

Latrine Pit Pumping System

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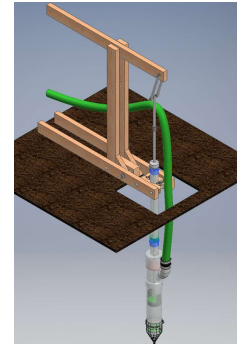
Problem

Latrine pits provide a means of better sanitation for rural communities in Mzuzu, Malawi. Over time, these latrines become full and must be vacated to remain viable for the communities that rely on them. Common current methods of latrine emptying are either too expensive or extremely unsanitary.



Innovation

More ergonomic power transmission



Modular components provided to address varied latrine conditions and depths

Collapsible design for transportation



Technical approach

- Locked check valve and piston check valve system provides both suction and lift
- Design
- Human powered system, with improved power transmission from existing designs
- Fabrication needed to represent in country material constraints and manufacturing capabilities
- Accurate simulated testing using pig waste at the Virginia Tech Swine Center



Results



- Proven a successful means of emptying pit latrines
- Tested from 2' to 8' depths

- Tested on three different sludge simulants
- Flow rate of 4.55 m³/hr with an applied load of 19 kg achieved with pig waste

Testing Results Filling a 5 Gal Bucket			
	Time To Full (s)	Applied Load (kg)	Flow Rate (m ³ /hr)
Water	6.7	3	10.16
Clay	15.44	13	4.41
Manure Mix (10 gal water)	15.0	19	4.55

Characteristic flow rate of pump