Technical Brief No.31/Latrine vent pipes

Ventilated improved pit (VIP) latrines are recommended for unserved 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.

- Wind blowing across the top of the vent pipe causes air in the vent pipe to move upwards.
- When there is no wind, air in the vent pipe moves upwards if it is heated by the sun.

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

- Smells from the pit are carried up the pipe and escape from the top.
- Flies from outside are attracted to the pipe by the smell, but cannot get in through the netting.
- Flies hatching in the pit are attracted by light at the top of the vent and fly upward, assisted by air movement, but cannot get out through the netting.
Technical Brief No.31/Latrine vent pipes

Materials for vent pipes

<table>
<thead>
<tr>
<th>Asbestos cement pipes</th>
<th>Minimum internal diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC and uPVC pipes</td>
<td>In areas with high wind speeds: 100mm</td>
</tr>
<tr>
<td></td>
<td>Latrines built at minimum cost: 100mm</td>
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<tr>
<td></td>
<td>In areas with low wind speeds: 150mm</td>
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<tr>
<td></td>
<td>Multiple pit latrines where each pit is used by two cubicles: 200mm</td>
</tr>
</tbody>
</table>

Brickwork or blockwork

A vent can be built as an extension of the superstructure.

It can be inside or outside the building.

Inside vents must not make the latrine uncomfortable to use.

Locally made vent pipes

Large diameter bamboo
Remove all dividers.

Plastered sackcloth on steel mesh
Pipes are made as follows:
- 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).
- Fold the steel mesh into a tube.
- Stitch sackcloth (hessian) tightly round the steel mesh tube.
- Optional: make a horizontal bath, for example, by cutting a 200-litre oil drum lengthwise and welding halves together.
  - Put 9kg salt, 50kg cement and 70 litres of water into bath and mix thoroughly. ('As an alternative to salt, soak cow dung overnight, strain next day, and use the strained liquid as water.)
  - Roll tube slowly in the bath until all backing is well soaked.
  - Keep pipe moist for four days, then allow to dry.
- 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).
- Brush on more layers of plaster until total thickness is at least 10mm, taking care not to put plaster on the flyproof netting

Plastered matting - see opposite page
Arthill soil - see opposite page
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 the 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 lathine 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 0.5mm.

Larger holes allow flies to get through.

Smaller holes restrict airflow.

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.

For anthill soil fix netting below the top sausage.
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.

Aspiral latrine can easily be relocated so both opening and pipe face the prevailing wind.

If the pit extends behind the superstructure the doorway should face 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.

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 strap 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 superstructure and replace if damaged.
- Make sure the vent pipe is sound and is firmly fixed to the slab.

For further information:

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