

Safety Devices Used as Control Devices

A volunteer at a vintage railroad tourist attraction describes how he prepares a steam locomotive for operation by building up the fire to warm the firebox and increasing the boiler pressure. He explains that he knows that the locomotive is ready for operation with proper steam boiler pressure when the safety relief valve on the boiler opens!

This story from a television interview sounds a lot like a process industry incident that Trevor Kletz, a process safety pioneer, often told. Kletz explained that material was pumped manually to a tank for many years without incident. One day, however, there was a small overflow that the operator quickly stopped. The incident investigation recommended adding a high-level alarm, which would shut off the feed to the tank if the operator failed to stop the flow of material.

About two years after the addition of the alarm, there was another overflow. How could this have happened? Supervisors had decided that the operator could be given other tasks while the tank was filling because of the high-level shutdown protection. No management of change review was completed. Instead of serving as a second layer of protection, the alarm and shutoff became the primary control. In addition, when the high-level instrument failed, there was nobody in the area to stop the flow of material and the spill was actually larger than the spill that occurred years earlier.



Did you know?

- The operator of the steam locomotive was supposed to observe the steam pressure and control it when it reached the desired operating pressure. The safety relief valve was intended to be a second layer of protection in case the operator failed to properly control the steam pressure.
- The operator of the manual tank-filling operation was supposed to manually shut off the feed when the tank was filled to the desired level. The high-level alarm and feed shutoff system was intended to be a second layer of protection in case the operator failed to stop the flow of material into the tank.

What can you do?

- Never use safety devices as control devices in your process.
- Know what devices in your plant are intended for process control and which are safety devices. Understand that safety devices only serve as additional layers of protection to prevent incidents (see the March 2002 Beacon).
 - Make sure your training and operating procedures identify which devices are intended for routine control and which are safety devices.
 - Check that all of your plant safety devices are properly calibrated and are tested at the frequency specified by the designer, and that the test results are reviewed to identify and correct any reliability issues.

Safety devices — for emergency use only!

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