On-Site Wastewater Treatment

The conventional on-site household wastewater treatment system is the septic tank and absorption (leach) field. As wastewater enters the septic tank, solids sink to the bottom and grease and oils float to the surface. The remaining liquid (effluent), is released to the absorption field where waste products are broken down by physical, chemical and biological processes.

Local soil conditions; type, depth, texture and permeability all contribute to how well wastewater is treated as it moves toward groundwater. Soil conditions in parts of the state are not suitable for absorption fields, so alternative disposal systems are necessary. The septic tank-mound system is one alternative that can overcome certain soil limitations and still allow subsurface disposal of effluent.

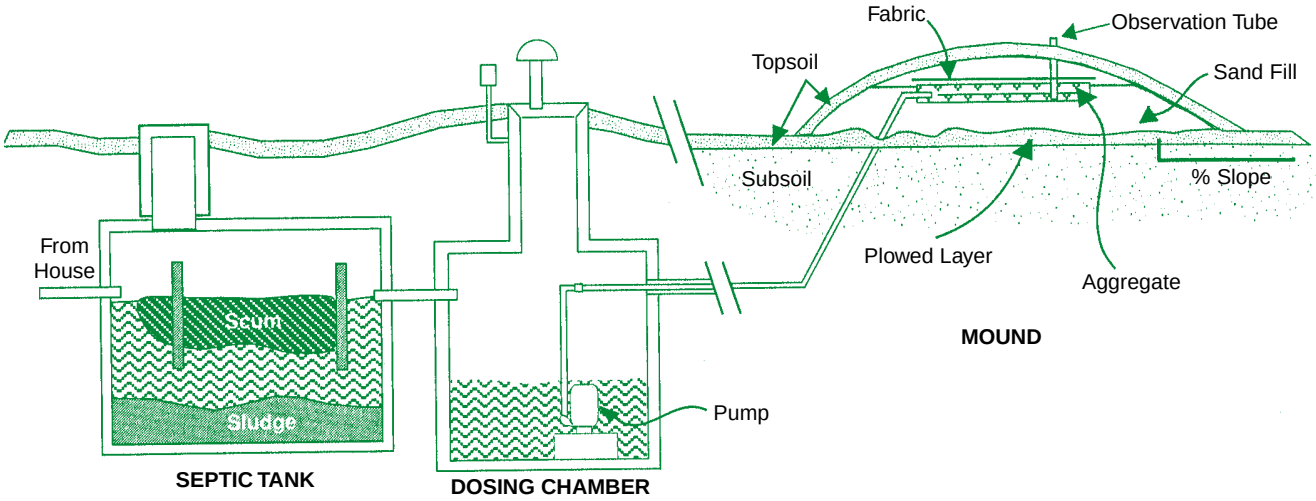
What is a Mound System?

Mound systems consist of three parts: the septic tank, dosing chamber, and the mound.

As in a conventional system, the septic tank separates most settleable and floatable solids from the effluent. The effluent then enters a dosing chamber where it is pressurized by a pump for even distribution to the mound. The mound serves as an added treatment area over local soils to prevent groundwater contamination. The mound is made of layers of sand and aggregate; a system of perforated pipe for effluent distribution; and covered with a layer of soil. In order to prevent erosion, the top of the mound must be sown with grass or other appropriate low-profile vegetation. Keep in mind that you do not want to use vegetation that requires a lot of water. Adding excess water to the mound will make it work harder than necessary.

Background

The idea of constructing a soil absorption system above ground level was developed in the late 1940s in North Dakota. It was designed to treat and dispose of effluent in areas with slowly permeable soils or high groundwater tables.



Mound system. (after: Converse and Tyler. 1990, and Widrig and Mancl. 1990. Used with permission)

Improvements on the original design were made in the 1970s by researchers at the University of Wisconsin. Since then, the Wisconsin design has gained wide acceptance, including in Arizona where more than 100 mound systems have been approved and installed.

Where They Can Be Used

Mound systems have been successful in treating wastewater on:

- slowly permeable soils;
- shallow permeable soils over bedrock; and
- permeable soils with seasonal high water tables.

Although mound systems have been successful in some areas they are not suited for all sites. For example, lot size plays an important role. The typical mound for a two bedroom house is 30 feet by 60 feet, so the suggested minimum lot size is 0.75 acres. Slope is another factor that may limit the success of a mound system. The mound must be large enough to offset the effects of a sloping lot. And, as the slope increases, so does the potential for failure.

If you are thinking about installing a mound system on your property, it is **recommended that you consult an experienced, licensed engineer** in your area. Because alternative wastewater treatment systems are more costly than conventional systems, proper design, installation and maintenance are essential to protect your investment.

Cost and Time Considerations

The total cost of a mound system is about $15,000. This figure includes estimated engineering costs of $1500 and $1000 for government review of the plans. The review process can take up to three months to complete, so plan accordingly.

Care for Your System

After a system has been properly designed and installed, the homeowner is responsible for routine care. The quality as well as quantity of wastewater generated in your home will affect the mound's performance. Grease and fat particles, or garbage disposal grinds can eventually clog the absorption field. Therefore:

- minimize use of the garbage disposal;
- keep grease and oils out of the system;
- use biodegradable toilet paper; and
- avoid using harsh chemicals (paints, hobby materials, etc.).

Reducing the amount of wastewater that enters your treatment system means better treatment and longer system life. This can be accomplished in several ways:

- install water efficient devices;
- check for leaks; and
- be aware of water use habits.

Water efficient devices such as low flow faucets, toilets and showerheads are available and required in many areas.

Regularly inspect your home for leaks. A leaky toilet can release many gallons of water into your mound system each day. The repair can be as simple as installing a new flapper valve.

Become more efficient in your water use habits. Take shorter showers. Run the dishwasher and clothes washer only when full, or use reduced water level settings.

Maintenance

Both the septic tank and the dosing chamber will need to be inspected and pumped regularly. In general, the tank should be pumped out when the sludge layer takes up one third the tank volume or exceeds 24 inches in depth.

BE CAREFUL! Septic tanks may contain explosive and noxious gases! Never enter a tank without proper safety precautions. A licensed septic plumbing contractor should be hired to pump and inspect the tanks.

Annual inspections are recommended, although tanks may only need to be pumped every 3 to 5 years, or possibly less often.

Problems

Occasionally problems arise with mound systems. Symptoms of problems or potential failure include:

Wastewater backing up in the house; toilets that flush too slowly; long-term standing water in the observation tubes in the mound; spongy spots on the top or sides of the mound; seepage on the side slopes of the mound; leakage or spongy spots in the toe area of the mound; areas of unusually green grass; and excessive solids accumulating in the dosing chamber.

Some of these symptoms may be seasonal, while others may indicate a more serious problem. Contact your installer or design engineer for further information.

For more information contact:

Your county health department for permitting requirements or the Arizona Department of Environmental Quality at 1-800-234-5677 to order Engineering Bulletin 12.

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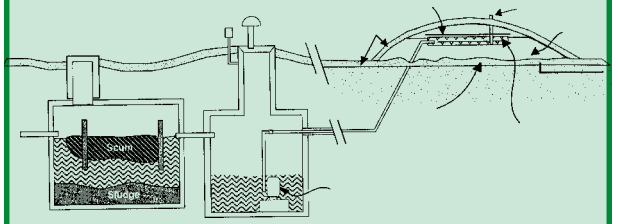
Mound Systems



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Elaine Hassinger
John E. Watson

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Cooperative Extension
College of Agriculture
The University of Arizona
Tucson, Arizona 85721