilt, the lower part can begin to take on liquids on the top side. Sometimes the liquid is the hydrocarbon fluid that starts to gradually leak onto the lower portion of the roof. Other times, the liquid may be melting snow or rain water that runs down to a low point.

Subsequently, users are looking for ways to monitor floating roofs to verify they are truly floating on the surface. Mechanical devices have been used in the past but some incidents have caused them to be prohibited. At some sites, only manual and visual inspections are used to determine the state of the roof. If fluid is present, it is important to know if it is oil or water. A way to detect this without climbing to the top of the tank is highly desirable. In addition, EU regulations require automation of this application.



The use of a repeater ensures the wireless signal from the Rosemount 2160 is transmitted to the Gateway when the roof is at a low level.

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SOLUTION

The Rosemount 2160 Vibrating Fork Switch was found to be a solution in determining both roof tilt and type of fluid present. Three of these wireless switches were installed at 120° of each other. Since they were wireless, the installation was a simple mounting connection off a support beam. To ensure the signal would be available when the tank level was low, a repeater was installed near the top rim of the vessel. The one-second updates of the switches are sent to a central engineering station by way of a Rosemount Gateway and a PLC to the BP control room. The visualization for each tank showed the three measurements and their frequencies. If a switch went from a dry to wet state, this would inform the operators that liquid was present at that location. Furthermore, the frequency supervision function of the switch in the wet state allows it to differentiate between oil and water as each fluid had a distinct frequency. Built-in self diagnostics of the Rosemount 2160 provides additional assurance that the switch was operating properly and the power supply was good.

With the installation of the wireless Rosemount 2160 switches, BP was able to make their floating roof tanks safer and meet the EU safety and environmental directives. They automated a system that previously required climbing to the top of the tank for visual inspection. The system was easy and economical to implement since there were no wiring costs. Built-in diagnostics of the Rosemount 2160 further ensured proper operation and minimized the need for validation.



Use of wireless vibrating level switch for floating roof monitoring.

RESOURCES

Emerson Process Management Petroleum Refining Industry

<http://www2.emersonprocess.com/en-US/industries/refining/Pages/index.aspx>

Rosemount 2160 Wireless Level Switch

<http://www2.emersonprocess.com/en-US/brands/rosemount/Level/2100-Series-Level-Switches/2160-Level-Switches/Pages/index.aspx>

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