



Got ghosts in your pipes?

Taming a potable tsunami

Are your customers hearing sonic waves? Catching the culprit may be an easy arrest . . . and you'll be an instant hero.



At some homes and buildings, there's an annoying echo that sounds long after the last hammer is swung. In some instances, it's as forceful as a sonic boom. Another variation sounds like ghosts rattling chains in the wall.

Water hammer, and a variant of somewhat lesser annoyance – water chatter – are terms that describe the audible, rock n' roll world of piped systems big and small.

After a sudden valve closure, a shockwave passes back and forth through the water column at roughly 4,500 fps, like a mini tsunami, causing the vibrations known as water hammer.

"When water hammer happens, energy forces may cause damage throughout the piping system by the sudden shaking, pipe expansion and contraction," says Steve Hamoen at Zonelife Inc., a mechanical installation and engineering firm based in Cambridge, Ont.

Damage can happen all along the piped system, not just at the point of stoppage. The weakest points in the system, typically where fittings are soldered, are most affected by the impact. If left unchecked and leaks develop, water hammer can move from being a simple annoyance to an expensive hazard.

According to Bob Bilodeau of Watts Water Technologies, the most common cause of water hammer is the quick closing of a valve within a plumbing fixture – most often

Water Hammer

Water hammer is the term used to define the destructive forces, pounding noises and vibration that can develop in a piping system when a column of liquid flowing through a line is abruptly stopped. The tremendous forces generated at the stopping point can be compared to an explosion.



a fast-acting solenoid valve inside a dishwasher or clothes washer.

"When a piped supply of water, at 50 to 70 psi is in motion and then suddenly stops, a sonic wave surges backwards toward the supply," says Bilodeau. The problem can be especially challenging if the water piping is made of rigid copper. PEX systems tend to be more forgiving because the tubing is pliable and the shock is absorbed to some degree, but similar to copper fittings the crimped and coupled fittings can be weak links. "There's never an absolute, 100-per cent elimination of the problem," he says.

"The best solution is proper placement of a water hammer or 'shock' arrestor," continued Bilodeau. The most effective location for the device, he says, is in the supply line as close to the fixture as possible. "Typically, these are mounted in the wall very near where the line protrudes from the wall, going to the fixture."

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TOOL TIPS

A cut above

Okay, it's demolition time, and what better tool for the task than the reciprocating saw?

When it comes to reciprocating saws, there are corded and cordless options. Corded tools tend to be lighter, which can be a big benefit by the end of the work day, but cordless tools are not tethered the way that their corded brethren are, which means more versatility in where the tool can be used.

On the power side, these are designed for some heavy-duty cutting tasks, so power is important. Pro corded tools tend to start at the 10 amp level and move higher. On the cordless front, 18 volt is typically a good level of power for professional use, but there are more powerful batteries available – and lithium ion battery technology is where things have moved because of some of the benefits they bring to the table, like consistency of power.

A tool with a 3/4" stroke will offer better control and less vibration than a 1-1/8" or 1-1/4" stroke, but the cutting speed will be reduced, so weigh those considerations carefully. If you are into straight demo, then the faster stroke may be desirable. If you want more control, say for plumbing and HVAC applications, a shorter stroke may be for you.

Also consider vibration control mechanisms, like counter weights, and don't overlook the importance of quality seals and gaskets in the tool. The saw is going to be exposed to a considerable amount of dust, and any debris that enters the internal mechanics can affect its lifespan.

Don't forget the blades

Reciprocating saw blades come in a variety of sizes, materials and tooth designs. To pick the right blade, consider your application and then choose based on the number of teeth per inch, the durability of the blade material, and the pattern of the teeth.



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WATER HAMMER con't from 68

Water hammer problems became so pervasive in the province of Quebec that the installation of water hammer arrestors was mandated. For the past two years, building codes in the province now demand that all new homes must include the devices.

Mike Breault, product manager with Watts Water Technologies (Canada), based in Burlington,



Mike Breault

Ont., says that the mandating of water hammer arrestors stems chiefly from the need to solve widespread water hammer problems in new home developments.

"Quebec is a fast-growing area," explains Breault. "There are large, new subdivisions that place a strain on the water supply infrastructure. That leads to water pressure irregularity, so pressure-boosting stations are being installed. But this introduces a new challenge: higher-than-normal water pressure with some homes getting 80 psi or higher. We've learned of some homes receiving water pressure in excess of 105 psi."

Whoa: 600 psi!

The speed of the valve closure, especially during the last 15 per cent of the valve's closing, is directly related to the intensity of the surge pressure. An approximate pressure rise of 60 times the fluid's velocity is produced. So, water traveling at 10 fps could produce a shock pressure of 600 psi!

The higher the pressure within the piped system, the greater the need for system shock absorbers.

Temporary relief of water hammer shock can be achieved by installing a correctly-sized air chamber,

generally a standpipe. Although effective for a short amount of time, air chambers lose their effectiveness rather quickly, either during the flow cycle, when water travels both ways, or by the air being absorbed through turbulence. Short of draining the entire pipe system and removing the chamber, there is no way to replenish the air in the chamber.

"The only true, permanent solution to lessen the damage caused by water hammer is to install an engineered water hammer arrestor," says Breault.



A Quick Fix

"We don't run into water hammer issues frequently, but they do come to our attention from time to time," says Steve Hamoen of Zoneline Inc. in Cambridge, Ont. On a recent trouble-shooting mission, Hamoen said that water hammer noise in a home was traced back to a well pump creating too much pressure, and a bathroom valve closing too quickly.

A quick installation of a water hammer arrestor and that was the end of the problem.

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