# Avoiding tank overfill with an automated prevention system

Oil & Gas


Endress+Hauser
People for Process Automation


# Safety; product security; environmental concerns; and finally, operational costs.

All these aspects of your business are affected by a relatively simple problem – tank overfill.

If you don't have an effective fuel measurement and monitoring system, knowing the state of your own resources becomes a serious trial, impacting upon your operational efficiency.

As safety is foremost in all industrial operations, the Australian Compliance Standard IEC61511 is enforced to prevent overfill and ensure proper levels of liquids are maintained; particularly when handling combustible or toxic fluids.

The API/ANSI 2350 standard outlines methods operating personnel can use to prevent tank overfills, particularly using an assessment system to evaluate the chances of an overfill event occurring and determining the associated risks. The IEC 61511 outlines practices that ensure the functional safety of particular instruments used in tank safety including lifecycle, design and engineering requirements.

But how can you be assured you're following these standards, and what happens if you aren't?

The fuel – if spilt – creates vapours that could easily combust, causing fires or explosions, such as those seen during the BP Texas City Refinery, where hydrocarbons


– originating from the F-20 blowdown stack following the operation of the raffinate splitter overpressure protection system caused by overfilling and overheating of the tower contents – were ignited by coming into contact with a vehicle operating on site. This disaster, not including the lives lost, cost BP US$50.6 million in fines.

“The need for effective tank overfill prevention systems was reinforced by the Buncefield incident, where a manual tank gauge had stuck and the independent shut-off switch was broken, meaning the tank had to be filled blind. This tank overflowed through the vents at the top resulting in the formation of a vapour cloud near ground level, which eventually ignited and exploded. This incident cost up to a billion British pounds worth of damages and 8.5 million pounds in fines.

While these are worst-case scenarios, even minimal problems caused by overfills can have lasting financial repercussions, requiring operators to fix or potentially rebuild parts of the site. These high profile incidents also have ongoing negative impacts on the company’s brand, which are more difficult to quantify.

With environmental awareness on the rise, the effects of fuel spills can no longer just be casually swept away, and require ongoing remediation and rehabilitation fees, as well as associated fines relating to non-compliance; and this is a best-case scenario.

This process has a high operational cost as workers are constantly required to manually check the levels. Workers can also be exposed to a potential explosive atmosphere and exposed to risks associated with working at heights when calibrating these instruments, as well as the potential risk of damage to the instrument itself when removed from the process and introducing unreliability of future readings.

So how can incidents like these be avoided?

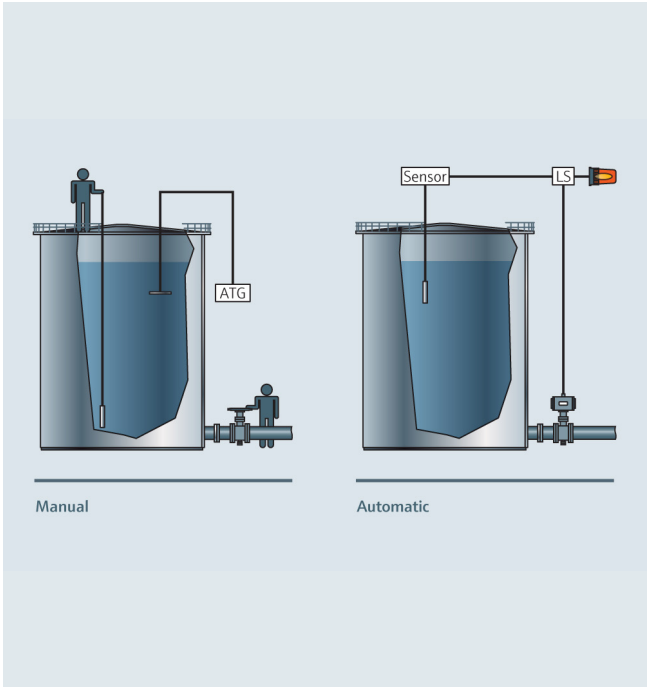
Although tank monitoring is used in overfill prevention, traditional methods are often time consuming and still presents safety risks if they fail, such as those presented at the Buncefield incident.

Additionally, these methods have a slow response time, lagging in communication time between the detection of the alarm and notification of the staff; time needed to analyse the situation and pinpoint the location; and time to complete the counter measures.

New automated systems have been developed to detect, indicate, and prevent overfill issues, raising safety and ultimately protecting your bottom line during what are currently tight energy and resources market. Furthermore, advances in technology that is designed based on safety standards like IEC 61508 and the availability of exhaustive diagnostics in the latest instrumentation and actuation enables a complete overfill prevention system to actually bypass the need for repeated wet proof testing, which is one of the biggest pain points for tank farm operators.

Additionally, automated systems can ensure optimal filling levels – so that no tank is over or under filled – directly increasing tank capacity accuracy as operators can set the high level alarm and the corresponding maximum working level closer to the critical height, allowing them to increase tank holding capacity and the ability to optimise stock levels within an existing tank farm.

To regain control of your business and understand your own resources, Endress+Hauser has developed an educational information source outlining how they can help you not only address the problems that arise from tank overfill, but also how to combat it to not only ensure it does not occur in the first place.





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