

Silva Solutions

KEEPING YOUR BASEMENT DRY

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BY MARK FEIRER

Water that drips through foundations, seeps through masonry, condenses on cool walls, and collects in puddles on concrete floors is the bane of every home owner with a basement. Even a little water is bad news. It rusts steel support columns, weakens framing, melts cardboard, corrodes tools, and renders a basement musty and useless for anything but growing fungi. And damp basement air can permeate the rest of the house, encouraging the growth of mold, mildew, rot, and infestations of wood-eating insects. *T.O.H.* contractor Tom Silva says, "If there's water in the basement, you've got to fight it."

The first step is to figure out where the water is coming from. "Begin your detective work outside," says Tom. In his experience, some of the most common—and easily fixed—sources of basement moisture are damaged, blocked, or missing gutters that dump water right next to a foundation. Then he takes his sleuthing—and fixups—indoors (see examples, right). If leaks persist, he tries more aggressive and expensive strategies, from regrading the lot to installing a system of landscape drains. When all else fails, Tom will jackhammer through the basement floor and install an internal defense perimeter: perforated pipe leading to a pump. "Water has to go somewhere," Tom says. "And anywhere is better than inside your basement."



In this basement, the darkened concrete blocks offer a clue that water is seeping through the foundation walls. If incoming water can't be diverted from the outside, the owner will need to find ways to block its entry from the inside.

CELLAR FIXES

WET FLOOR: Water reaching the underside of the slab can pass through the concrete and into the basement. If the water can't be diverted from the house outside, drain it away with an interior French drain connected to a pump.

GAP BETWEEN WALL AND FLOOR: As a house settles, basement walls may separate slightly from the floor slab. Patch with liquid grout.

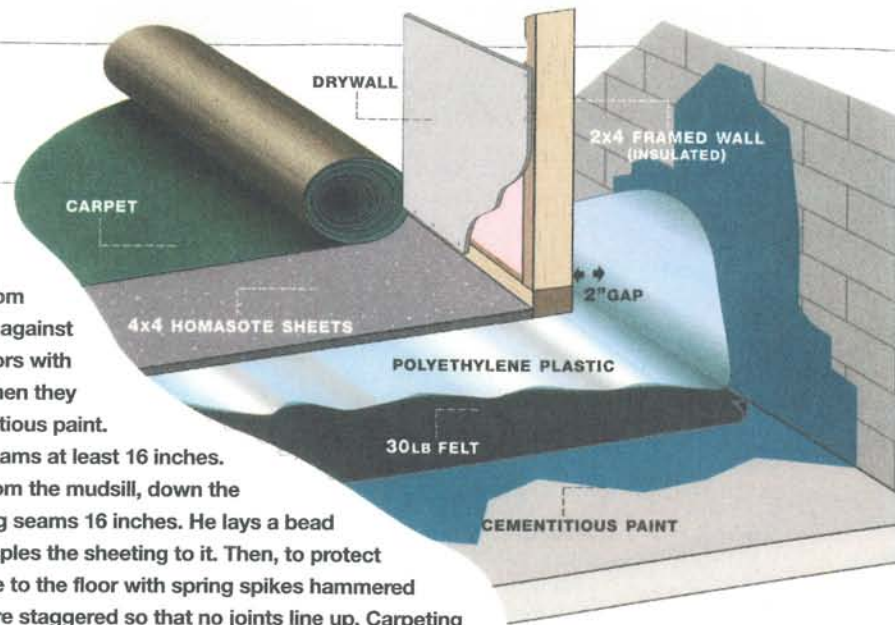
CRACKS IN WALLS: Fill with hydraulic cement.

PIPE ENTRY: Use hydraulic cement to plug gaps around drain and water-supply pipes that penetrate the foundation.

WINDOW FRAMES: Replace the rotten wood, then seal the perimeter with butyl caulk.

Finishing a Dry Basement

After all sources of water problems have been eradicated, Tom erects a multilayer defense to protect new basement rooms against future moisture incursions. First, he cleans the walls and floors with bleach and water to remove all traces of mildew and dirt. When they are dry, he covers them with two or three coats of a cementitious paint. Next, he lays 30 lb. building felt over the slab, overlapping seams at least 16 inches. A layer of 6-mil polyethylene sheeting follows; Tom runs it from the mudsill, down the walls, across the floor and up the opposite walls, overlapping seams 16 inches. He lays a bead of polyurethane or butyl caulk along the mudsill and then staples the sheeting to it. Then, to protect the plastic and isolate the cold slab, Tom attaches Homasote to the floor with spring spikes hammered into holes he drills in the concrete. The 4- by 4-foot sheets are staggered so that no joints line up. Carpeting or a floating wood floor system can follow. "Some people cover the foundation walls with rigid foam insulation and drywall," says Tom, "but it's generally easiest to insulate a newly framed wall with fiberglass." A slight gap between walls and foundation allows air to circulate so that any moisture can dissipate.



CEMENT PATCH



Hydraulic cement is ideal for patching small holes and cracks, even when water is actually flowing through. The material, a powder mixed with water to a putty-like consistency, expands slightly and sets within five minutes. The product contains portland cement, a caustic, so wear rubber gloves when applying.

CRACKING DOWN



Though it seems counterintuitive, Tom's first step in patching a crack is to make it bigger. Using a hammer and a masonry chisel, he makes a groove about a half-inch wide and a half-inch deep. After wire-brushing the area to remove loose material, he dampens the crack with water and then forces hydraulic cement into the breach with a margin trowel. A wet brush smooths the repair and feathers the edges. "You'd better have all your tools ready," Tom says. The cement will be rock hard in less than 5 minutes.

SEEPAGE STOP



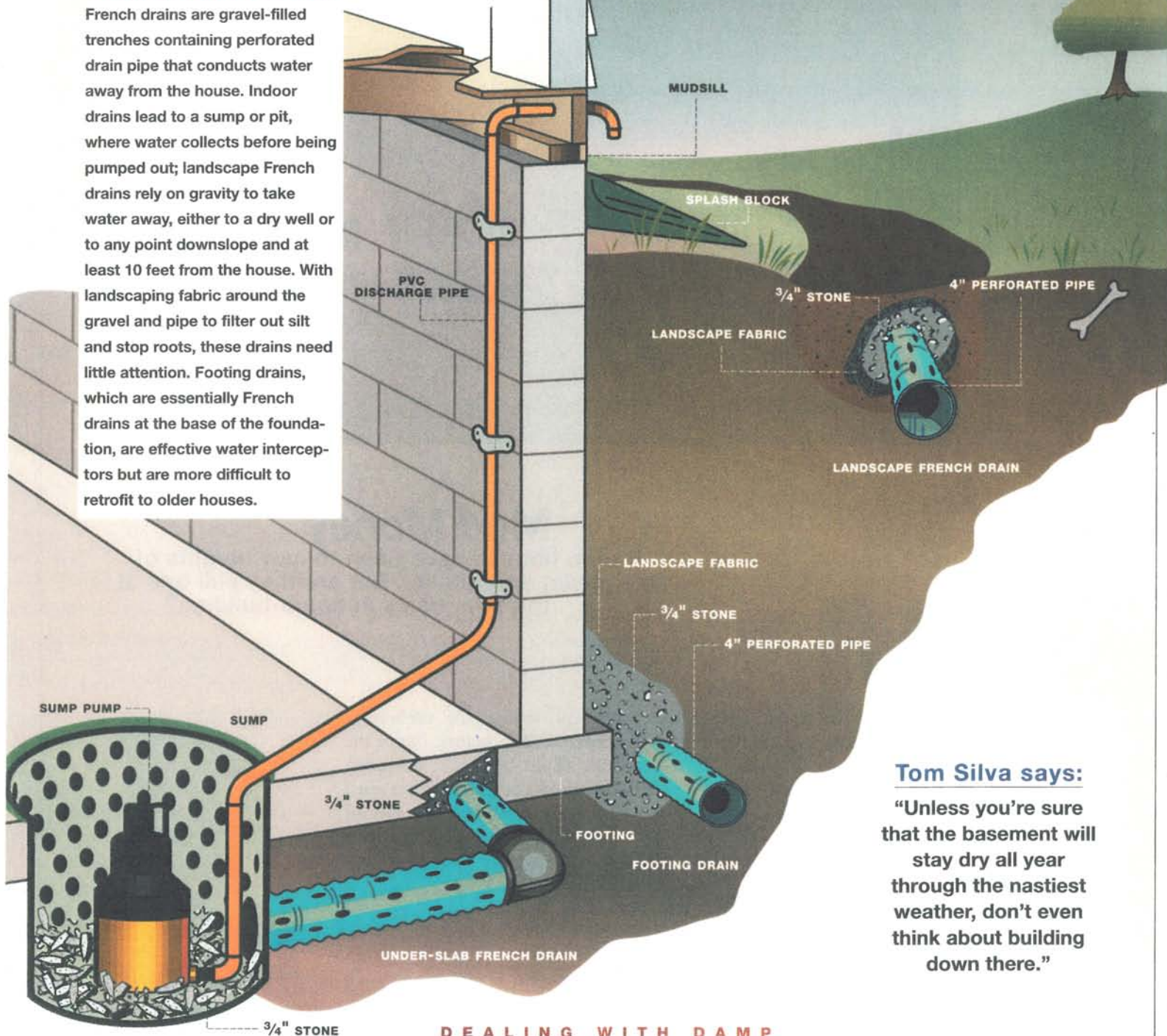
Unlike standard paint, cementitious waterproofing contains portland cement and synthetic rubber that bond to and seal porous cement-block and concrete walls. Two coats can withstand water pressure that would pop ordinary paints off the surface. Some cementitious coatings can be applied to damp walls, but none will work as crack fillers or on unprotected floors.

Plugging a Stone Foundation

Of all the waterproofing challenges, the hardest involve stone foundations, as Tom well knows: his own house sits on one that once leaked. He repointed the old, crumbling mortar inside, but a few stubborn leaks persisted. So he dug a narrow trench, 18 inches deep and about 10 feet long, next to the outside of the foundation (five feet on either side of the suspected leakage points). After he cleaned off the newly exposed stone and let it dry for a few days, he filled the trench with buckets of a liquid asphalt used for sealing foundations. Back in the basement, he watched for the black goo to ooze through, and stopped it with wads of fiberglass insulation and squirts of expanding foam sealant. Within a day or so, the liquid asphalt had dried and Tom poured more into the trench; the following day he topped it off with dirt. Tom warns that this method won't plug large cracks or correct a serious foundation problem, but it stanching his pesky small leaks; his basement is still dry 15 years later.

French Connection

French drains are gravel-filled trenches containing perforated drain pipe that conducts water away from the house. Indoor drains lead to a sump or pit, where water collects before being pumped out; landscape French drains rely on gravity to take water away, either to a dry well or to any point downslope and at least 10 feet from the house. With landscaping fabric around the gravel and pipe to filter out silt and stop roots, these drains need little attention. Footing drains, which are essentially French drains at the base of the foundation, are effective water interceptors but are more difficult to retrofit to older houses.



Tom Silva says:

“Unless you’re sure that the basement will stay dry all year through the nastiest weather, don’t even think about building down there.”

DEALING WITH DAMP

PROBLEM: Humid air condenses on cool walls, cold-water pipes, and well-water holding tanks, and this moisture problem is often misidentified as water seeping through the foundation walls.

DIAGNOSIS: To distinguish between condensation and seepage, place pieces of aluminum foil (each about a foot square) on the floor and each wall of the basement and seal the foil’s edges with duct-tape. Check after several days. Water droplets on the foil’s exposed surface indicate condensation; droplets on the underside mean there’s seepage,

which requires at least a coat of cementitious waterproof paint.

SOLUTIONS: A dehumidifier can draw moisture out of humid air, but first make sure to eliminate other sources of humidity in the basement—unvented clothes dryers, blocked exhaust vents on gas appliances (a safety hazard too), crawl spaces without vapor barriers, wet clothes, stacks of green firewood, or open doors and windows. **NOTE:** In a new home, lumber, plaster, and concrete foundations can take up to two years to dry.