The 30 Most Commonly Overlooked Piping Problems In Your Facility

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Process piping, fire protection systems, and HVAC units all operate in the background, ensuring your warehouse or facility is running smoothly—that is, until those systems break down.

Gas leaks, burst pipes, or fire protection system failures can not only cause major disruption to your production, but can be life threatening as well.

Halted production, no matter the cause, means lost revenue and increased expenses. Luckily, these system failures can typically be mitigated with regular maintenance and scheduled service by a professional piping company, like Piping Systems, Inc.

Use the checklist in this guidebook to identify these costly and potentially dangerous shutdowns.

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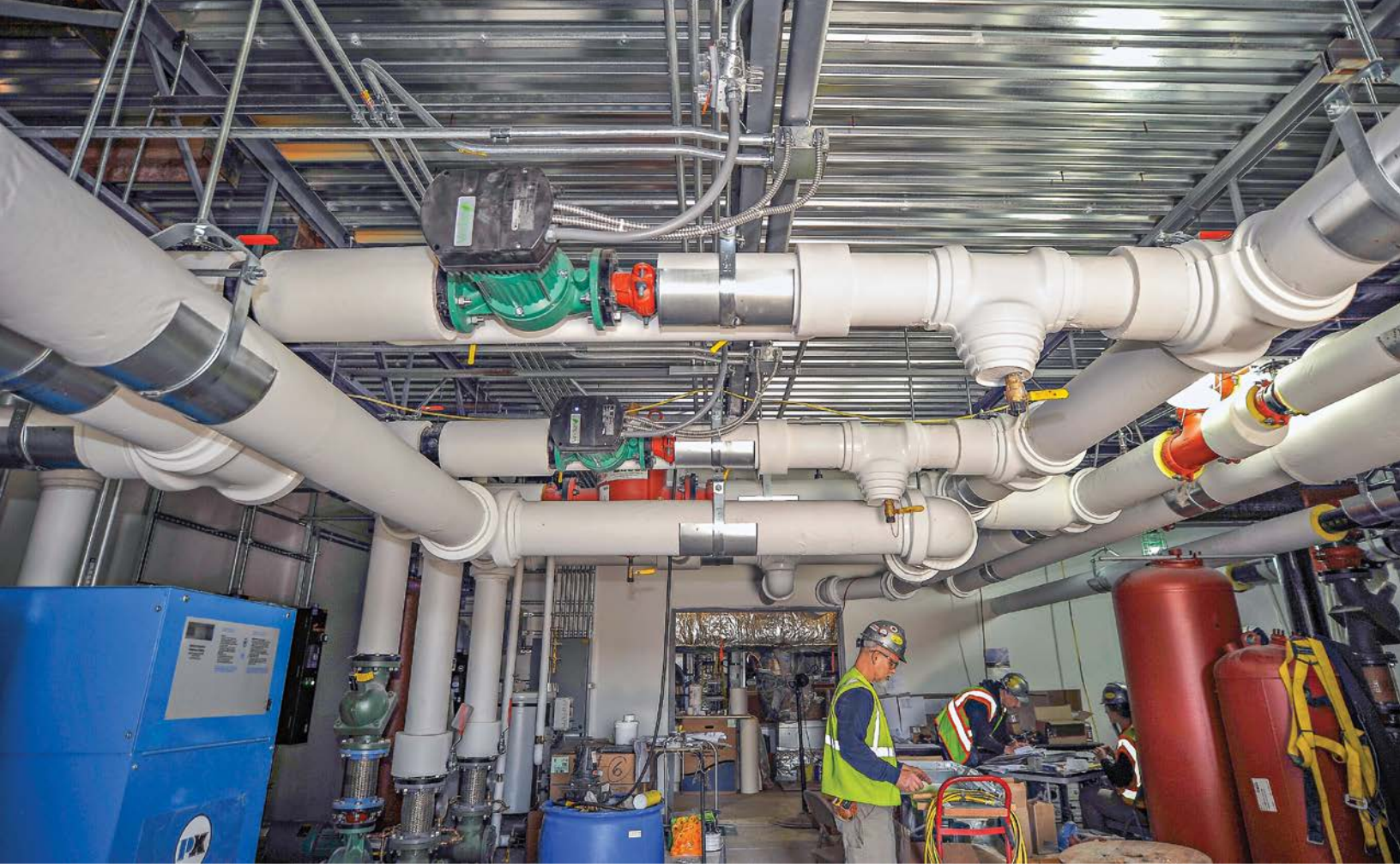

1. Bug screens have not been installed or have been removed from vents.
When regulators are installed, they are often not installed with bug vents. In the event the regulator diaphragm ruptures, the vent serves to relieve the gas to the atmosphere. Bugs and bees are attracted to the smell of natural gas and they tend to build nests inside. If the diaphragm ruptures, the blockage prevents the line from relieving itself. Not only could this result in a fatality, but the facility could suffer enormous physical damage.

2. Leaky regulators.
Although leaky regulators are protected by the diaphragm, if the diaphragm fails, a constant flow of gas would be released into the atmosphere. This is unburned fuel—and you are paying for every CFH of gas. In the case of purge valves, over time, the solenoid can fail, resulting in a valve to be stuck open. We've seen 1-inch solenoids on a purge line that have bled onto a rooftop. Nobody ever went up there and nobody knew exactly how long gas was bleeding onto the roof. Again, this is a problem of life safety and economics.

3. The grease on the gas cock has dried out.
Plug-type gas cocks are sealed with grease around the ball itself. Over time, the grease dries out, which allows gas flow to pass through the packing gland of the valve and bleed off into the facility. Even small amounts of unburned gas can present a significant danger to life and property.

4. Condensing boilers and neutralizing chips are rarely maintained.
Condensing boilers create an acidic condensate. Under the plumbing code, the condensate must be neutralized before it enters the plumbing system. The neutralizers are packed with limestone that dissolves over time. If left unchecked, the limestone can become depleted, allowing acidic condensate into your building's piping system. The acid will deteriorate the pipes, resulting in major expense and disruption to the facility.

5. Leaky water valves and deteriorating piping.
All valves have packing glands on the handles. Over time, the packing begins to deteriorate, resulting in leakage out of the valve. This, in turn, drips onto the copper tubing or black iron and

causes corrosion, which will eventually result in damaged piping and unnecessary expense for the facility.

6. Inoperable valves or handles.

With proper maintenance, valves and handles are checked regularly to ensure they are free and not frozen. However, many facilities do not maintain valves and handles as often as they should. If there is a failure, this results in water flowing into the facility without the ability to operate the valve or handle. Major damage to the facility and significant loss of production can occur.

7. Uninsulated valves and air separators.

Most companies insulate their steam piping. However, many boiler room components, such as heat exchanges, air separators and expansion tanks, go uninsulated. This allows steam to condense quicker, resulting in less steam in the system and more condensate being produced. Basically, the system is creating more steam than necessary, which wastes money.

8. Broken gauges and thermometers.

Several catastrophic things can occur if you have broken gauges and thermometers. If your boiler system were to malfunction and create pressures and temperatures higher than normal, you may not be able to detect this. We've seen instances in which safety valves malfunction and do not relieve the pressure. When this occurs, there is a high risk of explosion. In the case of a sprinkler system, a broken gauge would not detect an air compressor leak within the system. If the system begins to leak and the air pressure decreases, the water can enter the system and flood the facility. These are life safety and economic problems that can easily be remedied with proper maintenance performed by a piping professional.

9. Dirty screens before water makeup.

Screens are generally located on the inlet side of the valve. The screens consist of a fine mesh that can be clogged with calcium build-up over time. This build-up can prevent the proper amount of water to be supplied to the system. If the water level drops in a boiler system, an explosion can occur.

10. Barometric dampers.

Many burners on boilers are designed to work with a specific air flow coming into the boiler stack. Weights are set to a specific air flow when the boiler is first installed. Over time, these weights can rust or dislodge due to vibration. As a result, the dampers could open too much or remain closed, which would cause the burner to not operate at an optimum level. Gas could also flow back into the boiler, causing damage to the boiler system itself or needlessly burning too much gas.

11. Water testing.
Free water testing is available online and many supply houses will do the testing for you. It should be performed in a new plumbing installation, and in most cases, is required by code. In addition, the line is required to be chlorinated to ensure impurities are not present in the system. During construction and installation, contaminants like flux and solder can be accidentally introduced to the piping system. Checking your water quality is easy and should be done periodically.

12. Seismic bracing.
Seismic bracing is designed to help the piping move with the building during an earthquake or similar event. Over time, the brackets that connect to the building structure break away. The torque nuts that hold them in place become loose due to vibrations, causing the brackets to become disconnected from the piping. This can result in stress on the piping system, especially during a seismic event.

13. Sight glass sediment.
Many steam boilers have a sight glass on them. If the water quality within the system is poor, sediment can accumulate, causing water levels to fluctuate in the boiler. This can result in false readings and cause the boiler to shut down completely. Luckily, this problem can be typically corrected with proper chemical treatment of your water.

14. CO2 detection in the boiler room.
CO2 detectors are required by code for many installations, but not all. We recommend that there be a detector installed in every boiler room; even a battery-operated unit will do. It is essential to ensure the CO2 is always working. Even if the carbon monoxide level is at a low level and does not cause death, it can cause serious damage to your body over time. There could be high levels in your office, warehouse or facility and you may never know it. A small investment in a $30 CO2 detector can save a life.

15. Leaky steam valves.
As is the case with leaky water valves, steam valves have packing glands on the handles. Over time, the packing begins to deteriorate, resulting in leakage out of valve. In the case of steam, a leak will result in steam lost to the atmosphere. When a facility develops several steam leaks, the steam condenses and drops onto existing piping.

This causes rapid deterioration of piping, as well as lost steam, resulting in major expenses for the facility.

16. Defective or loose nuts in hangers.
Mechanical piping systems are subjected to vibrations in buildings. Over time, the bolts that hold these hangers together can come loose. This loss of additional support can cause pipelines to pull away from walls or ceilings, resulting in damaged equipment. Accidental injuries or death could also occur if unsupported pipes were to fall.

17. Wall thickness of mechanical and fire protection piping.
When piping has been in service for a long period of time, any deficiencies in the system may not be evident from the outside of the piping. We recommend taking portions of the system apart to spot check the inside of the piping to ensure the integrity of the system. Tuberculation is the development of small mounds of corrosion products on the inside of iron pipes. This phenomenon generally occurs in water systems with iron piping. Tuberculation causes pipes to become clogged with these small mounds of corrosion products resulting in increased pumping costs and a reduction in distribution pressure. In severe cases, it can cause leaks in the piping. Sprinkler systems are also susceptible to corrosion. The National Fire Protection Association (NFPA) recommends that an inspection of piping and branch line conditions be conducted every five years.

18. Fuel oil leaks.
Leaking oil tanks could contaminate the ground beneath. In the case of leaks, not only is it a fire hazard or could create slick areas, you're losing fuel before it's utilized, resulting in costly materials expenses.

19. Diluted glycol.
Glycol is used in hot water and chilled water systems to prevent the water from freezing under cold conditions. Over time, the chemical composition of the glycol deteriorates, lowering its freezing rate, increasing the risk of piping systems freezing. The glycol solution percentage should be measured periodically to make sure the freezing point is where it should be.

20. Combustible materials near boilers.
Many boiler rooms become storage areas. Be aware that paint cans, fumes, cleaning agents and other dangerous materials can combust, causing extensive damage or personal injury.

21. Gauges on expansion tanks.
Hot water expands and the job of an expansion tank is to compensate for this. The tank has a diaphragm seal, allowing one side to fill with water and the other to fill with air. The air side is generally equal to the system pressure. As the water

expands, it exerts pressure on the diaphragm instead of putting stress on the piping system. These diaphragms release pressure from the air side into the water side at the rate of approximately one pound per year. Expansion tanks needs to be inspected annually to ensure the system is operating under optimum conditions.

22. Dirty strainer baskets on suction diffusers.
Many pumps on hot water systems have suction diffusers which have strainer baskets to filter the water coming back into the pump. If these are not cleaned periodically, especially following initial system startups, debris can accumulate inside the strainer over time. This can affect pump flow and can cause unnecessary strain on the pumps. This, in turn, can result in the pump not being able to deliver the proper amount of water flow through the system to keep the piping warmed or cooled properly.

23. Cores not fire-proofed.
Cores are holes "cored" through a wall to allow a pipe to enter through. These cores need to be fire-proofed or a fire within the building can easily spread to other rooms. The space around the piping should be fire-proofed to prevent the spread of flames through the cores.

24. Leaky regulators and purge valves.
Regulators are designed to reduce the high pressure of a gas inlet in conjunction with a diaphragm. If the diaphragm malfunctions, a constant flow of gas will escape the system. This gas had been paid for, but not utilized. Purge valves work like a solenoid valve and, over time, may fail, causing the valve to remain open. If the purge line is located in a low-traffic area, a rooftop for example, a gas leakage can remain undetected for a significant amount of time.

25. Vent piping creating a buildup of CO2.
New boiler types are vented directly to the atmosphere. If vented too far below or close to grade, high levels of snow or other obstructions can cause the vent to be blocked. If the system is not venting properly, carbon monoxide can buildup in the facility. Called a "silent killer," the gas cannot be detected by smell. In industrial boiler rooms, a break in the breeching can cause the same buildup of carbon monoxide.

26. Steam traps not functioning properly.
If a steam trap is not operating correctly and is stuck open, the steam is not allowed to condense properly before returning to the feed tank. The steam could be traveling through the condensate lines, thus wasting the steam.

If a trap is stuck closed, the steam could flood or fill the line, resulting in condensing water being present in the steam line. The system could operate at a hotter temperature than normal and there would be a reduction in the heat transfer the system is designed for. In addition, high levels of condensing water in the steam system causes unnecessary wear and tear on the piping.

27. Outside cores not sealed.
In cases where gas lines and other mechanical piping must exit the exterior building wall, the spacing between the piping and core itself is very often not sealed properly. This results in a high level of heat loss from the building to the exterior.

28. Leaky or plugged air vents.
Air vents will develop leaks over time and could cause damage to ceiling tiles and insulation. If the vents are not operating properly, they could become blocked. This can result in air becoming trapped in the system, which could cause the flow of water to stop.

29. Compressed air leaks.
The Department of Energy (DOE) estimates that $5 billion per year is wasted on electricity due to compressed air leaks. One of the most popular connections, called “quick connects,” often leak. Even a 3/8” connection at 100 PSI can result in a very expensive leak.

30. Restroom problems.
Many of the restrooms we encounter on the job lack the installation of water hammer arrestors. Using quick opening and closing valves makes the water flow stop quickly, which could cause water hammer to flow back in through the line. Some lines have even blown apart due to water hammer. Also, many restrooms have electric hot water tanks that were originally sized for 60 people when the facility has since down-sized to 20 employees. These high-volume tanks are extremely inefficient for fewer users and savings could be made by installing a high-efficient hot water tank instead.

These system failures can typically be mitigated with regular maintenance and scheduled service by a professional piping company. Since 1971, we have been helping companies like yours build and maintain their systems. Contact us today for a free consultation.

How can we help you? Call 508.644.221 or email us…

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Checklist

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