

Small leak leads to catastrophic failure

July 2019

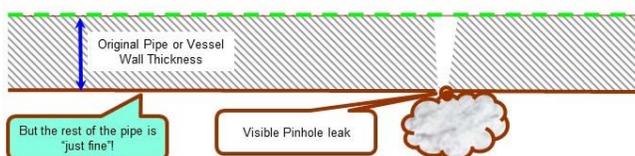
The June 2019 *Beacon* described an incident in which operators discovered a small leak in an 8-inch (200 mm) pipe containing flammable hydrocarbon gas. While the pipe was being isolated and depressurized, it suddenly failed catastrophically (Figure 1) releasing flammable gas. Fortunately, there were no injuries.

In another incident, in a refinery in the United States, operators observed a leak in a pipe exiting the Crude Unit Atmospheric Column. The pipe contained high temperature light gas oil (Figures 2, 3). During the response to the leak, the pipe catastrophically failed releasing a large quantity of hot gas oil (Figure 4). The resulting fire (Figure 5) injured 6 people, put others at risk, and caused significant damage to the refinery. Thousands of people in the surrounding community sought medical attention. Important parts of the refinery were shut down for many months.

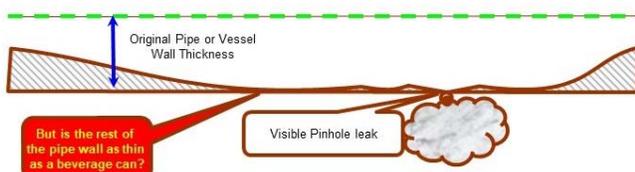


Did You Know?

When you observe a small leak in a pipe or vessel, it is possible that the leak is from a small crack or pinhole in the pipe or vessel wall. The pipe or vessel wall may look like this:



It is also possible that the small leak is the first complete penetration of a pipe or vessel wall which has been significantly thinned by corrosion or erosion. It might look like this:



If a large area of the wall is thinned it may be ready to fail catastrophically, releasing a large amount of the pipe or vessel contents. Your efforts to respond to the leak may disturb the pipe or vessel, making failure more likely. Significant changes to the process conditions inside (pressure, temperature, flow rate) may also increase the likelihood of failure.



What Can You Do?

- If you find a small leak any process equipment, first, report the leak. Consider the possibility of a catastrophic failure, and make sure that the response plan will protect people, property, and the environment if this happens.
- Understand the potential consequences of a catastrophic failure based on your knowledge of the properties of the material in the leaking pipe or vessel (flammability, toxicity, corrosiveness, etc.) and the process conditions (temperature, pressure, flow rate, quantity of material, etc.).
- Consult your plant technical experts on the process and materials, corrosion hazards, materials of construction, and emergency response to help determine how to safely respond to the small leak.
- Read the April 2011 *Beacon* about small leaks becoming large leaks for more information.

References: 1. Morey, A. "Corrosion Under Insulation Revisited: Aren't We About to Finish that Project?" *Process Safety Progress* 37 (4), pp. 502-505, December 2018.
2. US Chemical Safety Board report, <https://www.csb.gov/chevron-refinery-fire/>

What if that small leak turns into a big leak?

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