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What Happens If My Septic System Fails?

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While septic systems are a key part in keeping a household operating, they can also be one of the costliest and most difficult repairs if they should fail. In this publication, we discuss why septic systems fail, how to prolong the life of your septic system, and what to do should your system fail.

What is a septic system?

Septic systems use the natural characteristics of soils to dispose, filter, and treat household waste for homeowners who are not part of a municipal sewer system. When wastewater leaves the house, it is transported first to a septic tank (Figure 1). Wastewater is separated into three distinct layers in the septic tank: a scum layer made up of fats, oil, and grease less dense than water; an effluent water layer; and a bottom sludge layer made up of heavier solids. Decomposition of the solids occurs while they are contained within the septic tank. Naturally present bacteria in the septic system digest solids that have settled to the bottom of the tank. These bacteria can transform up to 50% of the solids in the tank into liquids and gases.

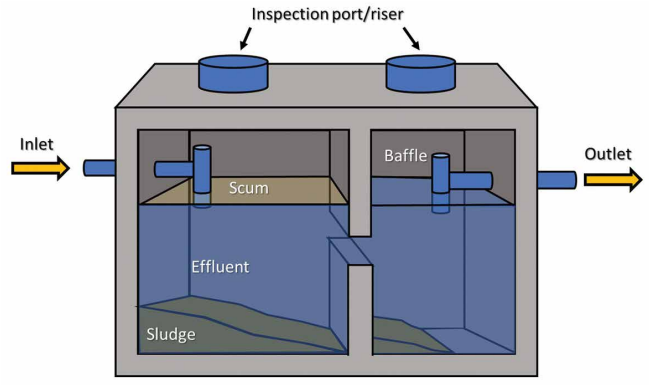

Figure 1: Illustration of a septic tank. Fats, oils, and grease that make up the scum layer float on the top, while heavier solids that make up the sludge settle to the bottom. This allows effluent water to leave the tank and enter the drainfield where it is treated by the soil.

The main function of the septic tank is to remove solids from household wastewater so that the effluent can more readily filter through the soil in the soil absorption field. Removing solids from the wastewater protects the soil absorption field from getting clogged and failing. When the liquid within the tank rises to the level of the outflow pipe, it enters the drainage system. This outflow, or effluent, is then distributed throughout the drainfield through a series of subsurface pipes typically bedded in gravel (Figure 2). Final treatment of the effluent occurs as it enters the soil profile and is filtered, where soil microbes convert the rest of the waste into harmless products.

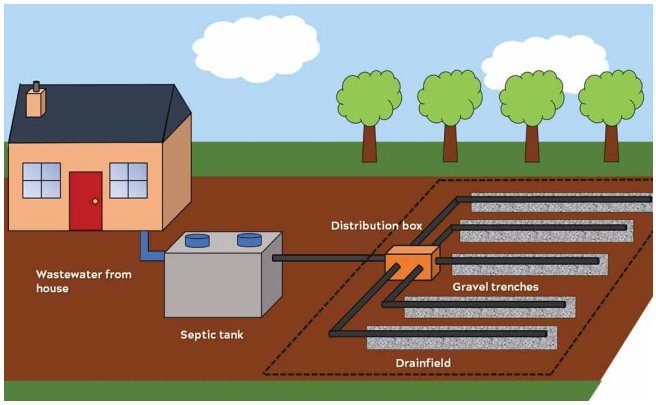

Figure 2: Effluent leaves the septic tank and is distributed through the drainfield via a distribution box. Effluent is treated as it passes through the soil profile.

Why Do Septic Systems Fail?

There are several possible reasons why septic systems fail. These failures can require relatively simple and easy fixes or costly system relocations. It is important to understand that even the best designed septic systems can fail over time.

Some failures occur due to problems inside the septic tank itself. The baffles (tees) (Figure 1) that help to keep the solids from entering the drainfield area can degrade. This is more common in systems with concrete septic

tanks. When this happens, septic waste can reenter the household through outlet pipes. However, of greater concern for the life of your septic system is when the outlet baffle is degraded and solids are able to enter the drainfield. This can cause the soil in the drainfield trench to become clogged and prevent appropriate drainage in the system.

One of the most common reasons septic systems fail is that the tank is not pumped often enough, thus allowing suspended solids to fill the tank. The solids can then enter the drainfield, compromising the soil's capacity to drain adequately and treat wastewater. Table 1 is a guideline for how often homeowners should have their tanks pumped.

Problems can also occur if the system is undersized for the number of people in the house. Hydraulic overload of the drainfield can severely limit the soil's ability to drain properly. Another cause of failure is a compromised drainfield. This can occur if the homeowner builds or plants on the drainfield. Other factors such as periods of extremely high precipitation can also cause system failures, especially if this causes standing water over the drainfield. Plants and tree roots near the drainfield can cause problems too. Tree and shrub roots are attracted by the supply of water and nutrients provided by the system, and they can enter and damage the drainlines, distribution box, or septic tank itself. It is important to plant only grass in the drainfield area. Trees and other landscaping plants should not be planted on the drainfield. The Virginia Department of Health (VDH) recommends water loving (hydrophilic) vegetation be kept a minimum of 10 ft. from the absorption area.

How Can I Reduce the Chances of My Septic System Failing?

There are a number of things that can be done to reduce the likelihood of a septic system failing. First and foremost, have the tank pumped at appropriate intervals. Follow best management practices outlined in VCE Publication SPES-380P, *Septic Tank Best Management Practices*, in order to prolong the life of a septic system. Do not flush oils, grease, vegetable wastes, napkins, or sanitary products into the system. You may also extend the life of your septic system by keeping the drainfield area free of woody vegetation, avoiding driving or building on the drainfield area, and visually checking your entire system at regular intervals. Many septic tanks are equipped with an observation port to aid in determining pumping intervals.

What Are the Signs of Septic System Failure?

There are a number of signs that your septic system has failed or is starting to fail. These signs are often easy to observe (or smell). In some instances, wastewater can back up from the tank into the house, coming out in bathtubs, showers, sinks, and toilets. Seeing this should be an obvious and clear indicator that there is a problem with the septic system. Sluggish draining of water from tubs and sinks may indicate problems with the absorption field, although this could just be clogged pipes. Evidence of a failing system can also be seen around the drainfield. The presence of standing water above the drainfield can indicate the system

Table 1: Estimated septic tank pumping frequency based on tank size and home occupancy. (Adapted from Mancl 1984.)

	Number of Occupants									
	1	2	3	4	5	6	7	8	9	10
Septic tank size (gal)	**Pumping Frequency (years)**									
500	5.8	2.6	1.5	1.0	0.7	0.4	0.3	0.2	0.1	–
750	9.1	4.2	2.6	1.8	1.3	1.0	0.7	0.6	0.4	0.3
1000	12.4	5.9	3.7	2.6	2.0	1.5	1.2	1.0	0.8	0.7
1250	15.6	7.5	4.8	3.4	2.6	2.0	1.7	1.4	1.2	1.0
1500	18.9	9.1	5.9	4.2	3.3	2.6	2.1	1.8	1.5	1.3
2000	25.4	12.4	8.0	5.9	4.5	3.7	3.1	2.6	2.2	2.0

is failing, especially if the water is discolored and smells unpleasant. Even if there is no water present, an unpleasant smell alone could indicate there are potential problems. The presence of greener grass over the drainfield lines can be an indicator of a failing system. This should be thoroughly investigated by an onsite system professional, as drought and low fertility conditions can cause a similar effect.

What Can Be Done If My System Fails?

In case of drainfield failure, some instances, a septic system can be relocated to a reserve field; however, some properties do not require a reserve area or one may not be provided. If the system fails at these properties, sometimes the soil between the existing trenches can be utilized; a new area may be available on the property; or adjacent properties might be considered. VDH sewage handling and disposal regulations only require a 50% reserve where drainfield trenches are in soil horizons with silty and clayey textures.

Drainfields in soil horizons with sand, loamy sand, sandy loam, or sandy clay loam texture are not required to have a reserve area. Some counties and cities require a 100% reserve area on all new construction, and in certain districts within counties, it can be 200% reserve capacity. In other instances, an alternative system may have to be built to treat and disperse the effluent in a smaller area. In some cases when a system fails, effluent can be removed and disposed of periodically by licensed professionals (pump and haul); this can only be done for a limited amount of time until the failed system is repaired or replaced.

When failures are seen and documented by the health department, a Notice of Alleged Violation (NOAV) is issued to the property owner, giving them the steps to remedy the situation and a time frame to accomplish the design and repair. Currently, failures are known to exist when:

1. Sewage backs up into the dwelling/structure.

2. Sewage is seen on the ground surface.

3. Sewage pollutes ground water.

If a system has failed, it is the responsibility of the owner to repair the system, meeting the sewage handling and disposal regulations or the alternative onsite system regulations, depending on what type of system can be installed. A repair permit is required, and generally, a private onsite soil evaluator, sometimes working with an engineer, will evaluate the site and soils and design a repair system. The repair can be as simple as individual components or as complex as replacement of the entire system. The repair application is approved by the local health department and must be issued prior to the repair.

In some instances, septic systems can be repaired by replacing some of the components, which is referred to as maintenance rather than repair. Maintenance includes replacement of the distribution box and any of the piping not within the drainfield area.

References

Mancl, K. 1984. “Estimating Septic Tank Pumping Frequency.” *Journal of Environmental Engineering*. 1984.10(1): 283-285.

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