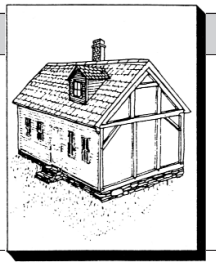
Things You Should Know About Old-House Plumbing



by Gary Feuerstein, P.E.

Wood develops a patina as it gets old; plumbing develops leaks. In other words, plumbing is one thing that doesn't get better as it gets older. From the moment they are put into use, pipes, seals, and fixtures begin to deteriorate. Throw in a remodeling or two, and it's easy to imagine that the integrity of a 60-year-old-plus system may be less than perfect.

Serious hazards lurk in plumbing that was installed or adapted improperly. Leaks and noise are minor irritations compared to the contamination of supply water or the escape of dangerous gases into a building.

Old plumbing isn't all bad news. Fortunately, the piping networks—the key part of the system—usually were made of the best-quality materials and installed with expertise. Good old piping often invites renovation rather than replacement.

Cast-iron waste pipe and copper or brass water lines, common in old houses, are still regarded as the premier materials. Even galvanized pipe, today regarded as inferior and banned in some cities for new construction, tends to have a thicker, more resistant coating in old installations.

On the other hand, inevitable repairs over the years probably haven't matched the system design, materials, or quality of the original features. Also, many old practices and materials are now seen as inferior. A post-Victorian house undoubtedly still contains some or most of the early plumbing. In even older homes, indoor plumbing was a later addition, and compromises must have been necessary just to make things fit.

All this is to say that old-house plumbing can have hidden blessings or be an expensive curse. Some flaws require pipe replacement; other problems can be remedied by maintenance or selective pipe repairs.

Waste Piping

Problem	Cause	Cure
Clogged drain or slow drain	Blockage	Plumber's helper or drain cleaner.
	Inadequate drain grade	Realign waste pipe to a minimum ¼-inch pitch per foot of run.
	Inadequate waste or vent	Replace or install piping to suit requirements.
Odors	Poor venting	Replace or install piping to suit requirements.
	Trap evaporation	Use trap regularly or install trap primer.
Noise	Normal operation	Insulate pipes or replace plastic or copper with cast iron.

Do wastes drain rapidly? Does the house smell okay? The chart above delicately explores the causes and cures of waste-pipe problems common to old houses.

Common Supply Problems

Noise and Pressure Loss

Besides routine maintenance of faucets, the most prevalent water-supply troubles result from pipe deterioration.

Corrosion is most pronounced with galvanized iron pipe. As the iron corrodes, iron oxide literally grows inward from the pipe wall. The interior of the pipe becomes restricted. The same volume of water must pass through at higher speeds and greater pressure losses, resulting in increased noise (or "water hammer") and lower pressure at the fixtures. Eventually, the pipe may become completely plugged, eliminating the noise but also eliminating the flow of water!

If you suspect blockage, the piping must be opened and inspected at a convenient location. Replace pipe as needed. Cleaning is rarely an effective, long-term solution.

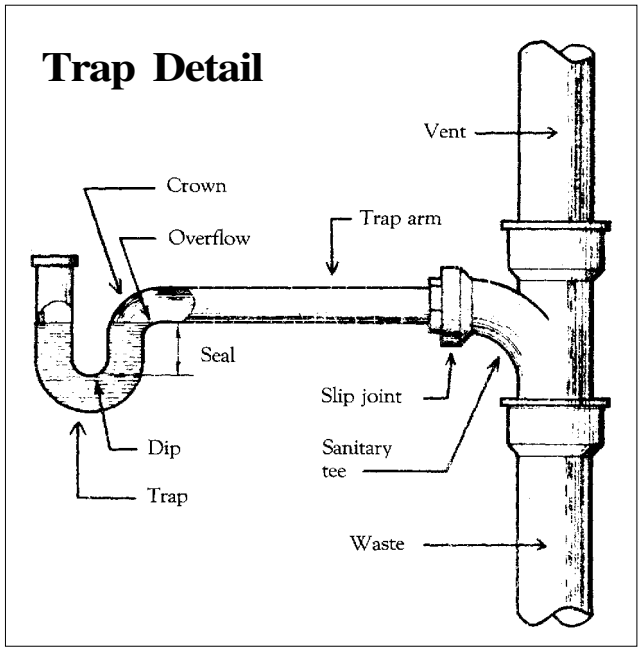
Pressure-loss problems also are caused by plumbing additions over the years for which the original service or piping was not intended. If pressure drops below the minimum, flow may become erratic, causing temperature fluctuations and poor water service at the faucet.

Noise in the system also can be caused by piping which is not properly secured. When water flow is stopped abruptly, as it is when a faucet is shut off, a dangling pipe will bang and rattle. Adding more pipe hangers alleviates this problem.

Another solution to water hammer—regardless of its cause—is to install an air chamber along the supply line near the fixture. There are several different kinds of air chambers, but they all work as a simple cushion, absorbing the shock of the abrupt flow stoppage.

Some old fixtures may have capped air chambers that are no longer effective. If it seems necessary, a plumber can install rechargeable air chambers on the hot- and cold-branch water lines, or add special shock absorbers to the system.

Copper or brass piping does not corrode as aggressively as galvanized. But problems can develop where these pipes connect to fixtures, valves, or piping of a different metal. Contact between dissimilar metals sets up conditions for electrochemical reactions called galvanic action, which corrodes metal. The result is a restriction of flow area in the pipe, higher velocities, and pressure drops—just as with internal rusting. The difference is that galvanic corrosion is both more rapid and more confined, generally occurring only at the immediate area of contact.



Lead Piping

The use of lead piping was a popular water-supply practice as late as 1940. It has since been recognized as a health hazard.

Once so characteristic of water/waste systems that it lent its name to the activity ("plumbing" is derived from the Latin *plumbum:* lead), lead is now known to contaminate the water supply. The contamination is a potential source of lead poisoning, a cumulative ailment.

Lead is identified by its gray color—silver when scratched—and its relative softness. It should be replaced if present.

Because of its flexibility, lead was especially popular for the main service connection at the meter. It's hard to determine whether an individual service is lead without digging it up, but water utilities often will provide the information. At the least, they can confirm the date of installation and give you an idea of the materials that were used at that time.

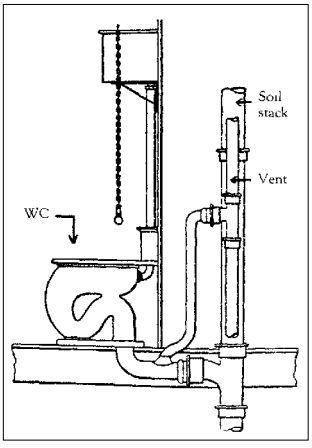
Common Waste Problems

The waste-system piping is subject to the same corrosion as supply lines. Although the conditions in each system are fundamentally different, the result is similar: piping must be replaced after corrosion has reached an unacceptable level.

Corrosion in waste pipes shows up as leaks or slow drainage. Extensive corrosion is visible at joints and fittings. Likewise, if you don't see apparent corrosion at joints and fittings, replacement of piping is probably unnecessary.

Horizontal drain lines must be installed with a minimum pitch toward the sewer. This seems obvious, as liquid ordinarily does not flow uphill. But in old houses where settlement has occurred, it often is necessary to realign the waste piping to assure that all parts of the system pitch to the drain point with a minimum slope of ¼ inch per foot.

Much less apparent is inadequacy in the trap and vent system. The drainpipe is connected to a sewage-disposal system, which has the capacity to generate unfriendly vapors (a fiendish mixture of methane—an explosive gas—with other gases, acids, and caustics). The vapors move



throughout the waste plumbing system and, if unchecked, will enter the house.

Traps hold the last of a waste discharge to form a seal against entry of these sewer gases. The gases can then migrate to the atmosphere through the vent system. At least that's the way today's accepted plumbing systems work.

Vents also protect the traps from being siphoned dry. Older plumbing usually incorporates some kind of trap, but vents were once considered optional. Consequently, the traps did not always do their job.

As a volume of water runs down a waste pipe, it creates a higher air pressure on the downstream side and a lower pressure upstream; in other words, it compresses air ahead of itself and creates a vacuum behind, as would any solid body moving through a fluid. Without adequate venting, that vacuum allows atmospheric pressure to push the trap liquid into the waste system, thereby destroying the water seal and leaving an open channel for sewer-gas migration into the house.

Such siphoning might occur only under some situations, such as the emptying of a big plug of water all at once. How to resolve a sewer-gas problem, therefore, can be quite a mystery.

Old houses are vulnerable for two reasons: 1) The plumbing may have been installed originally without proper vents; 2) Plumbing additions may have compromised the integrity of the vent system. A similar problem occurs with seldom-used fixtures, such as floor drains. Trap liquids evaporate over a period of several months; if they're not replenished, loss of seal may occur.

A trap primer (essentially a constant trickle of water) often is installed to eliminate the possibility of evaporation. If odor problems plague an old house, examine each fixture's trap and vent. You'll have to open the wall and see whether it's vented.

Cross Connections

Contamination of potable water is the most serious potential hazard in plumbing. A review of old-house plumbing afflictions is not complete without an explanation of cross connections. Because it's likely that much of the plumbing was done before cross-connection potential was fully understood, old houses are particularly susceptible. It most commonly occurs through siphoning.

An example: During a 1920s remodeling, a bathtub was installed without an overflow drain. Furthermore, the faucet was installed in such a place that it's possible to fill the tub so the water level covers the faucet. If, while the tub is being filled and the water is already up over the faucet, there's a pressure drop due to routine demand from another fixture, the tub water could be siphoned into the supply lines.

Primary sources for concern are leaky underground pipes, hose connections, and underground lawn sprinkler systems. In short, any time there is no break between supply water and non-potable water, the potential exists for cross contamination. Backflow preventers or vacuum breakers can be installed where you suspect cross-connection potential. ■

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Water Supply

Problem	Cause	Cure
Leaky valves and faucets	Normal wear	Replace washers.
Leaky pipes and tanks	General corrosion	Replace pipes, fittings, or tanks.
	Dissimilar metals	Replace damaged material. Isolate different pipe materials with dielectric unions. Examine piping for general corrosion.
No water	Dead water supply	Contact water utility or remedy well problem.
	Plugged pipe	Backflush lines and/or replace piping. May indicate more extensive problems. Flush lines thoroughly prior to continued use.
	Frozen pipe	Thaw, then insulate, bury, or trace with heat tape.
Low water pressure	Corrosion or improper line size	Replace piping with adequate size and quality.
	Low supply pressure	Contact water utility or adjust well-pump discharge pressure. Booster pump is a last resort for this problem: cost, about $250.
Noise	Dangling pipes	Install additional pipe straps.
	High water velocities	Replace piping with adequate size and quality.
	Water hammer	Install shock suppressor.
Dirty water	Water source (dirt and sediment)	Contact water utility or remedy well problem. Bad omen: indicates possible contamination of water supply. Well may require investigation by municipal or private experts.
	Corrosion (rust)	Replace pipe or fittings. May indicate significant problems in supply piping. Investigation appropriate.

Does the old plumbing work? That question can't always be answered with a confident "yes." The plumbing may need work that falls somewhere between routine maintenance and full replumbing. These charts indicate the true nature of common ills.