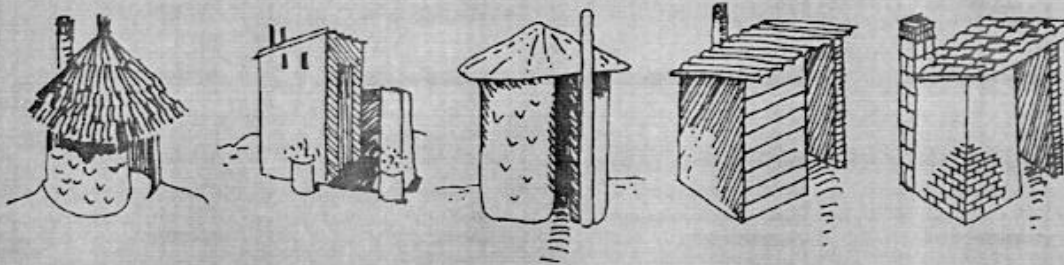


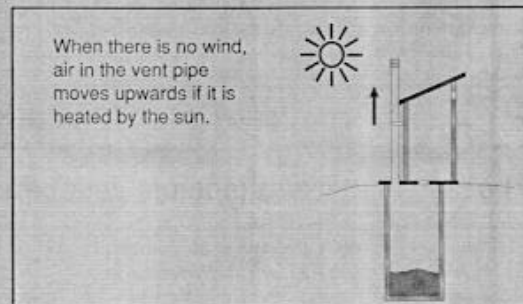
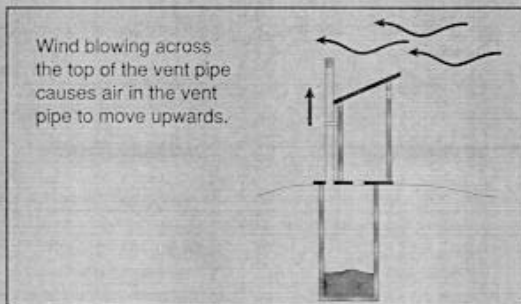
## Technical Brief No.31/Latrine vent pipes

Ventilated improved pit (VIP) latrines are recommended for unsewered communities in Africa and elsewhere - wherever solid waste material is used for anal cleansing.

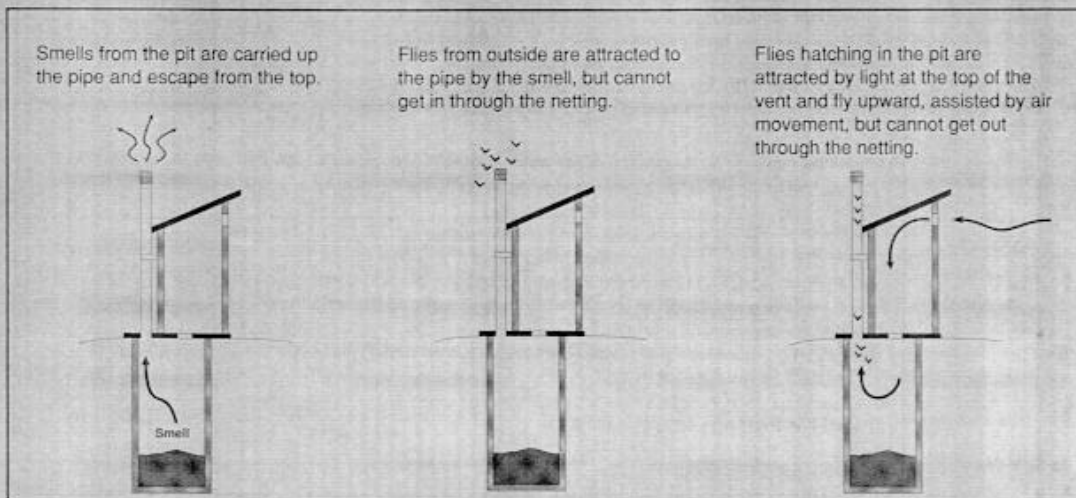
VIP latrines take various forms:



Ventilation is provided in VIP's by a vent pipe with flyproof netting at the top.



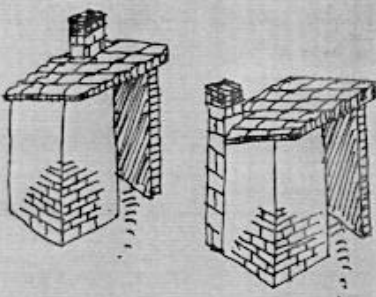
The upward movement of air in the vent pipe reduces nuisance from smells and insects.



# Technical Brief No.31/Latrine vent pipes

## Materials for vent pipes

<p><b>Asbestos cement pipes</b> <b>PVC and uPVC pipes</b></p> <p>PVC pipes should preferably have a stabilizer to prevent damage by ultra-violet light.</p>	<p><b>Minimum internal diameter</b></p> <p>In areas with high wind speeds: 100mm Latrines built at minimum cost: 100mm</p> <p>In areas with low wind speeds: 150mm</p> <p>Multiple pit latrines where each pit is used by two cubicles: 200mm</p>
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<p><b>Brickwork or blockwork</b></p> <p>A vent can be built as an extension of the superstructure.</p> <p>It can be inside or outside the building.</p> <p>Inside vents must not make the latrine uncomfortable to use.</p>		<p><b>Minimum size</b></p> <p>In areas with high wind speeds: 180mm square inside</p> <p>Latrines built at minimum cost: 180mm square inside</p> <p>In areas with low wind speeds: 230mm square inside</p>
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<p><b>Locally made vent pipes</b></p> <p><b>Large diameter bamboo</b> Remove all dividers.</p> <p><b>Plastered sackcloth on steel mesh</b> Pipes are made as follows:</p> <ul style="list-style-type: none"> <li>● Cut a piece of strong steel mesh 2.5m long and about 0.8m wide (suitable mesh is a spot-welded 4mm bars at 100mm centres).</li> <li>● Roll the steel mesh into a tube.</li> <li>● Stitch sackcloth (hessian) tightly round the steel mesh tube.</li> </ul> <p><i>Optional:</i> - Make a horizontal bath, for example, by cutting a 200-litre oil-drum lengthwise and welding halves together.</p> <ul style="list-style-type: none"> <li>- Put 6kg salt*, 50kg cement and 70 litres of water into bath and mix thoroughly. (*As an alternative to salt, soak cowdung overnight, strain next day, and use the strained liquid as water).</li> <li>- Roll tubes slowly in the bath until all sacking is well soaked.</li> <li>- Keep pipe moist for four days, then allow to dry.</li> </ul> <ul style="list-style-type: none"> <li>● Plaster outside of tube with thin layers of mixture of sand, cement and water (for example, 2 parts of sand, 1 part of cement and enough water to make the mixture like thick soup that can be applied with a brush).</li> <li>● Brush on more layers of plaster until total thickness is at least 10mm, taking care not to put plaster on the flyproof netting</li> </ul> <p><b>Plastered matting</b> - see opposite page</p> <p><b>Anthill soil</b> - see opposite page</p>	<p><b>Minimum internal diameter</b></p> <p>In areas with high wind speeds: 200mm</p> <p>In areas with low wind speeds: 250mm</p>
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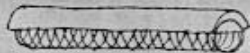


## More about locally-made vent pipes

### Plastered matting

Straight reeds, bamboo or wood poles about 10mm diameter are tied together with wire or string to make a mat 2.5m long by 1m wide.

- Roll the mat around green saplings to make a tube about 300mm diameter.
- Fix flyproof netting to one end.
- Lay on ground and plaster half the tube with a layer of cement mortar (one part cement, three parts sand, not too much water). Keep moist for four days, then allow to dry.
- Fix pipe to latrine wall, plastered part against wall.
- Plaster the other half.



### Anthill soil

- Knead anthill soil (like kneading dough to make bread).
- Make into large sausages about 100mm diameter and 900mm long.
- Make a sausage into a ring, which will be about 200mm inside diameter.
- Place ring in hole left in pit slab for the vent pipe.
- Drive short lengths of reed or thin bamboo vertically into the ring.
- Add another ring on top. Drive in reed or bamboo and continue to height of 2.5m.
- Fix flyproof netting at top.
- Smooth outside of pipe.
- Apply a thin layer of cement mortar (1 part cement, 6 parts sand) to outside.



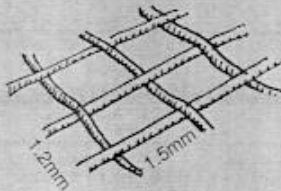
## Flyproof netting

### Size of mesh

The best size of mesh is 1.5mm x 1.2mm.

Larger holes allow flies to get through.

Smaller holes restrict air flow.



The best material for flyproof netting is **PVC-coated glass fibre**, which lasts more than five years.

Cheaper material may fail because of corrosion and attacks by birds and small animals.

Stainless steel lasts longer but is very expensive.

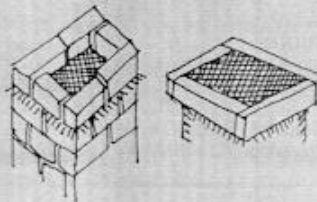
### Fixing flyproof netting

For PVC or AC pipes, sandpaper top of pipe so there is no sharp edge that will cut the netting.

Fix to pipe with spray resin glue or tie round with galvanized wire or nylon string.

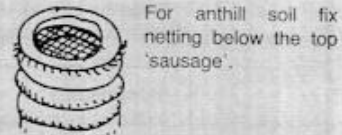


For bricks or blocks either build in or fix with pieces of wood.



For plastered sackcloth, sew netting to sackcloth before plastering.

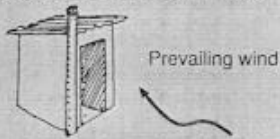
For plastered matting fix netting to matting tube with galvanized wire or nylon string before plastering.



# Technical Brief No.31/Latrine vent pipes

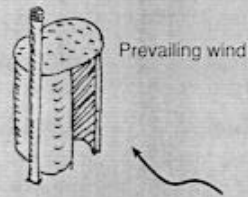
## Flyproof netting

Where upflow of air depends on the wind, the latrine doorway should face the direction of the prevailing wind.

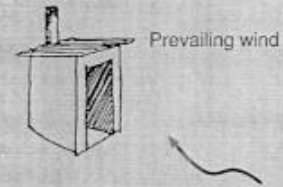


If the pit extends to the side of the superstructure the vent pipe should also face the prevailing wind.

A spiral latrine can easily be located so both opening and pipe face the prevailing wind.

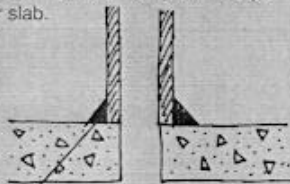


If the pit extends behind the superstructure the doorway should have the wind; the vent pipe is opposite the wind.



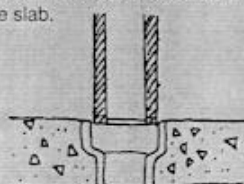
## Fitting vent pipes

The bottom of the vent pipe should be securely fixed over a hole in the pit cover slab.



Cement mortar fillet

A PVC or asbestos cement pipe can be lowered into a socket set into a concrete slab.



The pipe should be attached to the wall of the superstructure with steel straps or galvanized steel wire built into the wall.



## Inspection and maintenance

**Inspect flyscreen regularly (at intervals of six months or less)**

- Clear any debris from the screen, for example by pouring a bucketful of water down the pipe; this will also wash spiders and spiderwebs into the pit.
- Check the fixture of the vent pipe to the structure and replace if damaged.
- Make sure the vent pipe is sound and is firmly fixed to the slab.

### For further information:

Franceys, Pickford, Reed. *On-site sanitation*, WHO, 1989.

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