The Blair VIP Latrine

A builder's manual for the upgradeable BVIP model and a hand washing device

Government of Zimbabwe

National Action Committee

for

Rural Water Supply and Sanitation

Draft

Introduction

In 2010 the Government of Zimbabwe relaxed its technical policy guideline for family toilets (the spiral brick Blair VIP) to include an additional design called an Upgradeable BVIP (uBVIP). In this version the basic requirement is for a brick lined pit and a covering concrete slab, which allows the owner to upgrade in a sequence of steps to attain the final brick built Blair VIP. The starting point is a brick lined pit of suitable capacity capped by a slab which has both squat and vent holes. The government specifies that the range of vent pipe options should include those made from bricks as well as tubes (eg PVC or asbestos etc). It is a requirement that the minimum life of the pit be at least 10 years.

Brick built pipes can be constructed at relatively low cost with traditional materials (locally made fired bricks) and cement mortar. Brick pipes must be constructed outside the superstructure and in fact form part of the brick superstructure of current brick built BVIP designs. This necessitates that the diameter of the slab must be at least 1.2m. In earlier designs a heavier 1.3m diameter slab was specified. However in modern Zimbabwe an era of constraint dictates that cement should be used sparingly and carefully so that the investment made is good value for money and time.

Consequently a smaller, lighter and more economical 1.2m diameter concrete slab which permits the construction of both brick and tubular pipes has been designed. This uses 12 litres of Portland cement and 60 litres of clean river sand (5:1) and 3mm or barbed wire for reinforcing.

The method of construction of the brick lined pit has also been streamlined. The depth is shallower than older pits (2m rather than 3m), but it is also wider (1.4m rather than 1.1m). In order for the wider pit lining to connect to the small diameter slab, a method known as corbelling is used – where the upper courses of brickwork are stepped in to the required diameter that will support the slab (1.2m). This revised method of pit lining is easier to construct since the builder can stand on the base of the pit throughout the construction. Also a well tested method of using a much weaker cement mortar has been introduced for bonding the pit brickwork. This consists of 20 parts pit sand and 1 part Portland cement. This well researched revision of the construction method means that a single 50kg bag of Portland cement is sufficient to line a pit and caste a suitable concrete slab.

Start simple and upgrade - an explanation

It is possible to construct the well known standardised brick built Blair Ventilated Improved Pit (BVIP) toilet in a single building operation. Hundreds of thousands of these units have been built throughout Zimbabwe, and most have been built with the generous support of donor organisations. The “Blair” is popular because it doubles as a washroom and the square spiral structure has become the most popular.

The BVIP is a pit toilet and eventually the pit fills up. The filling time varies between 10 and 20 years depending on pit capacity, the number of users and the amount of garbage which is thrown down the pit. However eventually the pit fills up and another toilet is required by the family. A standardised brick built BVIP requires several bags of cement and a trained builder to construct and this cost is beyond the means of most rural Zimbabweans. A new concept therefore had to be found which was far more affordable and adaptable and could provided a valuable starting point from which rural families could build a variety of toilets including the standardised brick BVIP. The starting point technology and the process whereby it can be upgraded is called the Upgradeable BVIP (uBVIP).

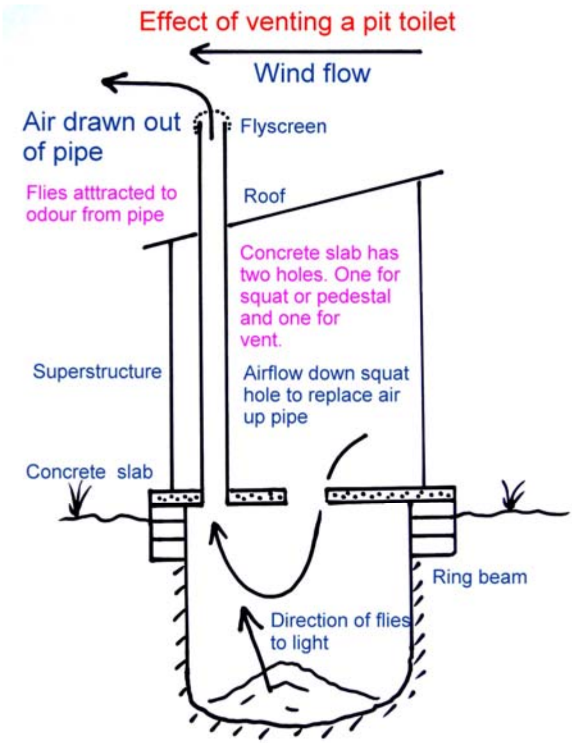
This basic unit consists of a brick lined pit and a concrete cover slab. This is the technical starting point from which a considerable range of pit toilets can be built, including the brick BVIP. A single 50kg bag of Portland cement together with about 500 bricks, river and pit sand and some reinforcing wire is sufficient to line and cover a brick lined pit which should provide at least a ten year life. The superstructure which is built on top and around the slab remains the responsibility of the owner. The structure built by the family above the slab provides just privacy at first. In the absence of a vent pipe, smells and flies can be reduced by the regular addition of wood ash and regular washing down of the slab. A loose fitting metal cover placed over the squat hole also helps

The basic aim of this new approach is provide, at relatively low cost, a system which can considerably reduce the extent of open defecation (in the absence of any toilet), and has the potential to be upgraded into the familiar BVIP over time. “Farm brick” are common in most parts of Zimbabwe and are produced locally and at low cost. Where bricks are not easily available alternative approaches must be found.

How the Blair VIP works

The Blair VIP is a ventilated pit toilet. The toilet slab is made with two openings, one for the squat hole and one for the ventilation pipe which is fitted with a corrosion resistant fly screen. The vent pipe sucks out air from the pit and fresh air is drawn down through the squat hole. The toilet itself should therefore remain fairly free of odours if the toilet floor is kept clean and washed down.

Flies approaching the toilet are attracted to odours coming from the pipe, but cannot pass the fly screen to enter the pit. Any flies escaping from the toilet are attracted to light coming down the pipe. But these will be trapped in the pipe. All Blair VIPs are fitted with a roof and a semi dark inside.



How it works

Materials required

The Upgradeable BVIP is constructed in two stages. The first stage is the pit lining and the construction and fitting of the concrete slab. The second stage is the construction of the superstructure.

Stage 1. The pit lining and concrete slab stage

Portland cement (PC15) – 1 X 50kg bag
River sand – 60 litres (for slab)
Pit sand – about ½ cu.m. (for making cement mortar for bricks)
Reinforcing wire – 12m of 3mm or barbed wire (for slab)
Bricks (fired). 500 (standard size is 225mmX 112mmX75mm)

Stage 2. The superstructure

The materials for the superstructure vary considerably depending on the type of structure built.

1. Simple grass and pole structure (spiral).
The minimum will be about 10 treated gum poles and grass and wire and binding string.

2. Grass structure fitted with door and roof.
Two treated gum poles 2.4m long, 8 treated gum poles, grass, wire, binding string. Suitable roof.

3. Brick structure fitted with door and roof
Two treated gum poles 2.4m long, Suitable door fitted with strong hinges, fired bricks 350 – 400. Cement approx 20 litres. Suitable roof (cement, hessian cement, corrugated iron, asbestos).

4. Brick structure (spiral)
Bricks for foundations (90+) and superstructure (800+) = **1000**
Portland cement. 2.5 bags if cement is used for wall bonding.
2 bags if traditional mortar is used for wall bonding
River Sand. For roof and floors **(226litres)**
Pit Sand. For brick foundation, wall bonding and plastering **(760li)**
Chicken wire (for roof). **2m X 1.8m** 25mm chicken wire.
Flyscreen: **225mm X 225mm** Aluminium flyscreen

Measurement of Portland cement for spiral brick BVIP superstructure

Part of toilet	cement	sand	mix
Brick foundation	10litres	150li (pit)	15:1
Floor	10litres	50li (river)	5:1
Walls (bonding)	20litres	400li (pit)	20:1
Walls (plaster)	10litres	150li (pit)	15:1
Floor surface	8litres	32li (river)	4:1
Roof	36litres	144li (river)	4:1
Finishing off	6litres	60li (pit)	10:1
Total cement used	**100litres (2.5 X 50kg bags of cement)**		

NOTE if traditional mortar is used for bonding the brick walls of the superstructure this reduces the amount of cement required from 100 litres to 80 litres. A 50 kg bag of cement contains about 42 litres of material. Thus if traditional mortar (a mix of anthill soil and river sand) is used for bonding the walls of the superstructure 2 extra bags of PC15 cement are required in addition to the single bag required to line the pit and make the concrete slab. This makes a total of 3 bags of Portland cement required to complete the whole structure. The revised method of pit lining and slab construction and the use of traditional mortar makes possible these reductions of costs of the standard BVP.

Total cement used for superstructure (using traditional mortar for bonding of wall bricks is 80 litres = (2 x 50kg bags of cement).

Measuring the cement

The 12 litres of cement required for making the concrete slab is a level 10litre bucket full. 10 litre buckets are used for measuring the river sand used in slab making. Each bucket is filled with material which is tapped down and leveled off. The 20:1 cement mortar used for bonding brickwork is best measured using a 5 litre container. 5 litres of cement is mixed with 100 litres of pit sand to make the mortar. Two full wheel barrow contains about 100 litres of sand.

SITING THE uBVIP

The site should be chosen by the family with assistance from the Environmental Health Technician and should be at least 30 metres from a well. The toilet site should be:

***Down hill from a well or borehole –** to reduce possible underground contamination of the water supply.
***Where the soil is firm** – to avoid possible latrine collapse
***On slightly raised ground** – so that rainwater can drain away from the site of the toilet
***Near the house** – for the convenience of the householders
***Away from trees** – so that air can flow easily over the pipe
***The orientation of the structure -** to provide the best privacy for the users

Stages of construction

The stages of construction are as follows:

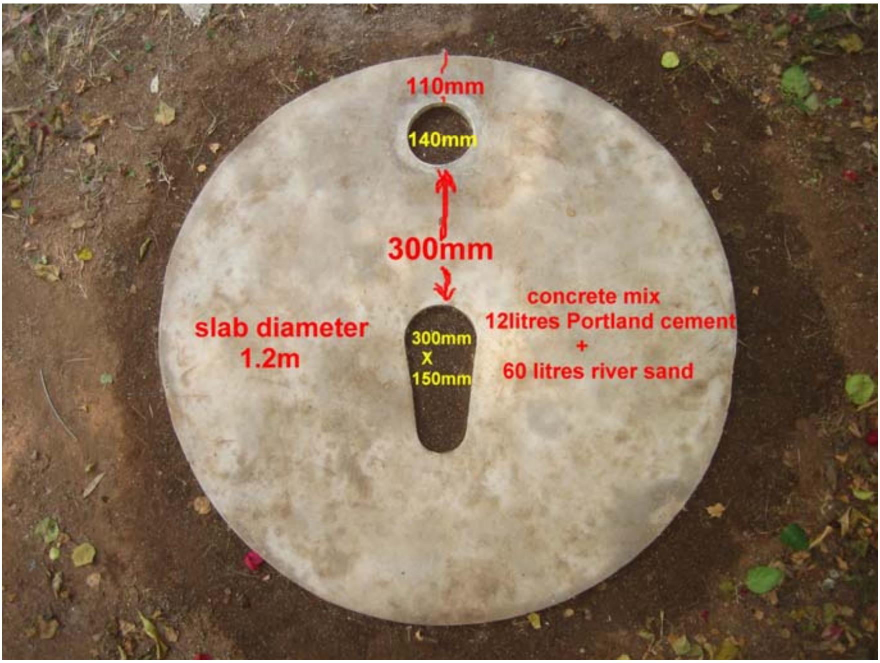
1. Dig the pit.
2. Make the concrete slab
3. Line the pit with bricks and fit the cured slab
4. Build the superstructure

Stage 1. Dig the pit

Dig a round pit 1.8m deep and 1.7m in diameter. Dig the pit with straight sides and a flat bottom.

Stage 2. The concrete slab

The concrete slab for the uBVIP is 1.2m in diameter and made with a mix of 12litres of Portland cement and 60 litres of clean river sand (1:5 mix). The hole for the vent is 140mm in diameter and the squat hole measures 300mm X 150mm. The vent hole can accept both brick and tubular pipes (with concrete adaptor). The 140mm hole is placed 110mm from the edge of the slab and the vent and squat holes are 300mm apart. The holes are placed down the centre line of the slab. The vent hole is made by using a short length of PVC pipe as mould. The squat hole in this case is made using a specially designed steel mould. 12m of steel wire or barbed wire is required for reinforcing per (4 X1.1m + 5 X 1m + 4 X 0.6m).The slab is cast over plastic sheet or on levelled ground covered with sand which is wetted down. One level 10 litre plastic bucket contains 12 litres of material. One level 10 litre bucket of cement and 5 level buckets of river sand are used.



Details of concrete slab for uBVIP

Making the concrete slab

A mix of 12litres of cement (one level 10litre plastic bucket) and 60 litres of clean river sand (five level 10 litre plastic buckets) is thoroughly mixed and water added to make a slurry-like concrete. This is added into the shuttering around the moulds which are held in position whilst the concrete is added. Half the concrete mix is added first and levelled off. Then the lengths of 3mm reinforcing wire or barbed wire are added as shown. The wires are added in a grid formation about 15cm apart. About 12m of wire is required and cut up A total of about 12m of 3mm wire is used per slab (4 X1.1m + 5 X 1m + 4 X 0.6m).After about 2 hours the squat hole and vent hole moulds are removed. The outer shuttering is also removed. The slab is covered with plastic sheet and left overnight to harden. The following morning it is carefully watered and covered again. To gain the proper strength before moving the slab should be kept wet and covered for at least 7 days.

Making the concrete slab for the uBVIP. Half the concrete mix is added first. Then the wire reinforcing is added. Then the remainder of the concrete is added and smoothed down flat.

The slab can be made before lining the pit with bricks. The slab requires at least 7 days to cure after it is made. It is essential that the slab is kept wet throughout this period to allow it to cure properly. During this time the pit can be lined with bricks.

Stage 3.
Line the pit with bricks using the corbelling technique

This uses a technique known as corbelling where the upper courses of brickwork are stepped in, so the diameter of the pit is reduced nearer the top of the pit. This allows a large diameter pit to be used with a relatively small and economic concrete slab which caps the pit. This technique allows for a large diameter pit to be built which is shallower (total depth 2m with 0.2m above ground level) and this easier to build.

Line the pit from the bottom with strong fired bricks. Using a cement mortar mix of 20 parts of pit sand and 1 part Portland cement (5 litres cement in 100 litres pit sand). The inside diameter of the first 1metre of brickwork must be 1.4m (about 19 bricks per course). Above the 1st metre of pit lining start to step the brickwork in course by course. Each additional course above 1.0m should be stepped in by about 20mm above the lower course. The brickwork should continue above ground level by about 20cm so the full pit depth is about 2.0m. This will take about 24 courses of bricks. The uppermost course of bricks uses about 15 bricks. The total number of bricks (standard size – 220mm x 110mm X 75mm) is about 470. Allow for 500 bricks for the pit lining. The amount of cement in a single 50kg bag should be enough to make the slab, line the pit and leave some spare to make either the foundations of the spiral brick toilet or the extended floor in front of the slab for a doored toilet.

Finalising the brick lining and fitting slab

The corbelled pit from the side and from the top. The shape of the pit lining is much like the conical tower of the Great Zimbabwe Monument.

Backfill the space between pit lining and pit with soil


The pit lining extends about 20cm above ground level. The annular space between the dug pit and the pit lining being filled in.

Fitting the slab on the brick pit lining


Weak mortar is laid around the rim of the pit lining. The slab is then mounted. The orientation of the slab depends on the type of structure to be built. In this case a square spiral structure will be built, so the pipe hole will be on the same side as the toilet structure opening.

The 1.2m diameter slab is placed on the brickwork in a bed of weak cement mortar. The slab is made level. The orientation of the slab depends on the type of superstructure built. With the spiral type without door the vent pipe hole is placed on the same side as the toilet entrance. Once the pit has been capped with this slab a wide range of superstructures can be fitted on top from simple pole and grass to the fully brick BVIP.

Diagrams of corbelled pit lining with doored and door-less spiral superstructures

Corbelled pit lining with superstructure fitted with door

Corbelled pit lining with spiral (door-less) superstructure

uBVIP Superstructures

Simpler structures first

Once the pit has been lined with bricks and capped by a durable concrete slab, the construction of the superstructure can begin. The family must decide what it can afford. At first this may be a simple grass and pole structure built for privacy only and not fitted with a roof or vent pipe. The preference is for a brick built superstructure which has no moving parts, like doors. Doors can be left open, and this will reduce fly control if the unit is upgraded to a BVIP. However in the first instance, the superstructure should be designed to provide privacy. In this way, the unit provides a start off structure, which can help to reduce open defecation at low cost. Over time the same substructure and slab can be upgraded in a series of steps to become the standard brick built Blair VIP, which doubles as a washroom. Wood ash can be added to the pit to reduce odour and flies if no roof and pipe are fitted. Also a tin sheet fitted over the squat hole can reduce flies.

Pole and grass structures

In the first instance the most easily structures designed for privacy may be made with poles and grass. These are temporary structures but will provide suitable privacy for a period of time. Such structures can be built with doors or in a spiral (door-less) form without doors. Gum poles may be the best poles to choose, but they are vulnerable to termite attack. The best gum poles will be pressure treated, but these will normally only be available in the city centres. Treatment of the poles can be undertaken by painting the poles, or the lower parts of the poles with old car engine oil, carbolineum or creosote or a combination of these. However, even these materials may not be available in the rural areas. Poles made of hardwood can be used if available. However depletion of natural woodlands is also not advisable. The burning of bricks also uses wood fuel, and these pose problems in terms of the negative effects of toilet building on the environment. A compromise can be sought by growing trees nearby the toilets. The growth of such trees, such as gum, can be enhanced by the application of diluted urine and also once the roots have penetrated more deeply can absorb nutrients provided by the composting excreta held in the pit. These aspects will be described later in further literature prepared for this development.

Construction of pole and grass structure without door.

The simplest structure is made of poles and grass in a spiral shape. It is designed to provide privacy only and is not fitted with a roof or vent pipe. First the concrete floor is extended in front of the slab within a mould of bricks. Cement left over from the construction of the slab and lining of the pit should be enough to make this extension. The hole for the vent pipe is plugged with cement..

Poles are placed around the slab in a spiral shape. Cement left over from the pit lining is used to make a cement floor in front of the slab. This cement can be extended into the entrance of the toilet

Finishing off the floor and entrance

In simple “start off grass and pole structures, the aim is to provide privacy only. At first there will be no vent pipe added and the vent pipe hole is either filled with a weak concrete mix or a round disc of concrete is made up and fitted over the hole.

Extension of the concrete floor made at the entrance. The vent hole can be plugged or capped with a concrete plug.

The grass spiral superstructure

The grass work is finished and neatened up.

Pole and grass structures are only temporary and will eventually be eaten by termites. Old engine oil or carbolinium can be used to lengthen the life of pole and grass structures. They can be made very neat and work well, but eventually they should be replaced with brick superstructures. Flies and odours can be partly controlled by the liberal addition of wood ash to the pit and also by placing a loose tin cover over the squat hole. This cover can be moved by foot.

The concrete floor is extended in front of the slab and also within the entrance.

2. Construction of pole and grass structure with door

In this method two treated gum poles (one of them fitted with a door) are placed in two holes made in front of the slab mounted over the lined pit. It is advisable to choose pressure treated gum poles which can also form part of a more permanent superstructure made from bricks during the upgrading process. The two treated poles should be 2.4m long and have a diameter of around 75mm. The door itself can be made of wooden brandering to form a frame, 1.5m long and 0.5m wide. The door panel can be made of plywood or some other material which offers privacy. The hinges can be made of car tyre. Wooden parts are best treated with a preservative. Alternatively a steel door frame and door can be used.


Fitting a car rubber hinge to one of the treated gum poles. The final pole and door unit ready to mount in front of the slab. The two holes drilled for the two main “king posts” are drilled in front of the slab. The door should be about 65cm in front of the squat hole and door posts 50cm apart.


A mould made of bricks is built up around the two main poles. This is filled with a mix of broken bricks, stones and concrete to anchor the posts. Each post is surrounded by a ring of steel wire.


The concrete mix is built up inside the brick mould to slab level. This is left to cure overnight before any further work commences,


This door unit can be linked to a grass and pole structure or linked to brickwork. The following photos show the link to poles and grass.

A series of hardwood or treated poles has been placed around the slab in holes drilled by an earth auger. Three wires have been tightly wrapped around the holes for attachment of the cleaned grass. The grass is attached to the poles as bundles. A disc of strong concrete can be made to fit over the ventilation pipe hole before a pipe is fitted. A vent pipe can be fitted later

Making and fitting the roof

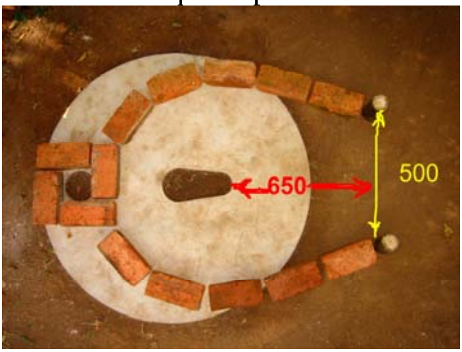
The roof can be made in several ways. In this case the roof has been made by assembling thinner wooden gum poles to a size and shape which will fit on top of the grass and pole superstructure. These have been nailed together. The covering can be made with wire netting overlaid by plastic sheet and grass, or, as in this case by two layers of hessian which has been treated with liquid cement. The treated hessian panel is made separately and when dried and cured is mounted on the pole frame and attached with nails.


The roof is prepared for attachment to the grass and pole structure. Extra poles are added to the upright poles for attachment to the roof.


The roof is attached with wire to the horizontal poles.
The finishing touches are made to the grass work. The finished grass and pole structure. These structures can be made very attractive and with care can provide good service. But they are vulnerable to termite attack and rot. However the system has been designed to be upgradable. At a suitable time the grass and surrounding poles can be dismantled and a brick structure built in its place. The same roof can be used. A vent pipe can also be fitted.

Upgrading grass to brick

Brick is the most suitable material for building toilet superstructures. In this case the door has been attached to door poles (king posts) which are made of pressure treated gum poles. Whilst grass can be used at first to provide privacy these can easily be replaced by bricks. Traditional mortar can be used to bond the bricks together, which reduced the amount of cement required. Whilst the BVIP structure with door is vulnerable because it has a moving part (the door) which can be left open or fall into disrepair, the number of bricks used is far less and the roof area is smaller making it cheaper to make or buy. 14 bricks are used per course in the doored structure compared to 30 in the square spiral structure.



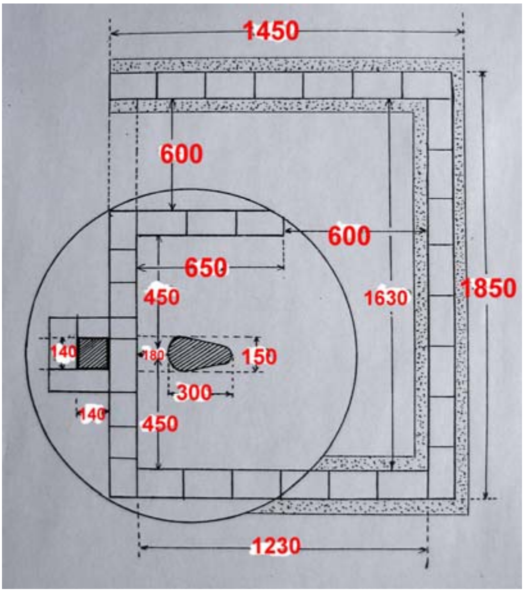
The distances between poles (500mm) and between the door and the squat hole (650mm)

One arrangement for the brick structure is to construct it in a horseshoe shape and connected the bricks to the two poles (king posts). The toilet floor is extended in front of the round slab around the poles. The horseshoe shaped structure is very easy to build and has been called the "horseshoe Blair." It derives strength from its shape. It can also be fitted with a tubular pipe.

Building the standard brick square spiral superstructure

The construction of the superstructure consists of laying the brick foundation for the walls, laying the concrete floor within the superstructure, building up the walls and brick vent pipe, making the roof, plastering the internal walls and laying the final sloped floor of the toilet cubicle.

The slab is made level on the elevated brickwork above ground level and the weak cement mortar smoothed down around the slab so the slab and brick lining are airtight. The slab and pit must have an airtight fit of the vent pipe is to work properly. A trench is cut down in the soil around the toilet. The brick foundation for the walls will be laid in this following the dimensions below,



Dimensions of the brick square spiral BVIP in mm.


The brick walls are laid on the foundation so the outer dimensions of the brick walls are close to 1.45m X 1.85m. The walls are built up to slab level. The toilet floor area is then backfilled with brick rubble to lower slab level. This is then filled with a concrete mix (10 litres cement + 50 litres river sand).

Building the brick walls and vent pipe

The mortar mix for the brick walls is 20 parts pit sand and 1 part Portland cement. This is mixed in lots of 100 litres of sand and 5 litres of cement. 4 mixes are required to mortar the brickwork of the structure and vent pipe.


The walls are built up together with the vent pipe as shown

Use of traditional mortar

The walls of the structure can be bonded together with traditional mortar made from anthill soil and river sand mixed together. This material is commonly used in the rural and peri-urban areas and has a long life. In earlier programs anthill mortar has been used for the walls but not for the pipe. However anthill mortar can be used for the vent if the uppermost course of bricks is covered with cement mortar. The screen is in fact bonded onto the brick vent with cement mortar which fulfils this function.

Stages in building the brick walls


Walls and vent come up together. The walls are built up to 1.8m in height and the pipe to about 2.4m, The internal surfaces of the brickwork inside the pipe must be kept smooth.


The walls are built up. The end walls and mid wall which will support the roof are built up so the roof will slope outwards.

Elevating the vent pipe


The vent pipe is raised 6 courses above the wall level. Later it is fitted with a corrosion resistant fly screen.

Making a concrete roof.

Roofs can be made of concrete or asbestos or tin sheet. The concrete roof is made in 4 sections to make lifting on to the structure easier. The structure is measured and 10cm or more are added to this measurement to form an overlap for the roof. In this case the total roof area measured 2m X 1.8m. A 2m length of 1.8m wide 25mm chicken wire was purchased to act as reinforcing. The mix of cement is 4 parts river sand to 1 part PC15 cement. To make the roof 3 mixes of 12li cement and 48li river sand (4:1) were used.

An area of ground is levelled and a mould made with bricks to suit the size of the roof required. In this case the total area was 2m X 1.8m.The chicken is laid within the mould and cut up into four pieces (900mm x 870mm (2 pieces) and 900mm x 1130mm (2 pieces). The exact measurements should be taken from the structure, which varies slightly in each case. A recess was made in one of the four panels for the vent pipe.

A sheet of plastic is best laid on the ground to cover the soil within the brick mould. The cement will loose less moisture when laid over plastic and will develop more strength. The mix of cement is laid in sections. The mix of cement is 4 parts river sand to 1 part PC15 cement. To make the roof 3 mixes of 12li cement and 48li river sand (4:1) were used.


Each section is covered with a layer of cement about 20mm thick and the wire is laid over this to cover the section. The wire is then covered with another layer of cement. Later on the concrete will be cut with a trowel when still soft. The sections of wire in the concrete must be separated clearly so the trowel cuts through concrete only. The concrete is then covered for the night. It is watered the following morning and kept wet and covered for a week before moving on to the structure.

Fitting the roof

The thin concrete roof panels are cured for at least a week. They are kept wet at all times, preferably under plastic sheet. These sheets are durable and cheaper than asbestos or tin sheets, but they must be handled with care. They should be lifted from the ground on to the toilet structure with great care.

Stages in fitting the roof sheets


The four panels are allowed to cure for at least 7 days being kept wet at all times. Each panel is carefully lifted from the plastic sheet and placed on the superstructure in the appropriate place, embedded in cement mortar.

Each panel is supported by the dividing wall in the centre of the structure as shown

Plastering the walls and adding the sloped concrete floor

The toilet walls are then plastered with a mix of 15 parts of pit sand and 1 part of cement (10 litres of cement and 150 litres of pit sand). When the toilet is used as a bathroom it is important to plaster the inner walls of the toilet. Another important requirement of the Blair VIP is that the floor is sloped towards the squat hole. This makes washing down easier and drains the cubicle effectively after bathing. The river sand/cement mix should be strong. 1 parts cement and 4 parts river sand. A mix of 8 litres of cement and 32 litres river sand is used. The floor surface is sprinkled with cement and smoothed down with a steel float.

All the internal surfaces of the Blair VIP are plastered. The floor is also dished to allow drainage of water into the brick lined pit. A fly screen made of aluminium is then embedded in cement mortar to the top of the vent pipe

Adding the fly screen

A piece of corrosion resistant fly screen made of aluminium (225mm x 225mm) is then embedded in cement mortar on top of the brick vent pipe.

Operation and Maintenance of the Blair VIP

The basic maintenance requirement of all Blair VIPs is that they are kept neat and clean with washing water being used to clean down the slab regularly. Also the ventilation pipes should be washed down with water every month or two to clear any spider webs that develop inside. A pipe filled with cobwebs will not ventilate. Also the fly screen should be inspected from time to time. A broken or damaged screen cannot trap flies and fly control is lost. . The ideal BVIP has no moving parts (spiral shape without door) and should provide a long almost trouble free service to the family if it is well made and well maintained. Once the pit eventually fills a new pit can be built and several parts of the superstructure recycled.

Extending pit life

Pit life is reduced considerably if a lot of garbage is added to the pit. It is far better to put garbage into a separate garbage pit and keep the Blair VIP toilet pit for excreta and anal cleansing materials alone. A garbage pit can be built using a concrete ring beam and covering slab (with lid) with the pit being dug within the ring beam. It does pay to build a pit with large capacity for long life. The cost per person served per year is reduced as the pit volume is enlarged. Using the corbelling technique pits lasting 20 years or more could be built using a single bag of Portland cement to make the brick mortar.

A well made Blair VIP can provide long and trouble free service for many years if well maintained.

Making a simple hand washing device

If improvements in health are ever to be achieved in programs linked to sanitation then hand washing should be an essential part of the program.

Many hand washing devices cost almost nothing to make and add very considerably to the hygienic component of the toilet and the sanitation program. Hand washing devices can be made from plastic bottles and alloy cans.

Making a hand washing device with an alloy can

The can is placed over a log or pole which makes the hole easy to make with a nail. Two holes are made on either side of the can at the top. Then a single hole is punched into the base of the can in a position between the two holes at the top of the can. A good nail diameter is 3mm.


A length of wire about 30cm long is then taken and passed through the two holes at the top of the can. The wires are twisted together behind the can as shown. A loop is made at the end of the wire. The hand washer is hung from another wire attached to the toilet roof.

A container of water is required as a source of water. The hand washer is dipped into the water and then hung up on a wire hook suspended from the toilet. Then hands can be washed. Used water can drain on flowers.

A variety of hand washers

Soap or wood ash?

Soap can be drilled with a hole and hung on a wire from the toilet roof. Also a tin container can be attached to the side wall of the toilet and filled with wood ash. The fingers are wetted first, dipped into the ash and then washed again. It is a very effective and simple method of washing hands.