

A small scale, mobile pit emptying unit:

The PuPu pump

At PRACTICA, we believe that small scale mobile desludging units can supplement the current gap in latrine emptying services. Based on insights in the technical, financial and logistical challenges in ongoing FSM programs, we started an engineering and testing trajectory towards a new fecal sludge pump called the PuPu pump (Pull/Push). It supports clean, efficient and affordable small scale emptying services to both served and unserved segments of the population.

Technical design

The PuPu pump is a new combination of a (small) compressor, a reservoir with automatic duck bill type non return valves and a manual operated suction/pressure valve. The small volume of the reservoir makes it possible to reach a high vacuum in a short time to draw up the sludge. The duck bill valves are unique in that they can handle debris while still functioning. The PuPu pump not only sucks the sludge from the pit, it can also push it from the pump into a tank on a vehicle nearby or parked at a distance, depending on the situation. In this case, a strong and expensive vacuum tanker or vacuum truck is not needed, but a simple storage unit can be placed on a transport truck.

Specifications	
Weight pump + compressor	45kg + 45kg
Pumping distance lay flat	0-100m depending on viscosity
Yield	1-7m3/h depending on viscosity
Operating pressure	0,5-2,5 bar
Investment cost	<10.000 euro



Key advantages:

- Light weight, mobility, and used with any type of storage and transport;
- Plug and play – complete set fits on euro pallet;
- Can pump high level of debris with 4" hoses limiting risk of need for fishing.

Why developing the PuPu pump?

Over 60% of the population in urban areas in Africa and Asia rely on manual emptying services because traditional vacuum trucks cannot access areas away from the main roads or service costs are too high. Manual emptying is a degrading and dangerous work, and a hazard to public health as there is usually no linkage & transport to safe deposition areas. Furthermore, conventional systems can cost up to 30-50.000 euro and this a barrier for small businesses to emerge in the sector.

Positioning - Next steps

The research facility of PRACTICA developed 2 prototypes for intensive testing at the workshop in the Netherlands mid 2020. Sludge thickness, debris, pressure, pumping distance and component strength was simulated and tested. Debris such as syringes, rags, bottles, sanitary napkins, stones and wood pieces did not block the pump.

A near commercial product was developed and shipped to Madagascar for technical evaluation by our FSM expert team by emptying 50 latrines.

Needs / Wants - **Technical design**

Insights from field tests will contribute to product iterations and steps towards commercialization. In parallel, we intend to further explore the need for smart solutions in fluidizing/mixing and transporting the sludge to make efficient emptying job.

Needs / Wants - **Business case**

There are many configurations possible on potential business cases: How do informal and professional businesses look at the technology? What are key considerations and requirements? What are the cost and income parameters? Business cases calculations and insights in market introduction will support the overall product development.





We aim to test the pump in 2021 in a number countries in variable situations with different actors. This supports product improvements and positioning for larger scale introduction similar to our endeavours capacitating over 100 small scale drilling companies in Africa for boosting rural water supply.

Click on the link to see the PuPu pump in action:
https://youtu.be/c8Lxo7-w8H4

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