

The Blair VIP

A short history

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The Blair Latrine was developed in Zimbabwe during the early 1970's in response to a felt need.

At that time pit latrines were known for their bad smells and uncontrolled fly breeding. They were both unpleasant to use and posed a serious health hazard.

- **People often preferred to use the bush as a toilet.**
- **This may have been OK in remote areas and in the dry season.**
- **But in more densely populated areas and during the rains, such a method was undesirable.**



The Blair Latrine has been used by the Ministry of Health in its rural sanitation programme since 1975.

- The Blair Latrine was designed and developed at the MOH's Blair Research Laboratory.
- The first experimental ventilated pit latrine was built in 1973, and after two years of testing, it became available for use by the Ministry of Health in May 1975.
- At that time details of this research and development were sent to South Africa and Botswana, where similar toilets were also constructed.
- Over 500 000 Blair latrines have been built in Zimbabwe since 1975, serving over 3 million people.
- The Blair Latrine later became known as the VIP (Ventilated Improved Pit Latrine).



Long Life

This Blair VIP was built at Henderson Research Station in 1976. It was still being used in 2010.



Long Life!

This Blair VIP was also built at Henderson Research Station in 1976. It was still being used in 2010 and was in perfect condition.

The pit was large, being 1.5m in diameter and 3m deep.

The spiral ferro-cement structure lasts almost for ever. During this era the vent pipes were made in asbestos and had a diameter of 150mm with coned top. This was a classic Blair VIP.

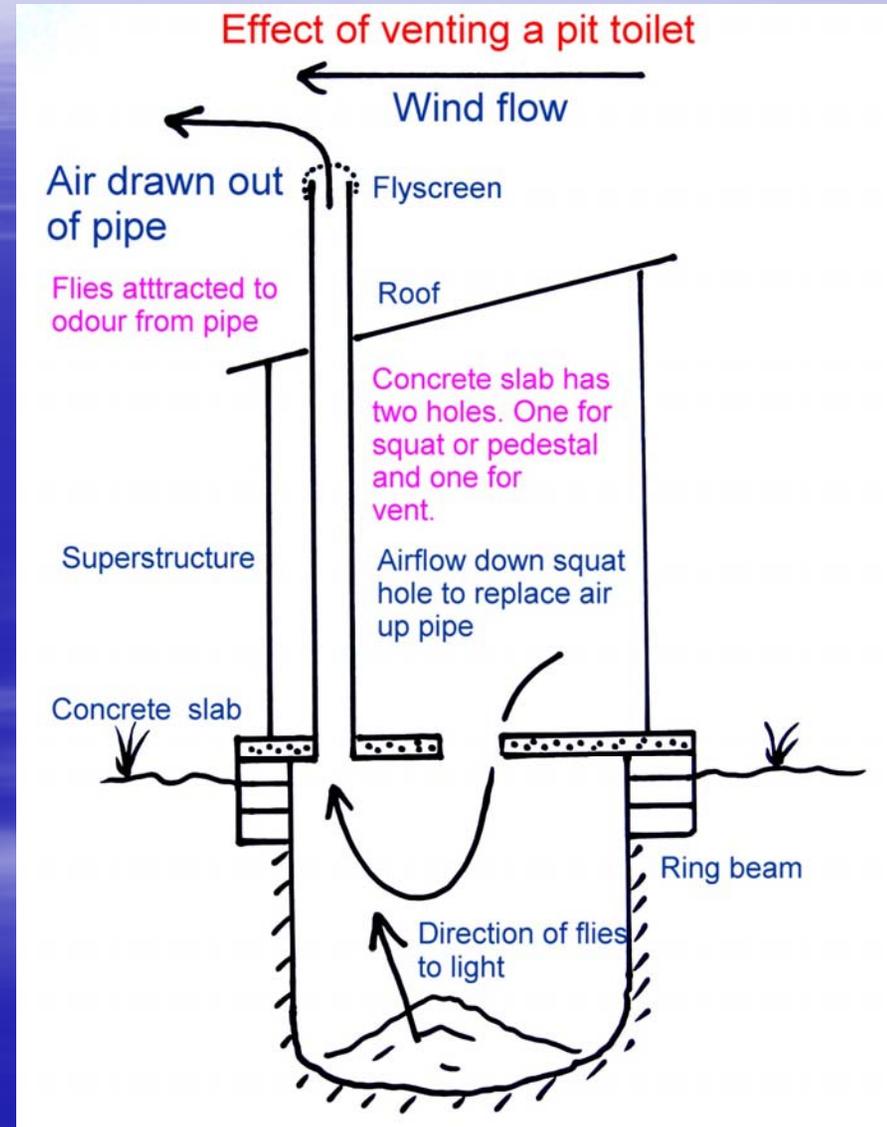


The Blair Latrine

How it works

1. Air flow

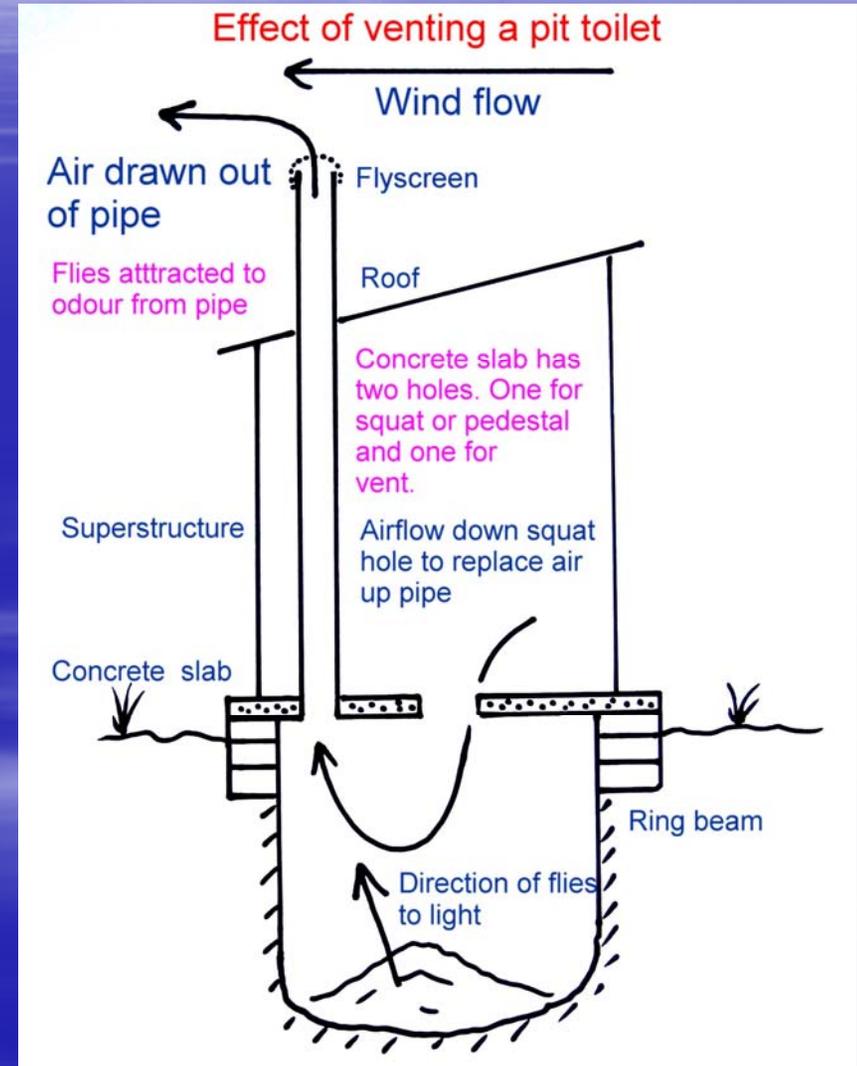
- The Blair Latrine is a pit latrine which uses a screened vent pipe to control odours and flies.
- A concrete slab covering the pit has two holes cast in it - one for the squat hole and one for the vent pipe
- A “superstructure” is built over the squat hole for privacy
- The pipe draws out odours from the pit mainly from the effect of wind passing over the pipe head.
- Pipes which get warm in the sun also draw air.
- Air passing up the pipe is replaced in the pit by air drawn down the squat hole. Thus odours from the pit do not pass into the structure



The Blair Latrine – How it works

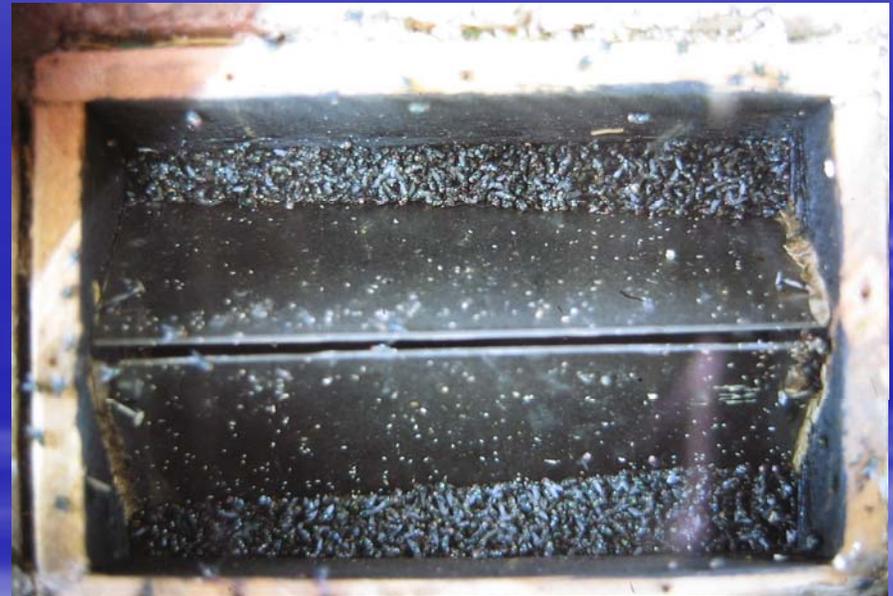
2. Fly control

- Flies are attracted to odours when they enter a pit
- Flies are attracted to light when they leave a pit.
- If the latrine structure is roofed and the door is closed the interior becomes semi dark.
- With the vent pipe in place, bad air from the pit will escape only from the pipe head. Thus flies from outside will be attracted to the pipe head.
- If the pipe is fitted with a fly screen, flies will not be able to enter the pit.
- Any flies in the pit will be attracted to the light coming down the pipe if the latrine is semi dark inside. They too will be trapped by the screen.
- Thus the pipe acts as both a pit ventilator and a fly trap at the same time. It is simple and uses the forces found in Nature .



Early experiments

- The development of the Blair Latrine started off as a series of experiments studying and trapping flies.
- Fly traps were mounted over pit toilets to assess the real problem.
- These experiments revealed that as many as 140 000 flies could emerge from a single pit toilet every year.
- The flies were attracted to light when they flew out of the pit. The trap attracted the flies because it allowed light to pass into the pit



The first Blair Toilet

This was built at the Henderson Research Station north of Harare, late in 1973. It was a double unit built with a fly trap in the middle. Each toilet was fitted with a vent pipe to remove odours from the pit. Most of the flies went into the trap.



An important experimental toilet

This was made of wood with a large metal vent. The aim was to demonstrate that the vent pipe could act as a fly trap. In this early model, a perspex window was placed at the base of the pipe to attract flies up the pipe. It worked.





Flies were counted in a trap fitted at the top of the pipe. This showed that if the toilet house was dark enough, almost every fly would travel up the pipe rather than out through the squat hole.



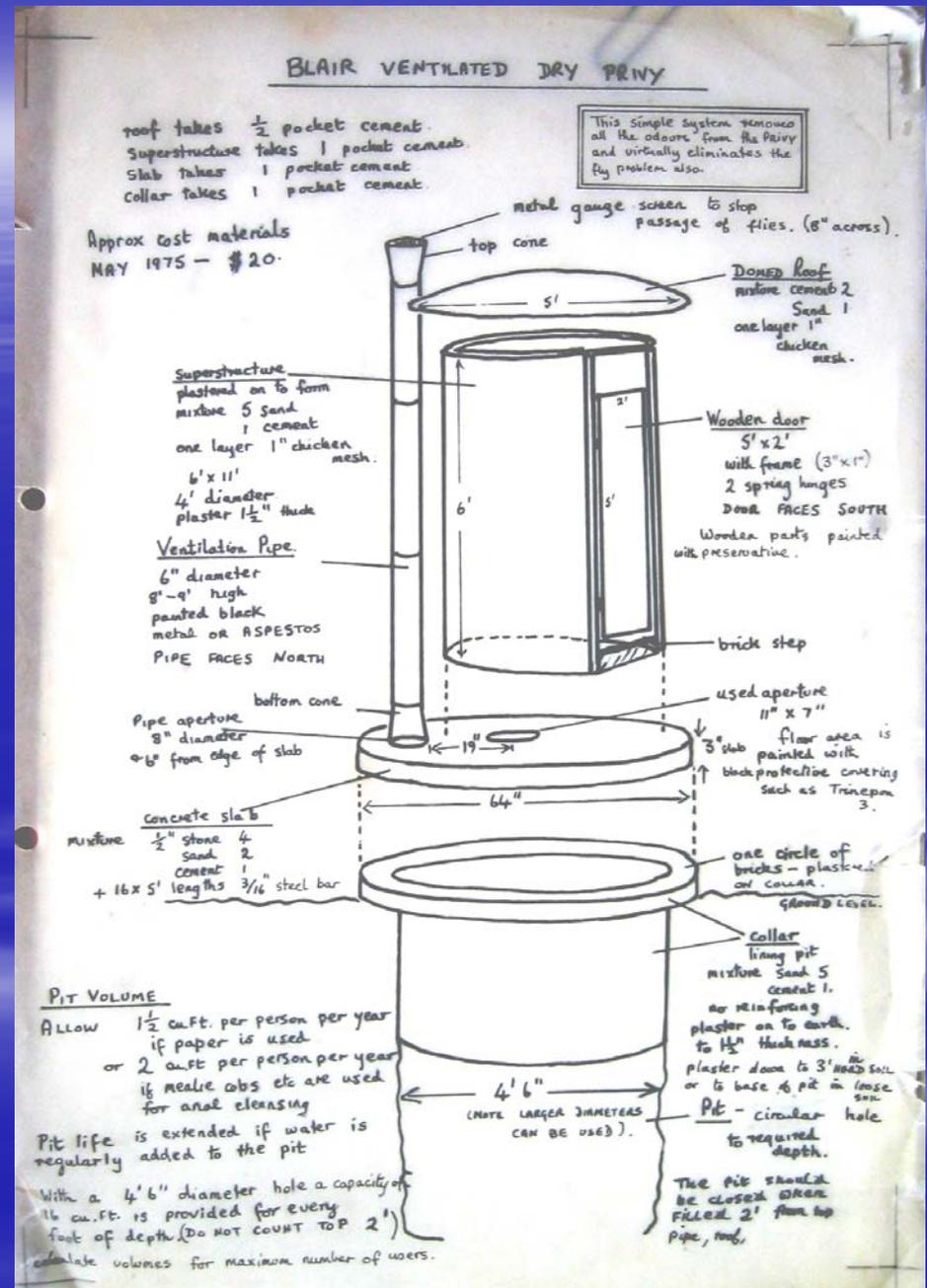
Other important experimental toilets

In the next series of toilets the perspex window was removed from the pipe. These early vent pipes were 150mm in diameter, made of tin and were painted black to make them hot in the sun. They were fitted with fly screens. To increase the air flow the bases and tops were expanded. Also ferro-cement superstructures were designed and were cast on corrugated iron moulds. In the toilet shown below a fly trap has been fitted on the slab to compare the efficiency of fly trapping with the vents. The vents proved to be very effective fly traps.



The Blair Latrine earliest drawings

- This sketch was released by the Blair Institute in May 1975.
- Early Blair toilets had a door fitted with spring hinges to keep it closed whilst in use.
- Later Blair toilet structures were made with a spiral shape which did not require a door for privacy. This feature guaranteed semi darkness within.



Experiments with fly control

In a series of controlled experiments carried out at Chikurubi, 2 pit toilets fitted with screened vent pipes were compared with 2 pit toilets without pipes. All 4 toilets were identical apart from the presence or absence of a vent pipe. They were used for 6 months prior to the experiment. From October to December 1975 weekly counts of fly output were taken from one pair of toilets (vented and un-vented) whilst the other pair were in use. The traps, fitted over the squat holes, were moved from one pair of toilets to the other at monthly intervals. The following fly counts were made and revealed how effective at controlling flies the vent pipes were.

Period of trapping 1995	No. flies trapped from un-vented toilet	No. flies trapped from vented toilet
8 Oct-5 Nov. 1975	1723	5
5 Nov-3 Dec. 1975	5742	20
3 Nov-24 Dec 1975	6488	121
TOTAL	13 953	146

Superstructure design

Early structures were fitted with doors. But they tended to fall off or were left open. Early ventilation pipes were made of tin or asbestos.



Superstructure design

Earlier structures had doors fitted but these were quickly replaced by spiral structures without doors. Unlike structures fitted with doors the spiral structure guaranteed semi darkness. Fly control was still effective in spiral structures although they let more light in than the doored structures. Thus they were superior in every way. The toilet with spiral structure had no moving parts to wear out. It became a standard.



Problems

*The early method of lining the upper end of the pit with cement plaster was not successful
A strong pit lining was found to be important.*



They were not all successful!

Many toilets leaned and sank or just sank!



The pre 1980 Blair Toilet

- This early work evolved into what is probably the most effective Blair Toilet ever designed.
- The large 150mm diameter asbestos vent pipe fitted to a ferro-cement structure made the unit almost ever lasting. The screen was made from UV resistant fibreglass netting, the best available before 1980.
- Later stainless steel or aluminium screens were used which had a much longer life.
- The large vents used on these structure made them very effective at controlling both odours and flies.
- About 50 000 were built before 1980, mostly on farms, estates and at government centres.

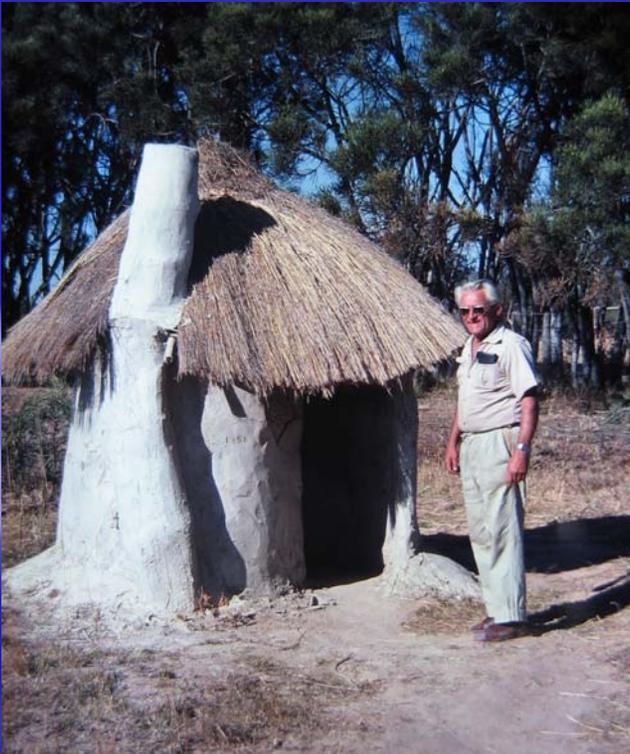


A commercial unit was also designed at this time



Evolution of the “Blair” after 1980

This was an era of trying “low cost” methods . After Independence in 1980 it was felt that the relatively high cost of the ferro-cement model was not affordable on a large scale. Also a specialised mould was required for construction. There followed an era of experimentation with low cost structures using a combination of cement and traditional materials.



The low cost era

These curiously made structures were effective at first but were not durable. The second stage of the post independence stage focussed on more substantial brick built structures which became the standard in the later programme.



Evolution of the brick Blair Latrine

Blair Latrines had been built from brick before 1980, but it was not until after the first signs of failure of the low cost approach, that they were taken seriously. The first brick built Blair's were being built at the Henderson Research Station in 1981. Thereafter brick built "Blair's" became the standard for use in Ministry of Health programmes. Both round and square spiral structures were built – with the square type becoming most popular.



Blair Latrines made with brick.

The use of brick extended to the construction of the vent pipe. Whilst not as effective as the smooth walled steel, PVC or asbestos pipes, it was cheaper and could be built on site. This unit was built more than any other



Blair Latrines made with brick.

The owners had great pride in their Blair Latrines. Many built with hand washing facilities.



Blair Latrines made with brick.

Much extra expense, like paint, was paid by the owners to making the units attractive



Blair Latrines made with brick.

There was no lack of innovation.



The Blair Latrine at schools

Whilst most Blair Toilets were built at private homesteads in the rural areas, very large numbers were built at schools. These were “multi-compartment “units, usually built in blocks of ten. Many were served with communal hand washing tanks



The Blair Latrine at schools

The Blair Latrine concept was taught in schools from the early 1980's and became part of the school curriculum. Part of the education involved making models. It was used as a tool to teach the art of construction in brick.



The Blair Latrine at schools



Assistance from Donors

– the material subsidy

During the active phase of the Rural Sanitation Programme, donors provided funds through the Ministry of Health to assist families and schools to build the Blair Latrine. 4 or 5 bags of cement were provided for family units, with the family providing bricks, sand, labour and costs for hiring a trained builder. The donor contribution was estimated at about 30 - 40% of the total cost.



Fully recyclable VIP.

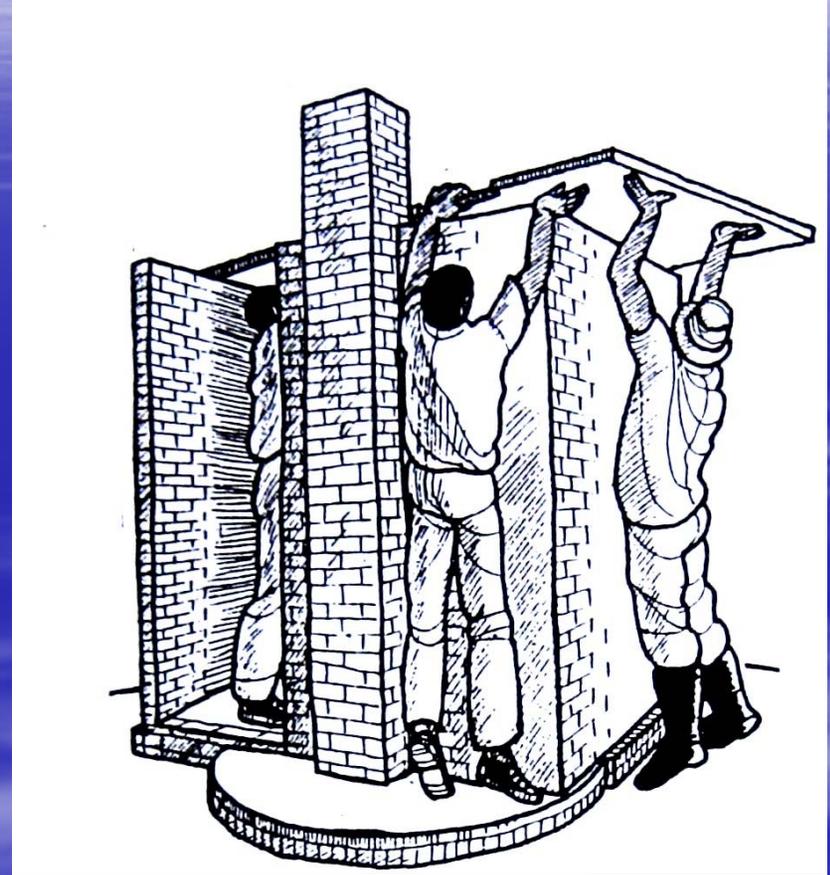
In this case the structure is made with fired bricks mortared together with weak cement mortar (20:1). The door is attached to a steel frame on which sprags are fitted to link into the brickwork. The structure is easy to dismantle and rebuild. The pits are brick lined and 2m – 2.5m deep. Soil, ash and leaves are added regularly. Two pits are dug and lined. The structure is dismantled and moved from one pit to the other at 3-5 year intervals. The addition of soil ash and leaves accelerates composting in the pit. All parts of the structure and compost are recycled.



Numbers built

The number of Blair Latrines built peaked in 1987, when 47 000 units were built. A second peak was reached in 1996 when 26 000 toilets were built. Since that time there has been a decline in output. This started to occur before 2001 when donors started leaving Zimbabwe. The total number of Blair Latrines built since its inception (including pre 1980), on farms, mines and estates as well the rural programme is about half a million.

The Blair VIP is still the preferred sanitation technology of choice by the Government of Zimbabwe. It is popular because it doubles as a toilet and a wash room. An upgradeable version is now being piloted



Problems with the Blair Latrine programme

Despite the enormous financial and national effort put into the Blair latrine programme between 1980 and 2001, only 33% of rural households were served. This number has since been reduced to 24% (by 2004), partly because of population increases and because the toilet pits fill up. Thus most of the rural poor were, and continue to be un-served. This large fraction continued to use simple pit sanitation or used the bush. In order to qualify for a material subsidy, rural householders were required to buy bricks and hire labour. Many could not afford this. Thus for the ordinary rural family the brick built Blair Latrine was too expensive to build.

The question therefore remains – what is the future of the Blair VIP?.

Ways ahead

* Clearly there is now an urgent need to look clearly at the current situation and make plans for the future, using the experience of the past.

* It is clear that a wider range of technical options must be considered for the future. These options must cost less, be upgradeable, and yet provide protection for families.

* Perhaps a “stepping stone concept” is most appropriate, where the basic pit and slab is built first, with privacy being provided in local materials by the user. Build the basics now – upgrade later.

* In 2010 the Government of Zimbabwe accepted the concept of an upgradeable BVIP where the toilet could be built in a series of stages. This requires a more modest and affordable start. Using a **single bag** of Portland cement it is possible to construct a brick lined pit and make a concrete slab suitable for upgrading to a full brick Blair VIP later.