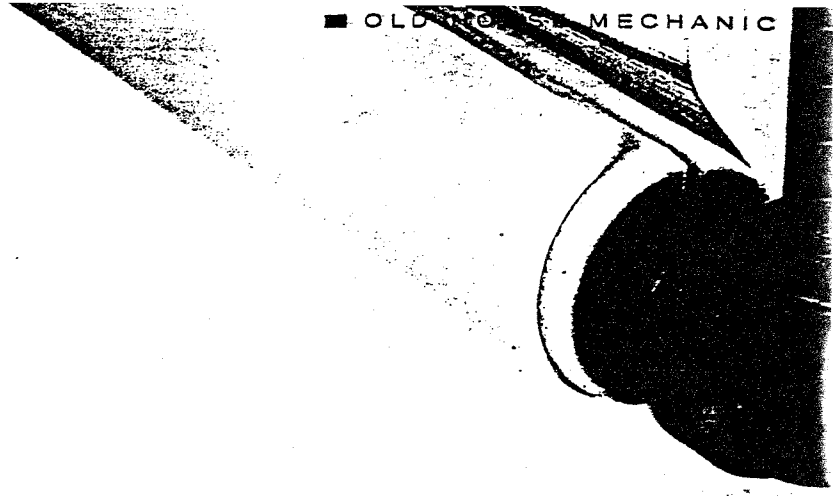


Tuck in Your Steam Pipes *by Dan Holohan*

Those insulation blankets suspended from your basement ceiling are as much a part of your heating system as the boiler. Here's why you need to keep your pipes under wraps.

When you take an old house under your wing you may also take possession of a steam heating system and the old asbestos pipe insulation that goes with it. Some old-house owners choose to contain these asbestos "blankets" by carefully wrapping them in plastic. But let's suppose someone already removed the old insulation from your steam pipes. Are you going to replace it?

You should if you don't want to wind up with an undersized boiler. With an undersized boiler, the rooms in your home will heat unevenly. Some will never get warm enough; others will be too hot. If your thermostat is in a room that has a cold radiator, your fuel bills will probably also increase because your burner will run longer than necessary. You're also liable to get water hammer noise, especially if the asbestos abatement folks didn't do a good job of reattaching your pipe hangers. Sags in the pipes cause water to form puddles, and puddles cause problems in steam heating systems.

STEAM PIPE PHYSICS Steam, you see, is a hot gas that desperately wants to give up its latent heat energy (an amazing 970 BTUs per pound!) and turn back into water. The steam will give up that tremendous amount of energy to anything that is colder than itself. When steam leaves your boiler it's roughly 215 degrees F. That's hotter than just about everything else in your old house, right? So when the steam hits a cold pipe, it will quickly make that pipe hot by condensing on it and releasing its latent heat energy.

As soon as the steam condenses it stops moving because, at that point, it's no longer steam. The colder the pipes in your home, the faster the steam will condense on them. That's why the builders of your old house covered your steam pipes with an asbestos "blanket." Like a thermos bottle, insulation keeps the steam hot; it prevents it from condensing too soon. Those long-gone installers wanted that steam to stay hot so that it would travel farther—particularly to your upstairs bedrooms. You don't need your basement to be 90 degrees, do you?

Insulation makes a huge difference when it comes to steam mains. Suppose you have a 2-1/2" steel main that runs around your basement. Let's say it's 50' long. Okay, the original installer covered that main with a 1" thick layer of asbestos insulation years before you were born. That was pretty standard practice. When the air in your basement is 70 degrees, the heat loss of that insulated main is going to be about 2,450 BTUs per hour. Naturally, if the air in your basement is even colder, the heat loss from the main will be greater.

Now, take the insulation off that pipe and the heat loss of the pipe jumps to an incredible 13,250 BTUs per hour—more than five times the prior heat loss! If your basement is colder

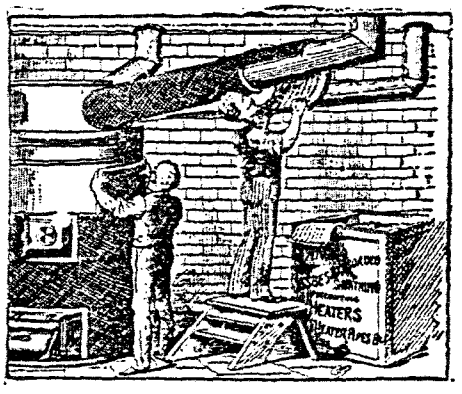
It's simple to keep your steam pipes hot with lengths of manufactured insulation that seal with an adhesive strip, or just batts of wall insulation bound with tape.

ROB HUNTLEY/LIGHTSTREAM

Always remember that when you remove—and don't replace—any type of pipe covering those pipes become radiators. They'll quickly turn steam into water because they're in full contact with the relatively cold air in the room.

(or if that main runs through a cold crawl space), the heat loss will be even more extreme. That's why your basement is a cozy 90 degrees, even though you're freezing in your bedroom.

As I said, the load that uninsulated pipes add to the system can effectively undersize your boiler. When heating contractors size replacement steam boilers, they have to make sure the boiler's ability to produce steam matches the system's ability to condense steam. It's like having an evaporator and a condenser in an air conditioning system. In this case, the boiler becomes the evaporator, and the system becomes the condenser. If the "condenser" (the system) is bigger than the "evaporator" (the boiler) the boiler can run for a long, long time before it shuts off because it will never develop any pressure. This will be most apparent during the spring and the fall because the boiler has to overcome the heat loss of the bare pipe every time it starts. During the winter months, when the boiler runs for a longer time, the pipes won't have the same opportunity to cool off, so the problem won't be as noticeable. Spring and fall, though, will drive you nuts.



By the 1890s, asbestos blankets were thought to be the ideal covering for all types of heating systems. Nowadays we know better, but steam pipes still need some sort of insulation.

LOSS OF PICK-UP The heat loss of the piping is what steam boiler manufacturers call the "pick-up" factor. When they rate their steam boilers they allow for a piping "pick-up" load that's equal to 1/3 of the system's total radiation load. In other words, they measure how much radiation you have in your home, and then they add 1/3 more boiler capacity to allow for the heat loss of the pipes that connect your boiler to your radiators.

They base this 1/3 "pick-up" factor on insulated mains because steam mains are supposed to be insulated. When the insulation's gone, the "pick-up" factor the boiler manufacturer built into the sizing chart will suddenly be too small. That's how the same boiler that's been sitting in your basement for years suddenly becomes undersized, and your rooms cold.

So insulate all the steam pipes you can see in your home. Tuck 'em in and keep 'em warm. Most plumbing suppliers and good hardware stores sell retrofit pipe insulation products that are non-asbestos and easy to install.

The insulation doesn't have to be fancy to work either. You can use something as simple as batt insulation and duct tape if the aesthetics aren't important. (Who cares what it looks like in that crawl space?) Install the fiberglass insulation so it's one layer thick, leaving the paper or foil as the outer covering. Your goal should be to give steam the best possible chance to get to where you are. Here's to a cozier you!

DAN HOLOHAN *is the author of* The Lost Art of Steam Heating *(order at 516-942-7271 or www.danholohan.com).*