

# REPAIRING RADIANT HEATING—AN EFFECTIVE METHOD

Roland Reisley

After 1936 Frank Lloyd Wright specified radiant heating in most of his designs. Hot water circulated in pipes buried under the concrete floor enables a particularly comfortable winter, environment marked by lower air temperature, higher humidity, less dust and the pleasantly warm floors. Unfortunately, over 40 to 60 years, some of these systems developed leaks that, unlike expose radiators, may be difficult to locate and repair. The perceived difficulty and the shibboleth, “don’t bother, one leak will soon be followed by more” has led to premature abandonment of some radiant systems. Replacement, too, is difficult, expensive and often architecturally devastating. Building owners should note that, in many cases, **leaks can be located** and repaired and that many “plumbing and heating” contractors do not have the knowledge or patience for these tasks.

Maintenance of the aging radiant systems is the most serious concern that is common to so many Wright buildings. This ongoing issue was discussed in 1998 Bulletins, Volume 7, Nos. 2, 3. Breaking into and restoring concrete floors is scary, but not very difficult or expensive. The hard part is locating a hidden leak. With luck, it might be an easily found wet or hot spot. Or it may be audible. The sound of escaping water or air can be detected in many ways from simply the unaided ear to stethoscopes to sophisticated ultrasound receivers. [Commercial/industrial leak finders use high pressure to hear leaks. This method however may be destructive.] Even so, locating the leak will likely require patience and some skill.

In the Reisley House (1951, 1956) the radiant system, Rayduct (steel) pipes, the original 1951 installation has not leaked. The 1956 addition however leaked in 1988 and again in 2000. Both were successfully repaired. In 1988, after months on my hands and knees with a stethoscope and only vaguely identifying a warm area, I gave in, increased the water pressure from the normal 15 pounds to 45 pounds which confirmed the location.

In the late 1990s, occasional slow leaking was stopped by infusions of Boiler Liquid (stop-leak) but soon, it was time to find the leak. One area, about 200 square feet, seemed warmer than the rest, but nothing could be seen or heard. A knowledgeable plumber<sup>i</sup> suggested the following system:

Attach an air compressor limited to 20 psi. Then fill the system alternately with air and water. Brief intervals of turbulence, noisier than a steady flow of air or water, should occur at the leak. After some repeated cycles it was possible to confirm the sound in an area of four or five square feet. The floor in this case was terrazzo, much more difficult to repair than concrete. Hoping to locate the leak more precisely, a valuable new tool was discovered.

Stethoscopes, the most commonly used leak detectors, frequently are not effective. They are intended for low pitched sounds, heartbeats, etc. Leaking water quietly makes many sounds that are ultrasonic, that is beyond the range of human hearing. Sensitive electronic instruments however can detect them. UE Systems, Inc.<sup>ii</sup> manufactures a variety of ultrasound detectors. [www.uesystems.com] Their Marketing VP, Alan Bandes, agreed to demonstrate the equipment in our efforts to locate the leak, exactly. Illustrating its sensitivity, the blink of an eye at a distance of 10 feet was received as a loud click.

Joining our plumber expert, Mark, Alan moved the “Ultraprobe” around the suspect area [Figure 1], stopping at the loudest point. Mark “attacked” at that point [Figure 2] and soon uncovered the leak. It was in a bend, perhaps a weakened stress point. [Figure 3] The pipe was replaced, surrounded with gravel and covered with concrete to an inch — below the surface leaving room to replace the terrazzo. [Figure 4] Correctly locating the leak limited damage of the floor to a single module — and the heating system is working perfectly.



Fig. 1. Searching in the suspect area.

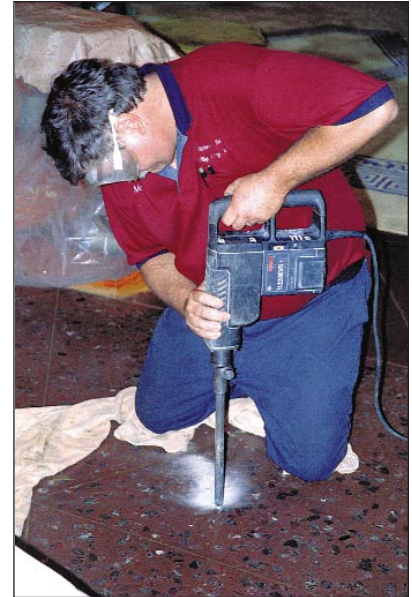


Fig. 2. Breaking in.

Ultrasonic detection is probably the most effective and practical method for locating hidden leaks, but it should not be considered a “magic wand”. The instruments are now in the hands of a number of franchised practitioners. Nevertheless, diagnostic “art” and patience will almost always be key to success.



Fig. 3. The bend that leaked (external corrosion).

<sup>i</sup> Mark Roberto, of Richard Bell Plumbing & Heating, Millwood, NY

<sup>ii</sup> UE Systems, Inc., 14 Hayes Street, Elmsford, NY 10523



Fig. 4. Accurate location limited damage to a single module.