FROM THE FIELD

Legacy systems

BY DAN FOLEY CONTRIBUTING WRITER

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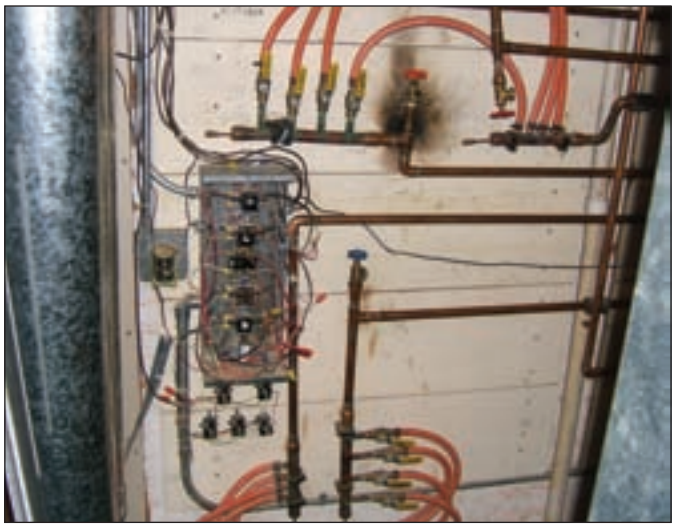
My company runs a service department in addition to doing installation and new construction work. In the course of running service calls, we often run into products and systems that have been discontinued or manufactured by companies that are no longer around. Some examples of these obsolete products that we run across from time to time are Monitor MZ boilers, Hydro Pulse boilers, Glow Core boilers, Amana HTM systems, and various lines of radiant tubing that are no longer on the market. It can give you a headache just trying to figure out what you are working on, much less how to fix it.

It would be nice if we could just replace these obsolete units or systems, but it is not always so cut and dry. Sometimes, the client does not have the budget to replace the system at that time. In the case of the radiant systems, the tubing is buried under floor coverings, behind walls, and under concrete slabs. In these cases we have to make the best of what we have, and make it last as long as possible.

One type of product that has given us a particular challenge is the rubber radiant products that we still run across. We still see Heatway Entran, Twin-Tran, Bio Energy, and SolaRoll EPDM rubber systems in the field. Most of these tubing products did not incorporate an oxygen diffusion barrier, which caused a lot of problems in closed loop hydronic systems. Oxygen would diffuse through the tubing wall and cause corrosion on the ferrous components of the hydronic system.

One such system was a project I inherited about six years ago. It turns out it was a job I bid on back in the early 1990s. I didn't get it, but I certainly recognized the project as soon as I walked up to the front door. It was a 1890s four-level Italianate row house in Georgetown, approximately 7,000 square feet. When the gut remodel was done in 1991, miles of orange rubber tubing was installed in a staple-up manner under the floors.

When I was called in to diagnose a problem with the heating system 15 years later, I was faced with multiple issues. The two cast iron boilers were rotted out and leaking. Several pumps had stopped working. When I split the volutes apart, I found them caked with rust and corrosion. The expansion tank had pinholes and was dripping. Even on zones with working pumps, several loops had no flow through them.



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At the manifolds, several of the barbed fittings were leaking. The tubing was becoming hard and brittle for several inches above most of the manifold connections (See Photo 1). Mixed water temperature was controlled through manually set thermostatic mixing valves. These were scaled up and corroded and no longer functioning properly, allowing 165 °F supply water temperature to the manifolds.

My solution:

There are several ways this system could have been saved. Here was my solution to this sticky problem. First, we gutted the entire mechanical room. We did not re-use any of the existing components, valves, specialties, etc.

Boilers and piping

We installed two modulating, condensing gas boilers with integral staging and reset controls. These boilers feature stainless steel heat exchangers. Y-strainers were installed on the returns at each boiler to capture any grit or debris in the system water. The rubber tubing degrades, hardens and becomes brittle quicker at higher supply water temperatures. The boiler reset control was step one in my strategy to minimize the supply water temperature and prolong the tubing operational lifespan.

We replaced all of the boiler room and mechanical room piping, valves and fittings that were accessible. The only existing piping that was re-used was that which was buried behind walls and under the floors.

Manifolds

The existing copper manifolds did not allow for individual loop isolation or purging. In addition, the

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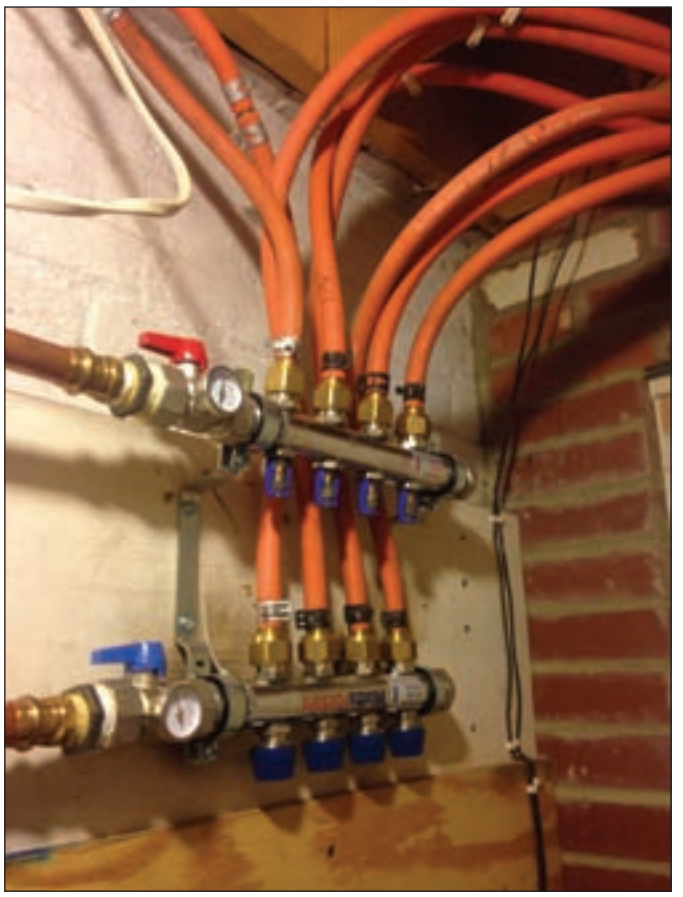


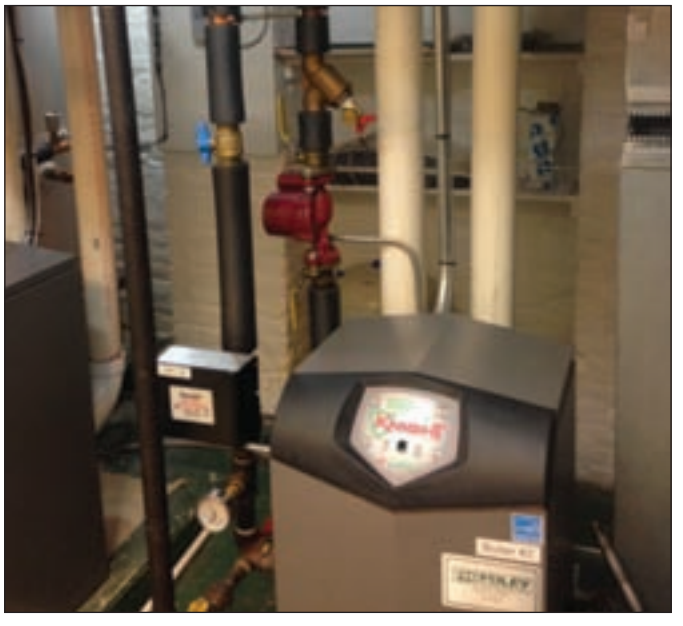
All the manifolds were replaced with new stainless steel manifolds with integral balance and isolation valves.

tubing was getting brittle and discolored near the barb and clamp connections. I chose to replace all the manifolds with new stainless steel manifolds with integral balance and isolation valves (See Photo 2).

We cut back the tubing to make the new connections on fresh, flexible tubing. As some of the loops were clogged with iron oxide and system debris, these valves were necessary to purge out the clogged loops. We installed purge, drain and isolation valves as well.

Radiant controls

A critical change from the original design was the use of weather responsive mixing controls along with 3-way floating action motorized mixing valves. There is one control and one mixing valve in each of the two mechanical rooms. Just like with the boilers, the idea is to minimize supply water temperature to the lowest that will heat the structure. The lower we can keep the temperature, the longer we can keep the rubber hose from becoming hard and brittle.



After the system was clear, refilled and purged, we introduced two gallons of boiler treatment.

Flushing and water treatment

Several loops were clogged with iron oxide and debris. We got lucky and were able to flush them out with house pressure water once we were able to isolate the loops with the new manifolds. It took a while to flush all the junk out of the system. The water coming out was a reddish-black color with a distinct, unpleasant odor. After all the loops and zones ran clear, we filled and purged the system.

The next step was to introduce Rhomar Hydro-Solv 9100 hydronic system cleaner. We pumped two gallons into the system and let in run for a couple of days. We then returned and flushed the remaining rust, scale and debris out of the system until the water ran clear. The Rhomar had a visible effect on the system and the water was a rich chocolate-red when first purged out of the system.

After the system was clear, refilled and purged, we then introduced two gallons of Rhomar Pro-Tek 922 boiler treatment. This treatment acts as an oxygen scavenger and corrosion inhibitor prolonging the life of the tubing and the ferrous components of the system. It also maintains system efficiency by preventing corrosion debris from fouling the system.

The flushing and treating of the system water added a day to the job and the expense of the treatment chemicals, but it is an absolutely essential to passivating the system and ensuring useful operation and longevity of the rubber hose systems.

This system was restored in 2006 and is still operational. We service it every year and boost the treatment level when necessary. Something is still happening internally as the strainers need to be flushed annually but the system as a whole is still 100 percent functional. I was at this site in early January, and other than flushing the strainers, all appears to be well. I do have to admit the amount of gunk in the strainers has me concerned, but also keep in mind the original radiant system is now 20 plus years old.

I have seen these types of systems fall apart in less than 10 years. We were once called to look at a rubber hose system in a radiant slab. The manifold was tapped directly off the oil boiler that was running at 180°F with no mixing valve. After isolating the radiant zone due to leaks, the leaders were so brittle they could be snapped in two like a breadstick. If properly controlled, serviced and maintained, who knows how long these systems can last. The oldest one I still service was a low temperature slab radiant system installed in 1989, and it is still functional. But, the client is wise enough to have us maintain it annually.

I recognize that there are many other ways of dealing with this type of system. I hope that sharing my solution with you has been enlightening. ●

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