Composting Toilets as a Sustainable Design

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There are things we need to consider when we flush the toilet. Even though conventional toilets have become increasingly efficient, using 1.6 gallons of water per flush, the process of treating that waste is very expensive. A more sustainable solution is the composting toilet. On average, one person can conserve more than 6600 gallons of water in a year by using a composting toilet (Andersen, Steinfeld, 86). This not only conserves water, but provides the user a substantial savings in the cost and treatment of water. Composting toilets also help extend the life of an older septic system by reducing the volume of waste. By eliminating black water, wastewater from the toilet, composting toilets allow for a smaller septic system to be installed in new homes. According to Steinfeld and Anderson, another sustainable attribute to composting toilets is that they "let you reclaim and recycle nutrients using the same biological process as garden composting piles..."(86) Even though this manure may not be safe for food gardens, it may still be used as a great soil amendment in non-food producing situations.

Although composting toilets have been around for quite some time, and they can be quite intricate, there are basic components common to each design. Each unit must have a composting reactor. This is the space under the toilet where the fecal material, toilet paper, and an additive such as sawdust or hay, is collected. Another key component to the reactor is the leaching system. The leaching system separates the urine from the solid waste. Commonly this leaching system is merely a void under the reactor, but in other units there are complicated evaporators. "Unlike a septic system a composting toilet system relies on unsaturated conditions (material cannot be fully immersed in water), where aerobic bacteria and fungi break down waste, just as they do in a yard waste composter."(Del Porto, Steinfeld, 2000) Composting toilets also require a ventilation system. Venting a composting toilet can be done by a mechanical fan, or simply by adding a stack where the odors can vent.

Beyond these basics, composting toilets vary in size and cost. Consequently there is also a variation in the amount of work that needs to be applied to them. There are manufactured self-contained units that fit well in homes or cottages. The cost of a self-contained unit can range from around $750 to $1500. There are also large manufactured units with large compost reactors. These are popular in commercial settings or in places where there will be a lot of use. The larger units start around $1400 and can well exceed the $10,000 mark. The wide range in price reflects the complexity and demand of the customer.

Another variable in a composting toilet system is whether it uses an active or passive system. This determines how quickly the breakdown will occur. Active systems can be very intricate and "may feature automatic mixers, pile-leveling devices, tumbling drums, thermostat-controlled heaters, fans, and so forth."(Del Porto, Steinfeld,2000) With all of those aspects working together, the composting process is sped up incrementally. Since active systems process the waste quicker, they can handle larger loads, or not require a large composter. Passive systems use no mechanized means to process the waste and therefore take a longer time.

According to a 1999 report by the US Environmental Protection Agency (EPA), there are disadvantages to a composting toilet system. Many of the disadvantages stated

in their report deal with the unpleasantness of dealing with human compost. Improper maintenance is another disadvantage of a composting toilet because it makes the toilet difficult to clean and it does not compost properly. An unfortunate situation could occur if peak loads have been underestimated and the toilet cannot handle the load. Probably the most serious disadvantage may be that using an "inadequately treated end-product as a soil amendment may have possible health consequences."(USDA) A deterrent to many is that composting toilets are not always accepted in every application. Though the acceptance for them is growing, there is a huge need to make sure that the plans have been approved by the proper authorities, especially in commercial and suburban residential applications.

According to the literature one of the disadvantages is the myth that these toilets are smelly and will attract flies and other insects. This is probably one of the largest rumors and non-truths about composting toilet systems. The cleanliness depends on the maintenance of the unit. An improperly maintained system that is not well vented will have the tendency to be both smelly and attract insects. However, with proper maintenance, composting toilets are a safe and sanitary alternative to traditional systems.

Even though there are numerous disadvantages there are many examples of successfully installed and maintained systems. One such example is in the Dana Building at the University of Michigan. This building uses two composting toilets in conjunction with a regular flush toilet. It serves to educate building occupants and visitors, and hopefully lead to the use of these water-saving fixtures elsewhere on campus.(www.greendana@umich.edu) This is a particularly great example because it introduces composting toilets to people without forcing it upon them.

The Harris Center for Conservation Education (www.harriscenter.org) is yet another example of how an educational institution is expanding the horizons of kids grades K-12. As part of a major renovation, they installed composting toilets and other aspects of sustainable design. A positive effect is that they are familiarizing kids with the technologies of sustainable design.

Composting toilets are slowly catching on in a world where water scarcity and economics increasingly playing a role. They are a basic technology that has been proven to work and be safe time and time again. The biggest obstacle with composting toilets is getting past the stigma of these stinky rooms that are unpleasant to use. With a little bit of research most people would find it easy and convenient to take care of composting toilets. From a sustainability standpoint, composting toilets are a great solution. They conserve water, they add to the beauty of your yard, and once you get used to maintaining them, they become a part of the routine of life.

Works Cited

Anderson, C., Steinfeld, C. (June-July 2002). Water-wise Toilets. (energy & environment). Mother Earth News, 86-87. 18 October 2006. Expanded Academic ASAP.

Del Porto, D., Steinfeld, C. (2000). Composting Toilet System Book: A Practical Guide Pollution to Choosing, Planning, and Maintaining Composting Toilet Systems. Center of Ecological Prevention.

United States Environmental Protection Agency. (September 1999). "Water Efficiency Technology Sheet: Composting Toilets." Office of Water Washington, D.C.