Basement Bathroom Retrofit

by Jim Eggert

Adding a bathroom to a finished basement greatly improves the livability of the space, though at first glance it appears to have gravity working against it. After all, in most basements the main drainpipe exiting the house is closer to the ceiling than to the slab below. Actually, this is an easy opportunity to triumph over client misgivings and Newton's apple.

There are two ways to connect a toilet to an existing overhead drain line: an in-floor ejector system or an above-floor system. The above-floor system uses a sealed pump tank, to which the bathroom fixture drains are connected. The tank can be concealed in an enclosure or closet, and requires little or no demolition of the concrete floor. On the down side, you'll have to build a raised platform, about 6 inches high, to accommodate the waste pipe. This means that access to the toilet requires a step up. The platform may also impinge on headroom requirements.

Low-Profile Pumping

I prefer the in-floor system, and customers are usually happier with it because it provides a normal appearance and easy access to the toilet. In one recent job, I converted a raised-platform toilet to an in-floor installation (see Figure 1).

In-floor installation requires some concrete demolition to install the sump basin and underfloor piping. The basin is a sealed unit, typically made of polyethylene, high-density polyethylene structural foam, or fiberglass, and contains a powerful grinder-ejector pump. These are rugged units that rarely require maintenance, although foreign objects may resist grinding and jam the works.

Depending on the unit, the basin measures a minimum of 18 inches wide by 30 inches deep. It can be located anywhere in the basement floor, but it's important to allow floor space for the basin and all of the related piping, with access for maintenance. I try to install the basin outside the bathroom, close to the point where it connects to the existing sewer line. This also eliminates anything unfamiliar in the look of the new bathroom.

Demolition

To install the in-floor system, I remove an area of the concrete floor about 24 inches square for the basin, and cut a trench about 8 inches wide for the waste piping from the bathroom fixtures. Concrete demolition is dusty work, but I keep the mess to a minimum by using an electric jackhammer instead of pneumatic tools. Normally, the amount of concrete to be removed is fairly small. I remove the concrete and subsoil, then dig the basin pit to a depth of about 30 inches, so that only the top of the tank will be exposed. The hardest part of the job is now done, and my plumber can take over.

Tying In

The basin requires a 2- to 4-inch tee-wye connection, cut into the existing sewer or septic line, with a check valve on the ejection side to prevent refilling of the basin (Figure 2, next page). For the piping above the basin, Schedule-40 PVC provides a quick and simple tie-in.

In my experience, sometimes the pump will create excessive vibration in the piping. In these cases, installing a

Before

After

Figure 1. A basement toilet on a platform (above) installs easily but is awkward to use. Using an in-floor basin with a sewage grinder pump creates a normal appearance and doesn't impinge on headroom (right).

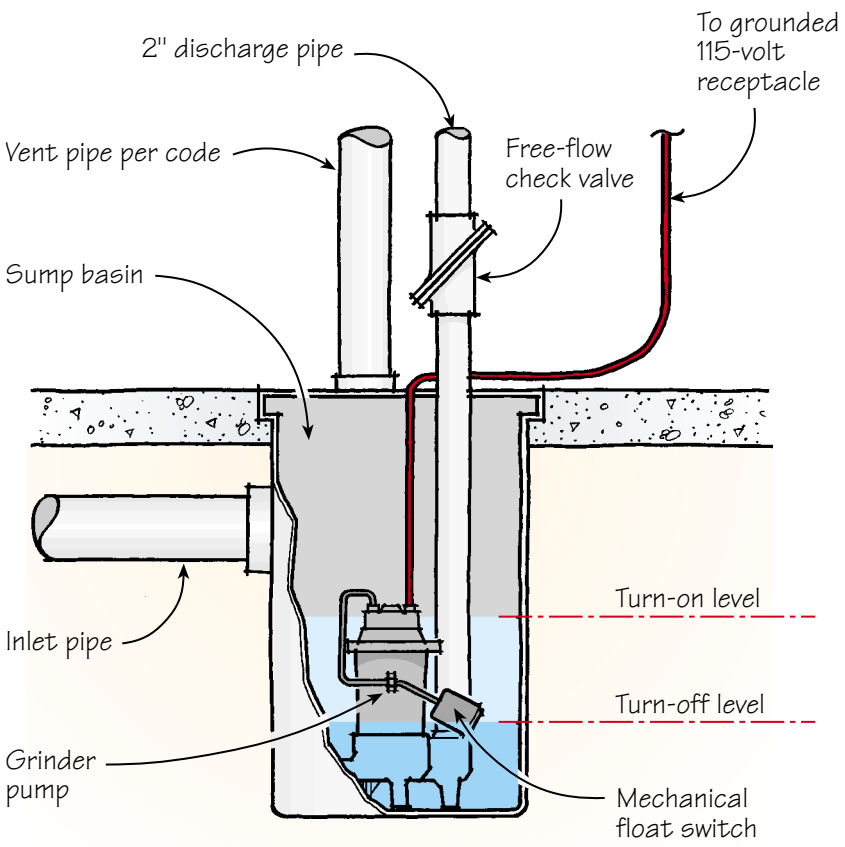

Figure 2. The sump basin receives wastewater from bathroom fixtures. The grinder pump liquifies the sewage and pumps it up to the main drain line exiting the house. A check valve prevents gravity backflow into the basin.

Fernco or Mission flexible connector in the line will absorb the vibration and prevent stress from building up at the rigid connections. This fitting also serves as an easy disconnect should the basin require servicing.

As with any plumbing drain, venting is important. Without a vent in the sump basin, the pump action would create a powerful vacuum. The basin includes a vent connector, either molded into the lid or the body of the basin, which eliminates the need to disconnect the vent pipe when removing the lid.

The inlet pipe from the bathroom fixtures connects to the basin inlet connector, completing the drainage installation. Once this connection is made, I backfill the excavated areas with sand or gravel and repair the concrete surface. I take extra care with the patching process, making sure that the floor is restored to a flush, smooth condition. Any lumpiness in the floor finish will telegraph through carpet or vinyl flooring.

Finishing Up

After the bathroom walls are framed, my plumber completes the rest of the rough plumbing above the floor just like any installation. Tying the fixture vents back into the main stack finishes the drain job.

The ejector pump can be either hardwired or have an integral plug, so I have my electrician wire a connection near the tank location, and the system is operational (Figure 3).

Figure 3. Only the top of the basin shows, allowing service access. Plug-in power simplifies the disconnect.

An option you may want to add is an alarm system, which monitors the basin level. An integral float furnished with the pump provides automatic on-and-off action, in response to usage. In case the pump does not cycle, an audible alarm sounds to warn against usage until the system is checked. Few manufacturers supply these alarms as part of their package, but I feel it's a worthwhile investment for both the customer and the contractor. Both battery and electric alarm models are available. Line-voltage alarms should not be plugged into the same circuit as the pump, because if the pump has failed due to an electrical fault in that circuit, the alarm should still function. Alarm costs vary, but average about $50. I highly recommend their use, especially if children are going to use the new bathroom.

Ejector pump prices currently start at about $625 for self-contained systems and $325 for an in-floor setup. They are available from plumbing supply houses and some larger home centers.

Jim Eggert *owns and operates Eggert Construction, providing design/build services in Branford, Conn.*

Makers of Ejector Pumps

Zoeller Pump Co.
800/928-7867
www.zoeller.com

Water Ace Pump Co.
800/942-3343
www.pentairpump.com