

# Refinery Reduces Safety and Emissions Risk, and Maintenance Costs with 2120 Vibrating Fork Level Switch

## RESULTS

- Reduced safety risk
- Reduced risk of environmental emissions
- Reduced maintenance costs
- Reduced project costs

## APPLICATIONS

Hi-Hi trip on a lockdown drum

## CUSTOMER

A refinery in North America

## CHALLENGE

For safety and environmental reasons, it's important to prevent sending liquids to the flare. To accomplish this, there is a Hi-Hi liquid level detection point upstream of the flare. If the Hi-Hi level is detected the line to the flare is closed, and process materials are redirected to a blowdown drum.

Previously the Hi-Hi level was detected using float switches. The float switches needed to be serviced quarterly to confirm proper function and to clean process materials from the switches. Functional testing and cleaning typically took an hour or longer. Process materials were sticky and could coat the float switch mechanism preventing the switch from moving in response to a Hi-Hi level. A float switch is a 2-wire device. The customer wanted to avoid any changes to the wiring or control system I/O when upgrading to an electronic solution. There was no indication at the control system if the switch stuck or malfunctioned. The float switch was connected to the control system using an Intrinsically Safe discrete input. This limited alternative solutions for the level detection point.

If the float switch failed to detect a Hi-Hi condition when the flare was in use, liquids could be sent to the flare. This increased the risk of a fire in the refinery. It also increased the risk of fugitive emissions. Valuable liquids could be lost increasing costs and reducing throughput. Finally, float switch maintenance could take an hour or more per switch. Hundreds of float level switches were used throughout the refinery leading to high maintenance costs.



*The Rosemount 2120 Vibrating Fork Level switch allowed this refining company to reduce the risk of sending liquids to the flare.*



Figure 1: Rosemount 2120 Vibrating Fork Level Switch

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### SOLUTION

This refinery solved the problem using a Rosemount 2120 vibrating fork level switch. The intrinsically safe version of the 2120 is a 2-wire device that can be powered, and the input read by the customers installed discrete I/O. No additional signal or power wires, or changes to the system I/O were required to implement the 2120 solution. The vibrating switch has no moving parts, so sticky process materials do not interfere with normal switch operation. The Rosemount 2120 also has internal diagnostics which check for switch failure conditions. If a switch failure occurs, it can be detected by the discrete input on the control system. In addition, a self test function at the switch can verify the health of the switch in seconds. Diagnostics available from the 2120 reduced the risk of undetected failures. This has resulted in reduced safety risk to the refinery. The reduced risk of sending liquids to the flare also reduces the risk of fugitive emissions, and the risk of losing valuable liquids. The vibrating fork design has reduced maintenance costs with maintenance now being scheduled once a year instead of quarterly. In addition, the time required for inspection and maintenance is reduced from over an hour with float switches to five minutes or less with the 2120 vibrating fork switch. The 2120 was wired into the existing discrete inputs which minimized the cost, time, and skill sets needed to implement the solution. This application has been so successful that this refinery is now replacing float level switches with Rosemount 2120 switches in other applications.

### RESOURCES

#### Emerson Process Management

[http://www.emersonprocess.com/rosemount/industry/oil\\_gas/index.html](http://www.emersonprocess.com/rosemount/industry/oil_gas/index.html)

#### Rosemount 2120 Vibrating Fork Liquid Level Switch

<http://www.emersonprocess.com/rosemount/products/level/m2120.html>

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