IN SEARCH OF
THE IDEAL PIT EMPTYING MACHINE

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South Africa has been engaged in a large scale supply driven sanitation delivery programme for the last ten years.
But what happens when the pit is full?
Pit emptying options – vacuum tanker

Photo credit: Steve Sugden
Vacuum Hose Arm

Double Layered Tank

Dewatering outlet
In Action

Connect lengths of pipes as required

Pipe can fit down standard pedestal

Or through a pit opening
JetVac in Action

• Vacuum tanker in operation emptying pit latrines, 1:18, [http://youtu.be/C58Dd7dVxZs](http://youtu.be/C58Dd7dVxZs)
Limitations

Manoeuvring

Poor Access

Obstacles
Access Limitations

- Vacuum tankers can't go everywhere, 0:18, http://youtu.be/U4otwoy6x5o
Small tankers – SMME friendly?
Access can be a problem!
New devices explored by PID-WRC

Three main ideas

• ‘Gobbler’
• ‘Pit Screw Auger’
• ‘Nano Vac’
Gobbler – Final prototype

Sprung scraper to remove waste from scoops

No bend = one chain = lower part count, weight

No cog at the bottom
Pit Screw Auger
Pit Screw Auger - Testing
Pit Screw Auger – reverse thread near the top is critical
Pit Screw Auger – usefulness limited by design of pit toilets
Nanovac – mini vacuum pump based on the Mapet concept
Moving on - the eVac
Critical – a small vacuum pump works best with a small vacuum tank
eVac Field Trails #1

eVac Field Trails #2

- eVac field trials, near Pietermaritzburg, South Africa #2, 0:55, http://youtu.be/ZtZkCpDMfco

Complete video, 9:36, http://youtu.be/cRTMt9yQb1k
But, *trash* is a major problem in South African pits.
Phase 1:

Emptied 10,000 VIPs per year at a cost of R1,500 to R2,000 per VIP.
How to empty - conclusions

• There is no ideal pit emptying machine (yet).
• Wet pits – use a vacuum pump, small or large, depending on access. Can also use a trash pump, or a Gulper.
• Dry pits or pits with excessive amounts of trash – there is still no practical alternative to manual emptying.
What we can do to reduce the emptying burden

• Build larger pits so that pit life is much longer (e.g. 15 to 20 years) then knock down and rebuild the VIP when full (assumes space for relocation is not a problem)
• Use lightweight robust *movable* pit structures (ditto re space)
• Use smaller alternating pits designed with better access for emptying
• Use pour flush toilets with alternating pits (easier to access, much less trash, easier to empty)
• Use urine diversion or composting toilets
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