A Ventilated Pit Privy

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The deep pit latrine has distinct advantages in that it is cheap to build, easy to use and requires little maintenance, but it also has the disadvantage of acting as a perfect site for the transmission of flyborne disease. Some pit latrines are only one degree better than no sanitation at all, and under certain conditions may be worse! As a result they are often replaced by more complex waterborne systems of sanitation which can often be equally undesirable.

Many attempts have been made to overcome the offensive odours and fly breeding commonly associated with pit latrines. 'Solutions' here included the use of coverplates, fly traps and chemicals, but all these methods are far from foolproof and cannot be regarded as successful. Ventilation pipes had been tried, but with limited success until the system described here was put into widespread use in Zimbabwe-Rhodesia in 1976 after two years of thorough testing. The Blair Ventilated Privy, as it is known, provides almost complete protection against flies and odours emanating from the pit without the use of water, chemicals or coverplates. This makes it particularly useful where water is scarce or difficult to pipe to conventional waterborne sanitary devices, and it is safer and certainly more reliable than many waterborne methods of sanitation currently in use.

The system partly depends on the aerodynamic properties of an efficient fluepipe, 150 mm in diameter and about 2.5 m high. If this is fitted on to a concrete latrine slab over a sealed pit or tank the temperature difference between the inside and outside of the pipe will cause a convection updraught, drawing air and gases from the pit and thus causing a downdraught through the toilet aperture. Efficiency is increased by painting the pipe black and facing it.

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towards the equator where it receives most sunlight. If there is a wind or noticeable air movement across the top of the pipe, air is drawn through the system even at night or in cold weather. The top of the pipe is elevated above the roof level and kept away from trees to reduce air turbulence which causes a loss of efficiency. The upper end of the pipe is cone-shaped and opens out to 200 mm and is fitted with a copper or fiberglass flyscreen (Fig.1).

When the latrine is in use, flies from outside are attracted to the odours passing up the pipe and tend to avoid the interior of the privy. Fly-breeding is thus reduced in the pit. Flies emerging from the pit travel towards the greatest light source and are attracted up the pipe, if the latrine structure is dark enough within. They are prevented from escaping by the screen and eventually die (Fig.2). The pipe thus performs three functions: it draws out odours, prevents much of the fly breeding and traps most of the flies that might emerge. It is essential that the pipe is large enough to enable the system to breathe efficiently and that it allows sufficient light to enter the pit to attract flies. 100 mm, 150 mm and 200 mm pipes were used in trials. The 100 mm pipe was ineffective and the 150 mm type was chosen because of its efficiency related to cost.

Basically, the privy consists of a reinforced concrete slab placed over a deep pit lined with bricks or plaster. Two openings are made in the slab, one outside the superstructure for the pipe, the other within the structure for the squatting hole. The structure itself must be darkened inside and the most successful are cast in a spiral form without a door (Fig.3). The structure can be built from bricks but a popular method of building consists of plastering a corrugated iron mould with a plaster mix using chicken wire as reinforcing.

Although the system works well without water, the privy can be built over a septic tank or seepage pit. This type of privy has been modified to produce biogas, and the pipe can also be designed to trap flies which have bred in other places. This latter modification is particularly effective for reducing the nuisance of flies in compounds and other other living areas. The ventilated privy works at its best when built as a single unit, with one pipe serving one squatting hole. Other combinations have been tried but are not as effective at reducing odours. An allowance is made for 0.087 cu.m. (3 cu. ft) per person per year when estimating the capacity of the pit. Pits are dug round and plastered in situ for strength, usually about three to five metres deep. The properties are retained even when the contents of the pit lie only 30 cm below the aperture.

The effectiveness of the unit has been tested thoroughly and one typical experiment serves as a good example. Four identical privies were built in a row, but only two were fitted with vent pipes. All the units were put into use for six months before the experiment. During the period October to December 1975, weekly counts of fly output were taken from one pair of structures (vented and unvented) whilst the other pair stabilised in use. The traps were moved from one pair of privies to the other at monthly intervals. During the period October 8 to December 24, 13,953 flies were trapped from the unvented structure, Fig. 4) whilst only 146 were trapped from the vented structures. The structures differed only in the presence or absence of the ventilation pipe.

The ventilated privy described in this article is very popular in Zimbabwe-Rhodesia and many thousands are now in regular use all over the country. Its success and acceptability can be ascribed to its simplicity and reliability and the fact that it does not necessarily need water to operate. It employs the forces of nature alone to overcome the passage of disease.

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References

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