Practical Advances in Pit Latrine Emptying Technology

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PIT VIDURA BY PIVOT

engineers without borders uk

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(Pty) Limited

WATER
RESEARCH
COMMISSION

Where we started (c. 2009)

Chain and Scoop

Screw Auger

Moving parts, sludge and trash are not a great combination!

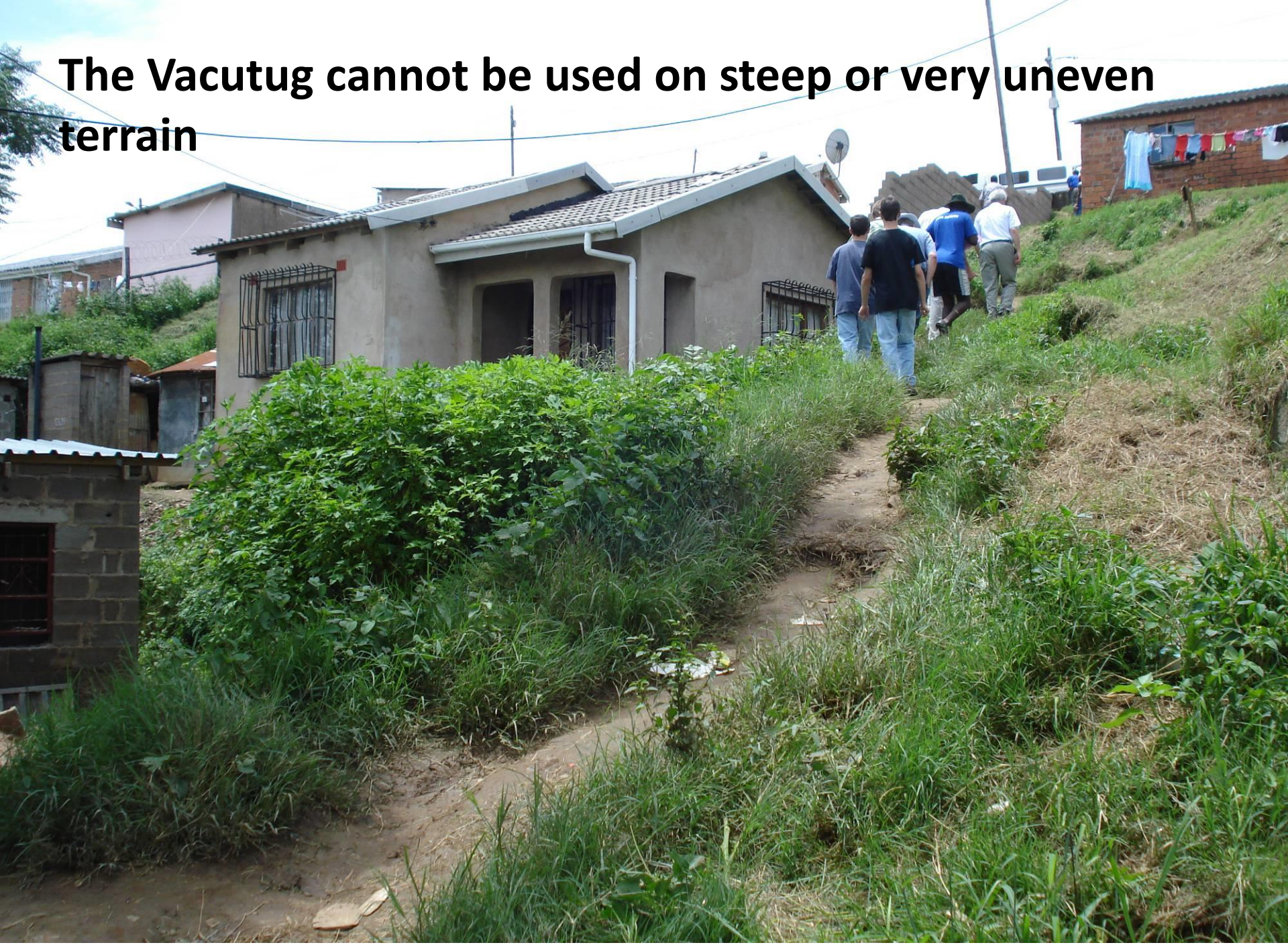
Back to vacuum . . .

The Vacutug –

Developed by UN Habitat in 1995

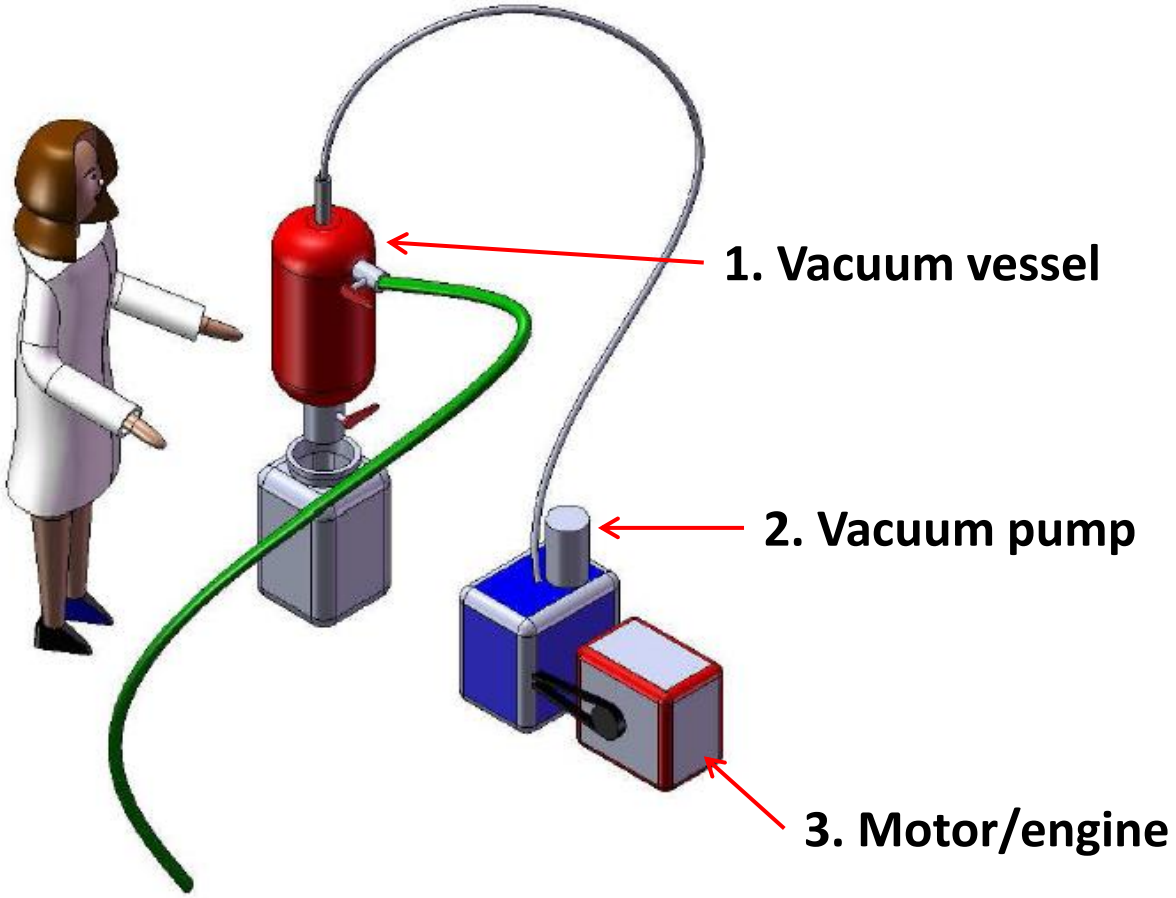
500 litre vacuum tank, 6 kW engine, 5 km/hr travel speed

The Vacutug weighs 1 ton – not so easy to move around if travelling more than short distances


The Vacutug cannot be used on steep or very uneven terrain

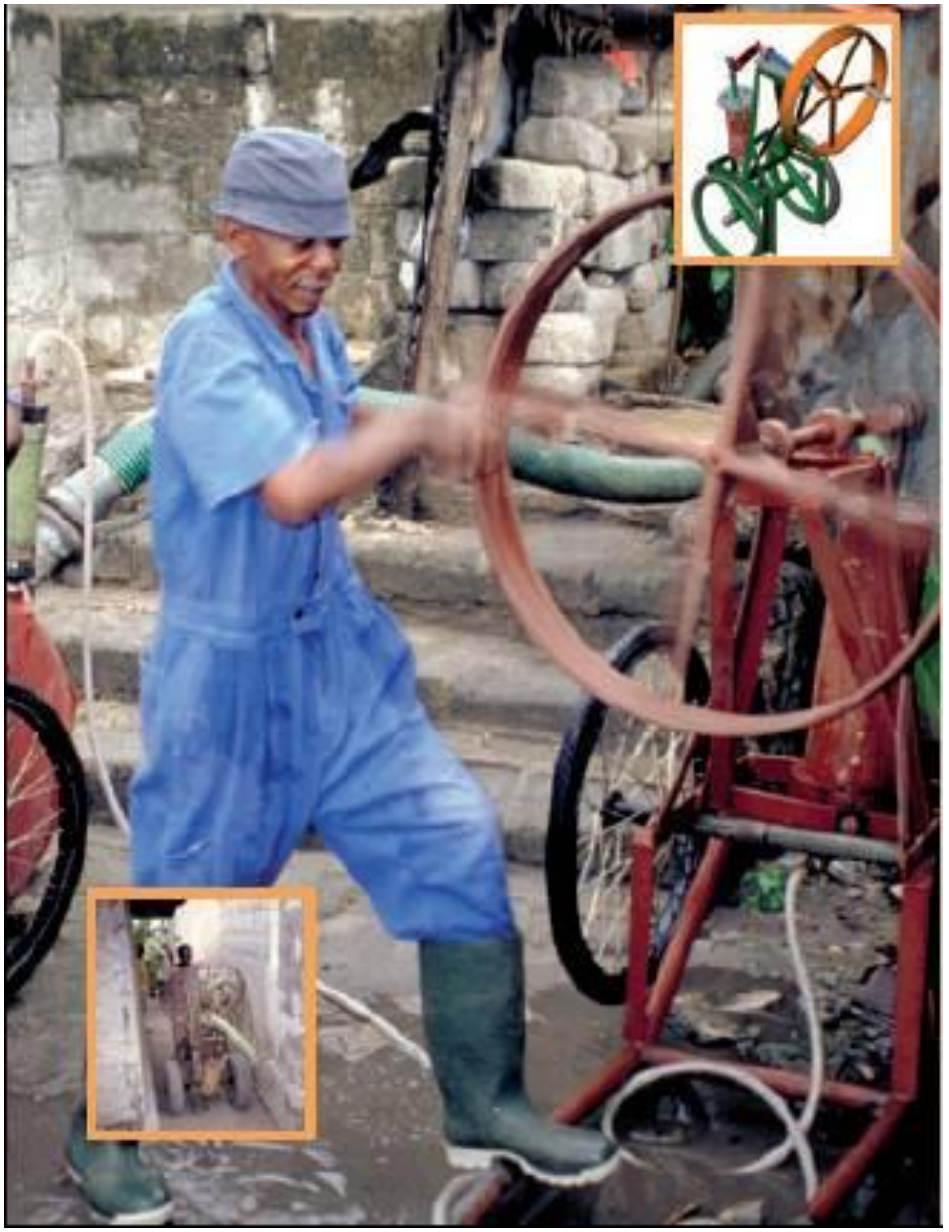
The components of a vacuum suction machine

These components do not need to be all mounted on one chassis



The Mapet –

Developed by WASTE,
Dar es Salaam
early 1990s

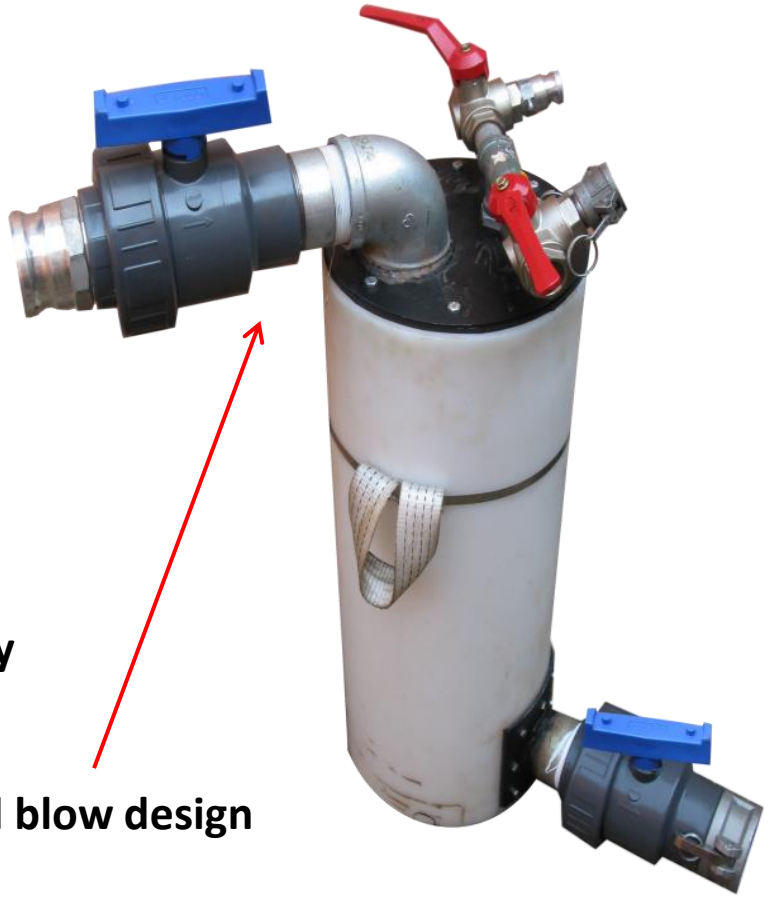


Nanovac – mini vacuum pump based on the Mapet concept

Experimenting with vacuum vessel design

Portable 40 litre vacuum vessels

Suck only design



Suck and blow design

Portable 40 litre vacuum vessels

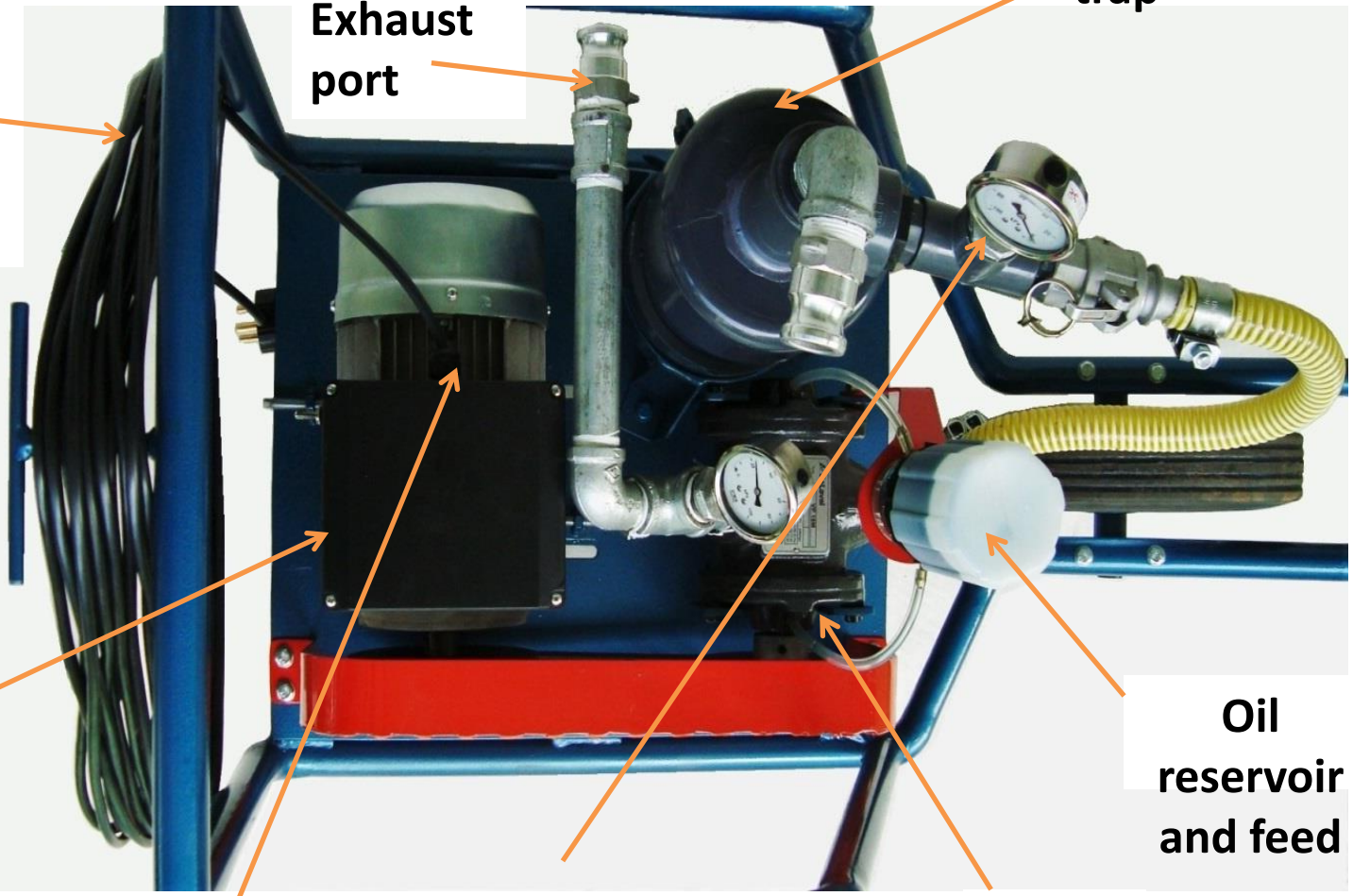
Sight glass to check sludge level

The first eVac - 2012

The eVac Mk 2 - 2014

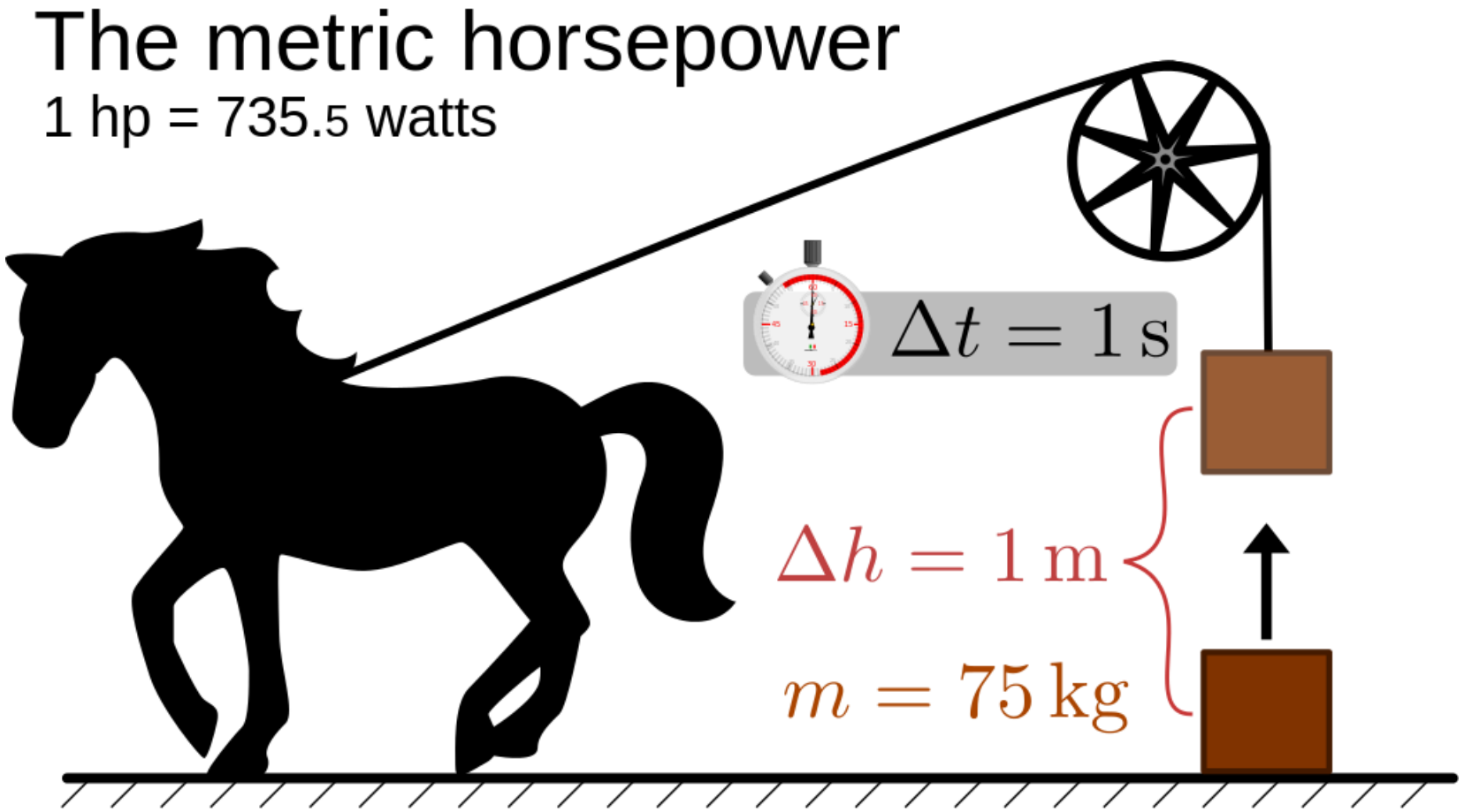
The eVac Mk 3 - 2016

Anatomy of the eVac



But isn’t it too small to be effective?

Powered by a 2hp motor



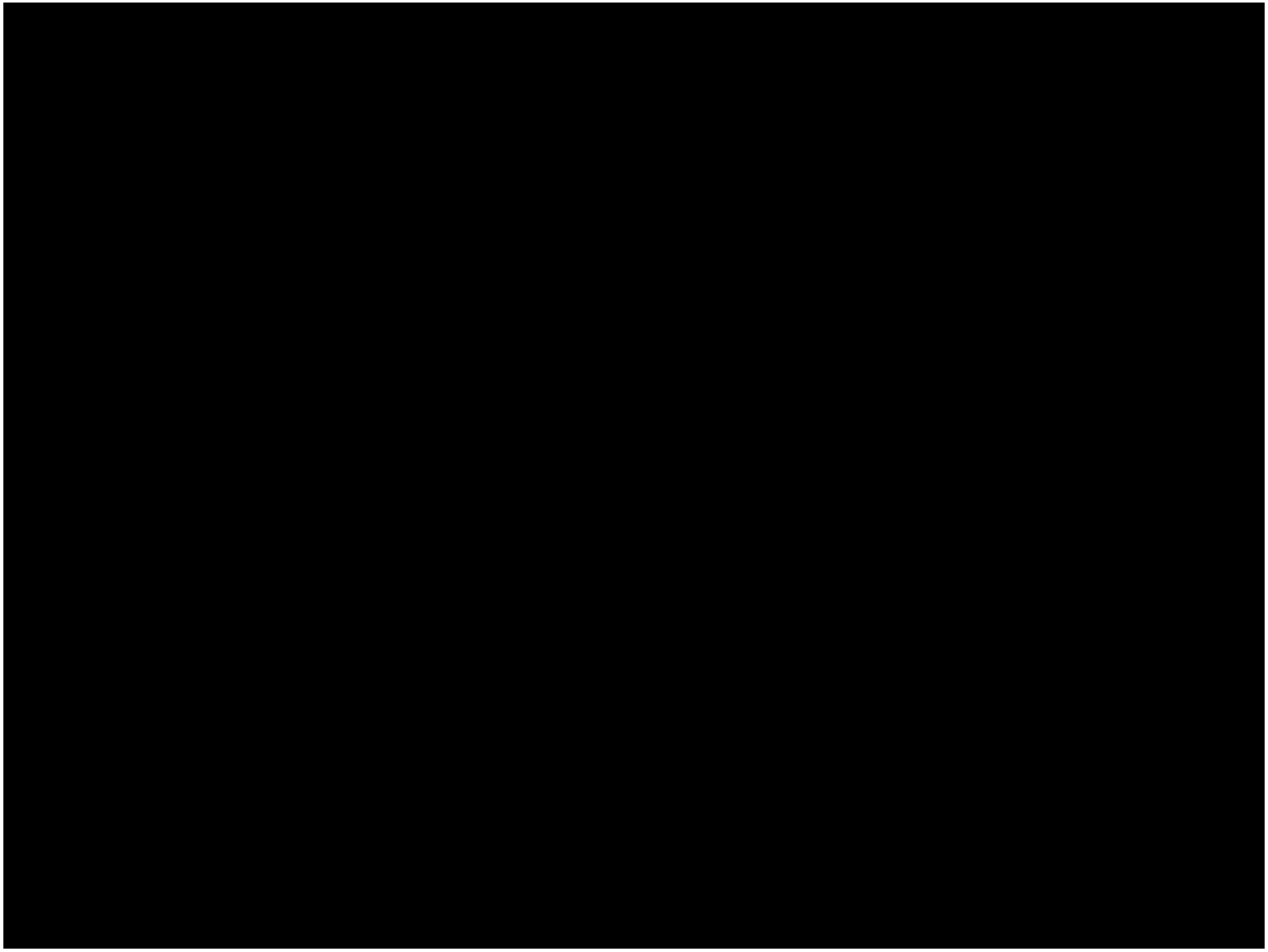
Sizing a vacuum pump

- In vacuum pumping power demand increases as air flow increases
- Therefore a big vacuum tank and a long hose needs a powerful vacuum pump
- A short hose and a small pit side vacuum tank does not need such a powerful pump
- The suction force at the end of the vacuum hose is the same as long as the vacuum pressure is the same (vacuum pressure x area = suction force)

Use of the eVac in practice

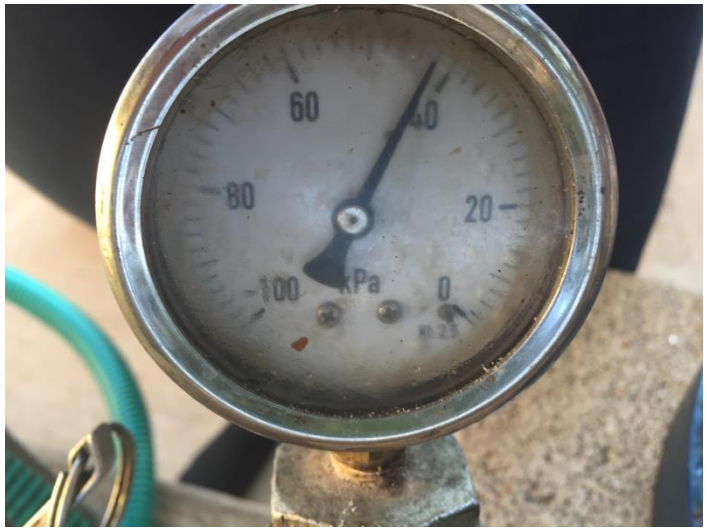
Additions for Rwandan eVac

Operating the eVac



But, its not all as straight forward as it may seem

If it can break, it will break…



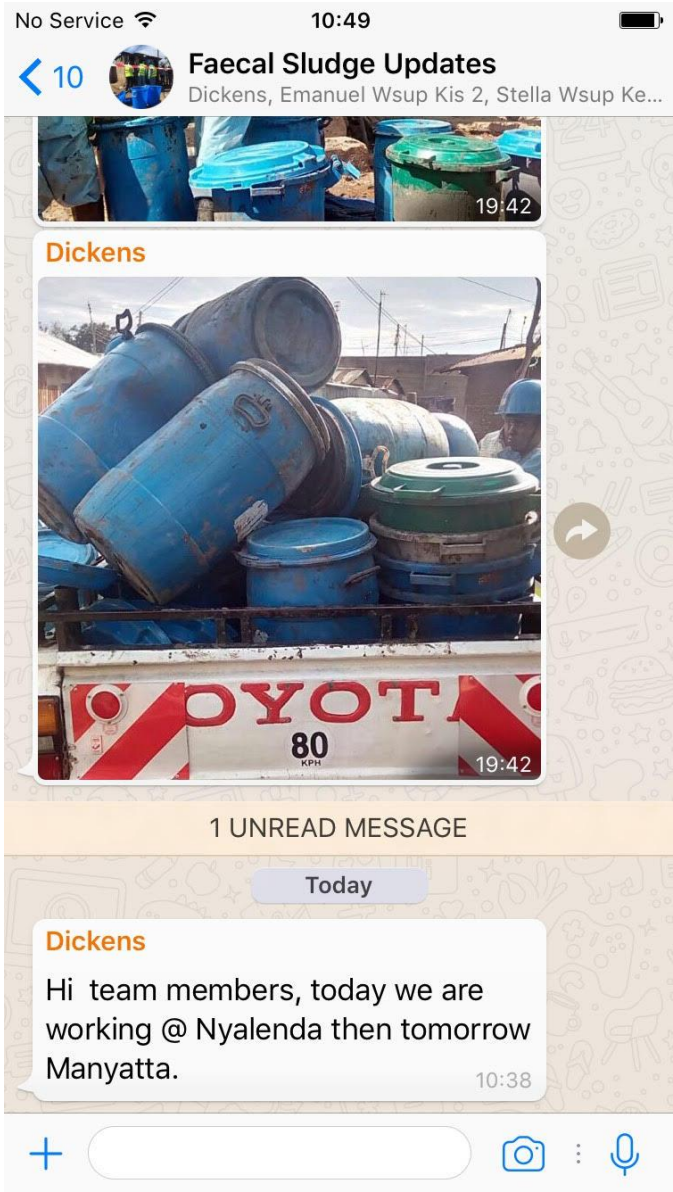
Pros	Cons
– Can pump to 4-5 m depth – Easy to operate, clean, and maintain – Easy to unclog when blocked – Customer/operator not exposed to sludge – Can be locally manufactured	– Must continue to ‘fish’ for trash – Will leave large solids behind – Needs a power source – High capital cost (~$4000+) – Breaks easily without well trained workers

Will not revolutionise your business unless you already have a business case!

So – why use the eVac?

LEGITIMACY

The Box Mk1


No Service
10:49
10
Faecal Sludge Updates
Dickens, Emanuel Wsup Kis 2, Stella Wsup Ke...
19:42
Dickens
80
KPH
19:42
1 UNREAD MESSAGE
Today
Dickens
Hi team members, today we are working @ Nyalenda then tomorrow Manyatta.
10:38

Practical

Advances

in

Pit Emptying Technology

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