

## Repiping or Epoxy Lining? Strategies to keep commercial plumbing systems running smoothly

By Skip Wolfe



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It's easy to take a building's plumbing system for granted, so long as water keeps flowing. Yet leaky pipes, low water pressure and stained, discolored water are all signposts to larger piping issues – possibly even system-wide failure. The longer these issues linger, the worse they can get.

Some plumbing systems perform well for years, while others fail well before their design lifetime. Why? The answer hinges on three variables:

### 1. Design and installation

According to the World Health Organization, a plumbing system's durability depends on the quality of its component parts, and the assembly skills of those who install them. Having one without the other ultimately yields an inferior system.

### 2. Material type and quality

Domestic water pipes in older structures are likely made of lead, galvanized steel or copper. In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8%. However, this so-called "lead-free" brass can still legally contain up to 8% lead, and plumbing systems installed prior to 1986 can contain high levels of lead from both plumbing components and lead solder.

Galvanized pipes will corrode over time due to high levels of zinc or iron in tap water. They will discolor water, impart a "metallic" water taste, and develop poor flow from mineral buildup blockage. Despite its historic acceptance among plumbing professionals,

copper piping is also subject to failure from pinhole leaks.

### 3. Water source and composition

There are currently more than 75,000 public water systems in the U.S., and each processes water containing unique attributes. Compliance with federal standards and regulations is key to assuring safe drinking water, yet inherent features of water, including pH, oxygen content, alkalinity, chlorine, chlorinated by-products and even temperature, can all affect metallic water pipes to varying degrees.

Like other building system components, pipes, valves and fittings will not last forever. Pinhole leaks form, interior surfaces break down, and rust and other potential contaminants accumulate. Left untreated, these conditions can taint drinking water, impede water flow, and cause mold to develop in unseen damp areas. Eventually, they can even cause building-wide problems.

Some issues can be solved by fixing a single valve or section of a piping system. If a professional determines that spot repairs are not feasible, there are three basic options to consider:

### Repiping with copper

For more than 70 years, copper has been the conventional piping material of choice for plumbing professionals,

owing to its corrosion resistance and relative flexibility. Copper pipe is light and rigid – it doesn't sag over long runs and it requires fewer supports. Manufacturers also offer a 50-year warranty against manufacturing defects, though corroding and associated failures are not covered.

Repiping with copper requires cutting into walls and ceilings. Once piping work is complete, it's necessary to restore drywall, tile work and painted areas. This can be time intensive and costly – especially in older buildings and historical structures. Additionally, repiping in such structures often entails dealing with asbestos, thus increasing time and cost burdens.

### **Repiping with plastic**

Plastic pipes are marketed as a more flexible, easier-to-install alternative to copper. Proponents also note that copper requires a torch to solder pipe and fittings together, while plastic systems employ a solvent cement joining system, thus mitigating potential fire risks during installation. Accepted plastics include PVC, chlorinated PVC (CPVC), polybutylene, polyethylene and cross-linked polyethylene (PEX). CPVC and PEX are now approved to all national and most state plumbing codes.

Despite its inherent qualities, plastic repiping still presents many of the same installation challenges as copper repiping – especially for aging structures. Additionally, critics of plastic repiping argue that the solvent-based adhesives used to join pipes contribute to air pollution and breakdown of atmospheric ozone.

### **Epoxy lining**

Lining copper, galvanized steel, lead, cement and cast iron pipes with epoxy

coating offers the immediate benefit of restoring existing plumbing lines without ripping them out. The process itself uses treated, pressurized hot air to fully dry pipes which are then sandblasted to clean away potentially unhealthy debris and corrosion build-up. Finally, epoxy coating is blown through the pipe, creating a seamless and sanitary barrier on its surface.

Because existing pipes are buried within the infrastructure of a building – or in the case of exterior pipes, beneath landscaping and hardscape

*Some issues can be solved by fixing a single valve or section of a piping system. If a professional determines that spot repairs are not feasible, there are three basic options to consider: repiping with copper, repiping with plastic or installing an epoxy lining.*

– lining can be more cost-effective than repiping while generating far less landfill waste. Typical lining installations may also be shorter in duration than repiping projects – some epoxy products feature cure times that enable water service to be returned, if necessary, on the day of installation. Additionally, epoxy lining can provide protection from future corrosion, the process is less intrusive to tenants, and it protects users from impurities associated with pipe deterioration.

Epoxy lining has gained steady traction throughout the U.S. during the past decade. Still, the materials your

plumbing contractor uses should be formulated for broad-range corrosion protection; they should be safe to use in hot and cold potable water systems; they should be certified to meet ANSI/NSF Standard 61, the government's safety standard for safe drinking water; and they should be approved for use in pipes where the water temperature can reach up to 180 degrees Fahrenheit.

Which alternative is best? Certainly, the pipes themselves are a determining factor. Some may simply be too damaged to be epoxy lined; they must be replaced. Others have the structural integrity necessary for lining. The answer also depends on factors relevant to your building – from its layout and material composition to the diameter of your pipes and their location throughout the structure. Additionally, you should understand your timing and budgetary parameters, as well as municipal rules governing the renovation of older and/or historical structures.

Even if problems aren't evident, owners and managers of commercial, industrial and multi-family structures would be wise to have a master plumbing professional evaluate the health and performance of their current plumbing system, diagnose potential issues before they become all-out crises, and suggest appropriate remedies – whether they be spot repairs, repiping or relining. **P**

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