

Your Facility Is Aging

Aging process equipment, facilities, and infrastructure are a safety concern for the chemical process industries (CPI). Prolonged exposure to chemicals as well as extreme temperatures and pressures make older process units vulnerable to disaster.

Process equipment. A violent explosion killed seven people at an oil refinery in Washington state in 2010 after a heat exchanger shell failed catastrophically (right). The exchanger had been in service for almost 38 years, and cracks had developed in the carbon steel shell due to continuous exposure to hydrogen at high temperature and pressure. The failure mechanism, *i.e.*, high-temperature hydrogen attack, was not well understood when the refinery was built, and the cracks had gone undetected during an inspection 12 years earlier.

Infrastructure. The roof of an ore processing plant collapsed onto the gallery below, causing significant damage to process equipment but, fortunately, no injuries. Beams on the underside of the roof had been exposed to steam from the equipment below for nearly 20 years. Snow and rain on the roof caused the steam to condense and corrode the beams, and the roof collapsed after a particularly heavy snowfall. No one had been assigned responsibility for maintaining the building, and operators were focused only on checking the process equipment.



What Can You Do?

- Ensure all facilities and equipment are operated within specified safe operating limits.
- Report any deviations from safe operating limits and contact an expert to evaluate the potential impact of the deviation on the equipment.
- Look for any unusual conditions or signs of equipment deterioration during plant or facility inspections.
- Look beyond your immediate area of responsibility as you travel about the plant. Inspect loading racks, railway sidings, pipe bridge supports, building structural steel, and other infrastructure, which can be overlooked during formal inspections.
- Check the integrity of all equipment and infrastructure, even if it does not directly contact process chemicals.

Did You Know?

- Aging affects the condition and integrity of all process equipment, facilities, and infrastructure.
 - Prolonged exposure to normal operating conditions and occasional upsets can cause equipment to deteriorate, making it more prone to failure.
 - Many plants now operate at rates and conditions not anticipated during construction.
 - Aging is not necessarily related to the actual age of the facility or piece of equipment. It is about how well the facility or equipment has been operated and maintained, which requires constant vigilance by personnel.
- Tank cars and separations equipment are just two of the many types of equipment at CPI facilities that are vulnerable to failure due to aging.



Aging equipment requires extra care!

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