

A rapid, low-cost test for faecal sludge strength used to evaluate pump performance

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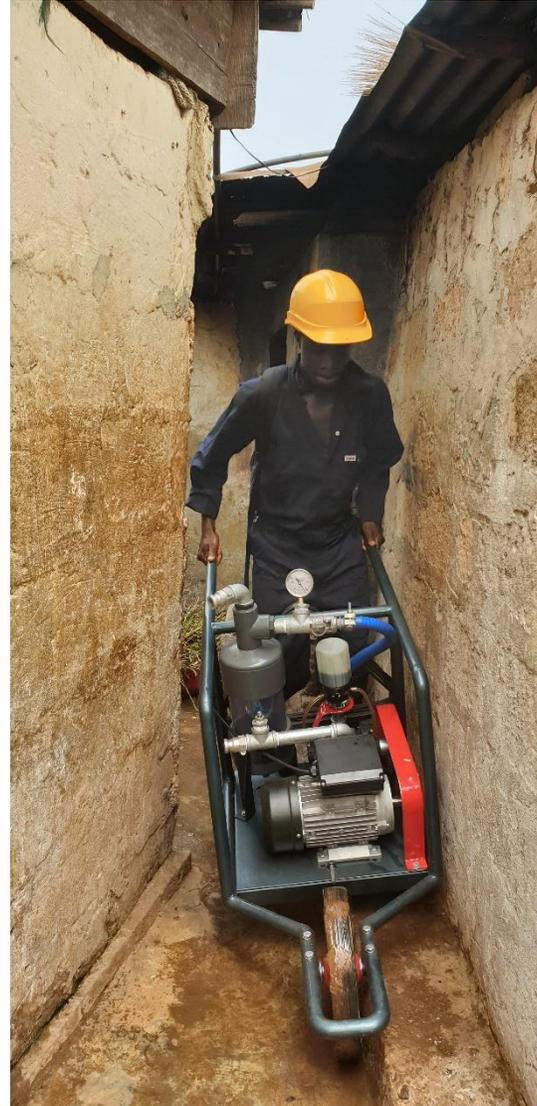


Partners In Development, Mott MacDonal

With material so variable as faecal sludge, how can one objectively compare the performance of different pit emptying technologies?

eVac – a portable pit emptying machine

- Vacuum pumping machine
- Powered by a 2hp motor/engine
- < 70 kg



eVac – a portable pit emptying machine

But how good is it? How can one compare performance objectively, quantitatively, when the medium is faecal sludge?



The penetrometer –
widely used for testing
bearing strength in roads
and foundations



Cone replaced
with ball

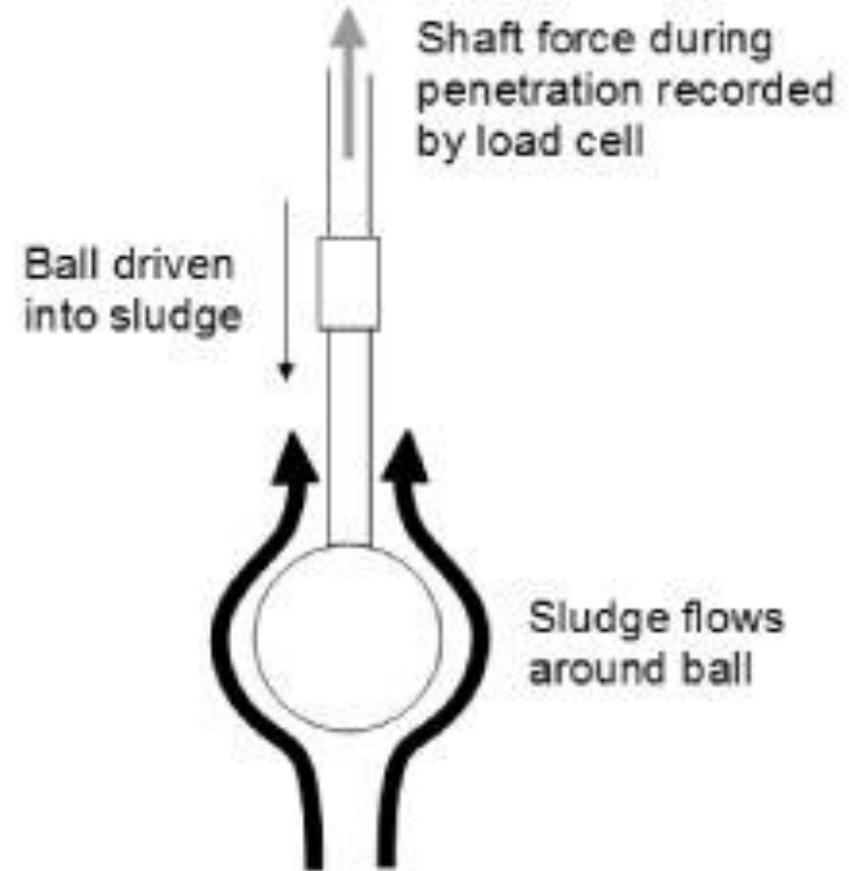


Figure 1
Schematic demonstrating the operating principle of the portable penetrometer

Penetrometer for faecal sludge



P-lite

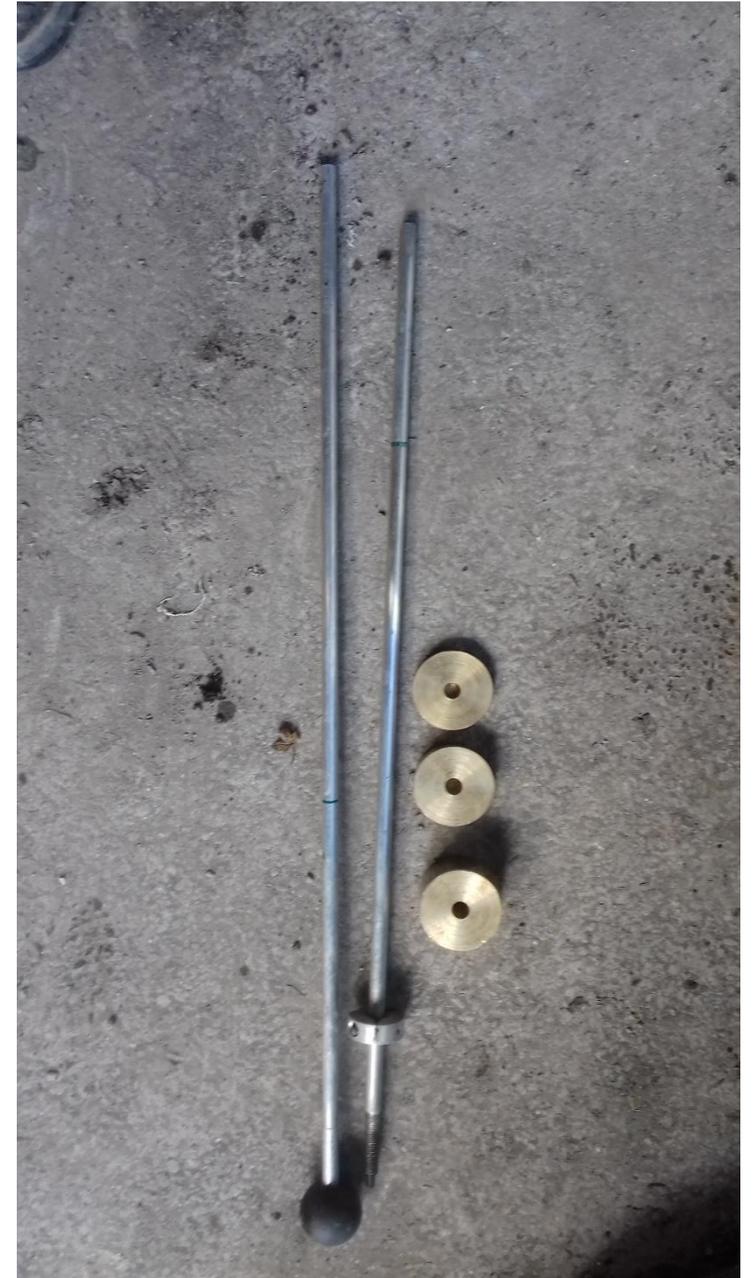
Lightweight manual
penetrometer



P-lite

Lightweight manual penetrometer

- Improved sensitivity at low strengths



P-lite

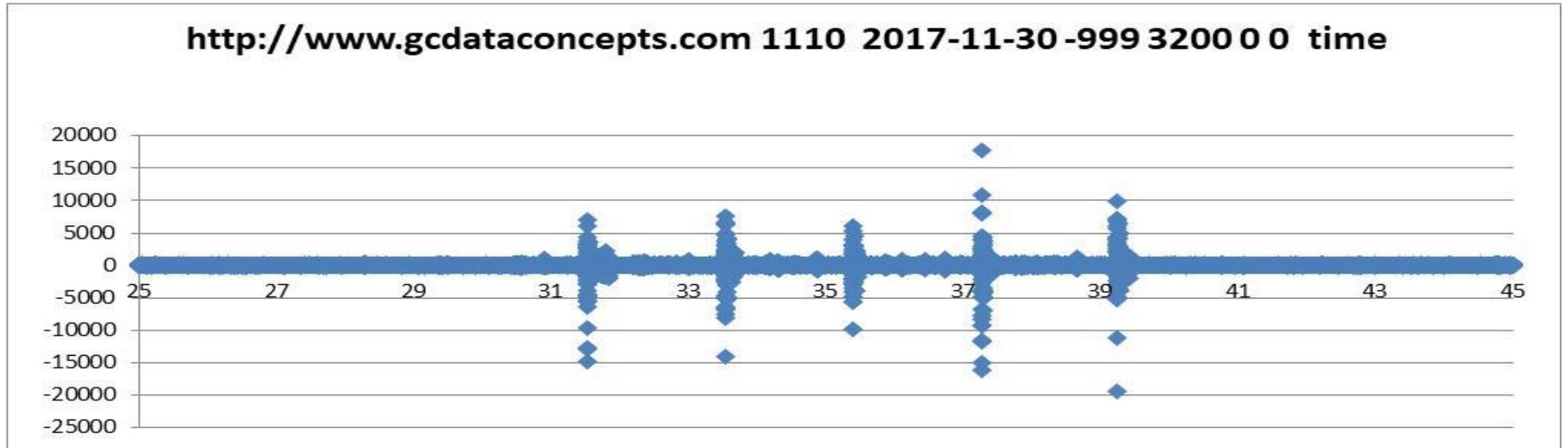
Hammer and anvil



Trialing digital
measurement using
accelerometer



Accelerometer data –
can be used to measure displacement against time



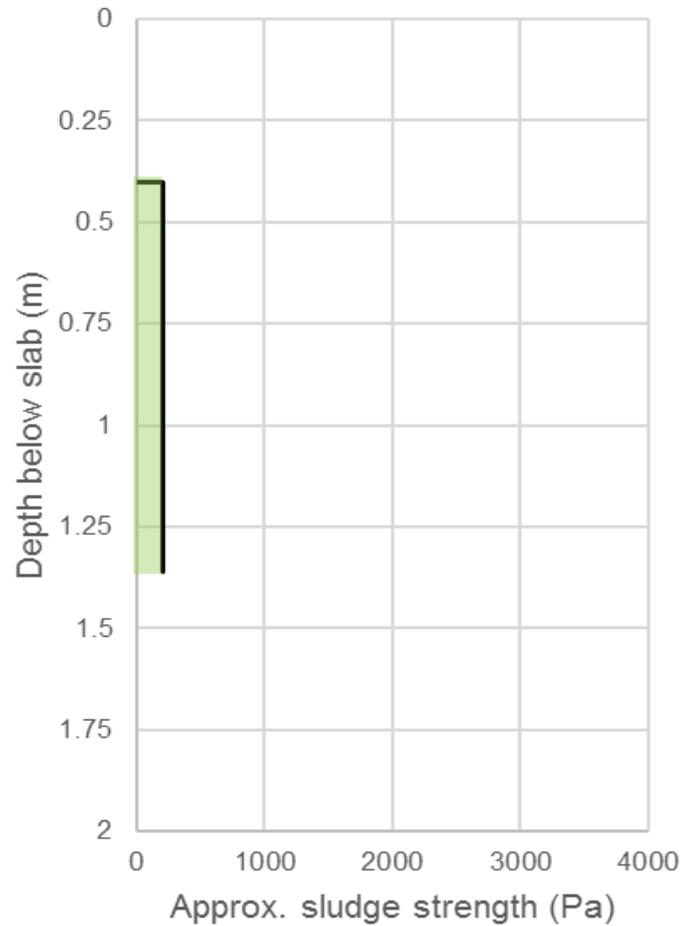
Lusaka Field Trials

- GIZ funded
- Demonstrate eVac
- Measure performance
- Comparison to manual emptying (steel pole and bucket)

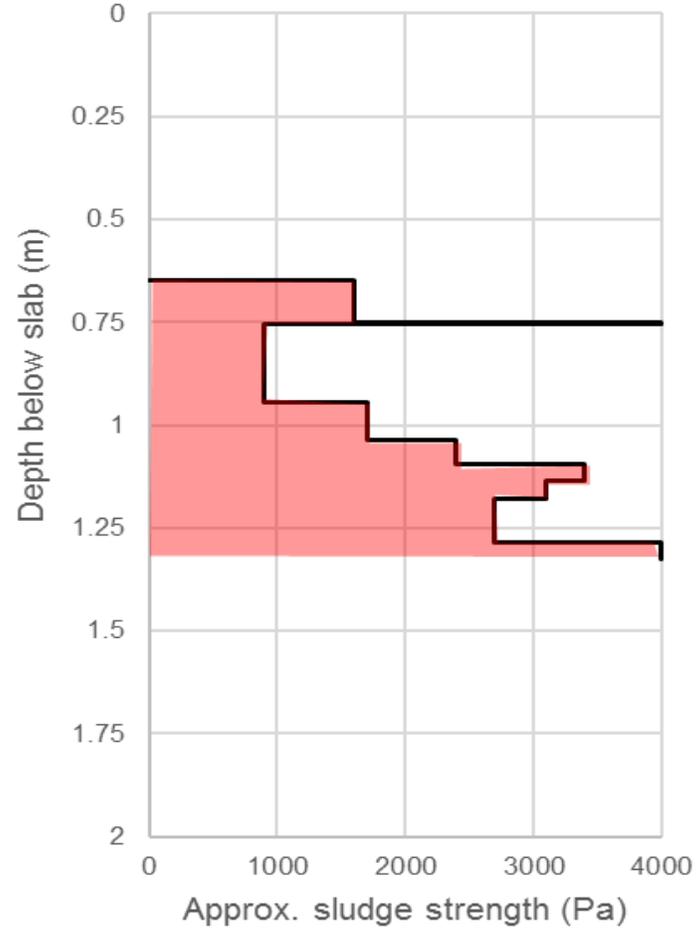


Conversion to Strength

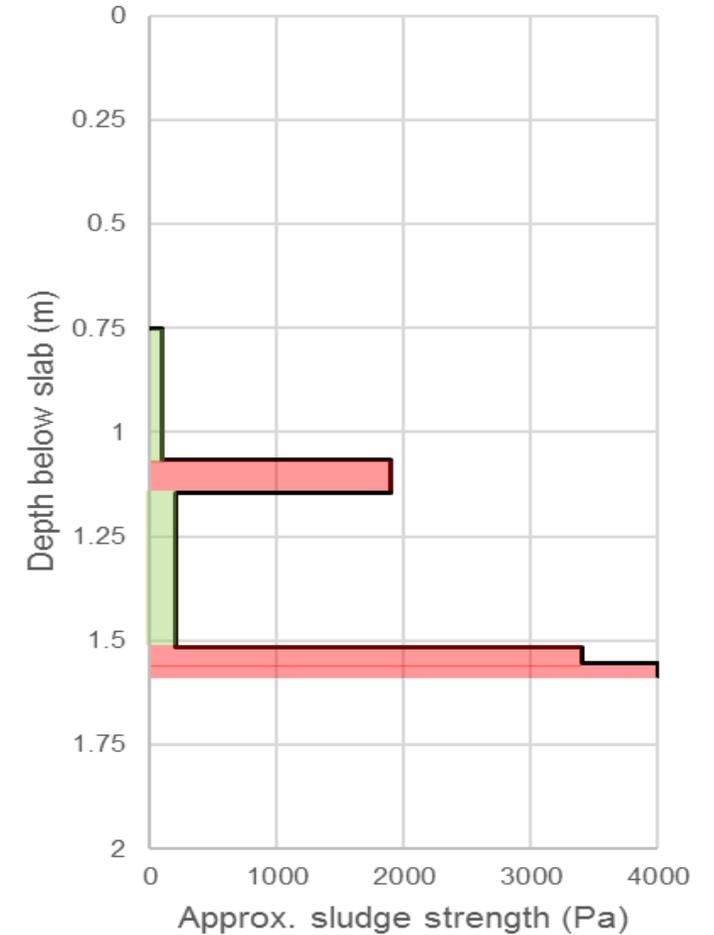
Pit 3, Chazanga, Lusaka, 29-11-2017



Pit 5, Kanyama, Lusaka, 30-11-2017

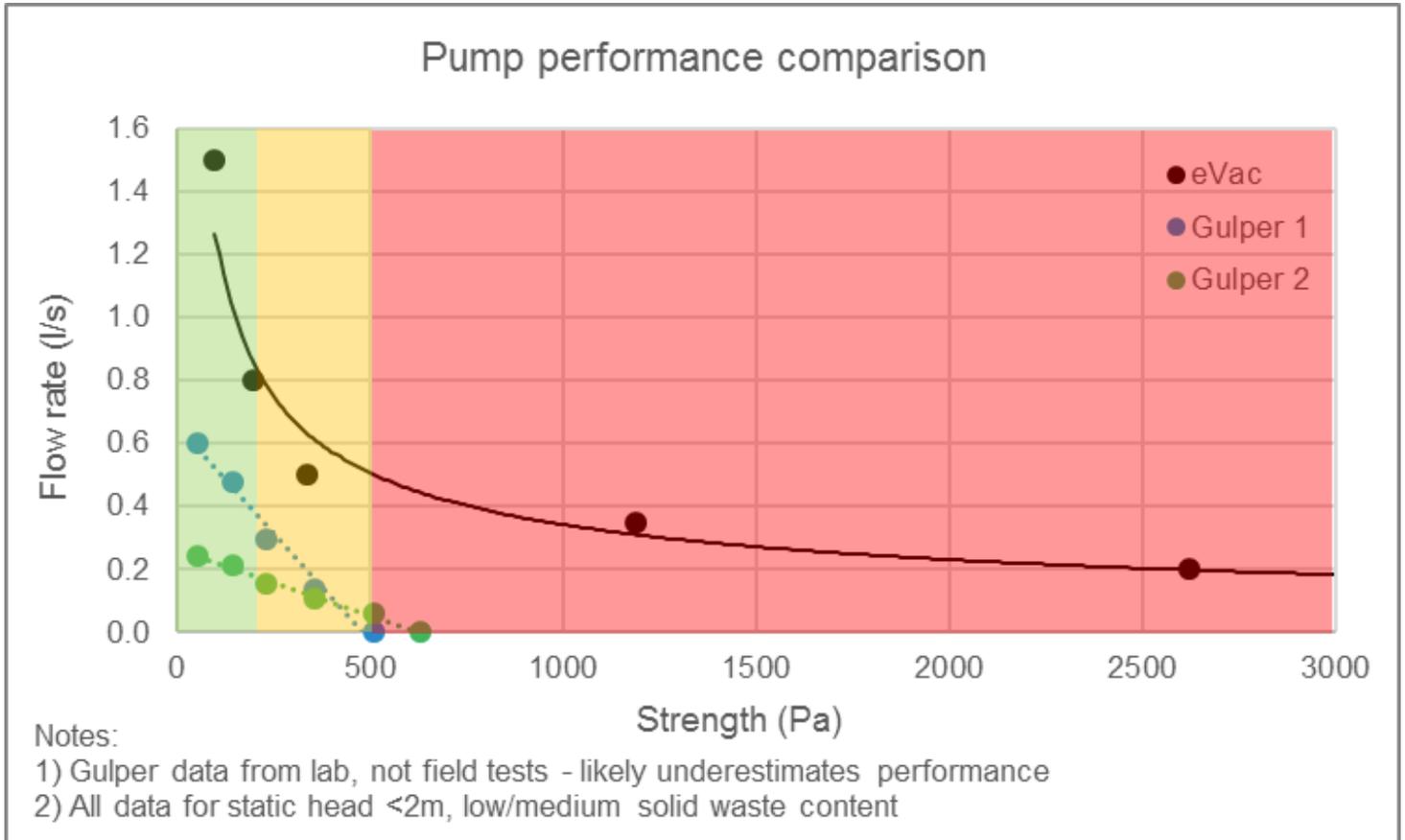


Pit 8, Kanyama, Lusaka, 1-12-2017



eVac Performance

- Flow rate combined with strength data and field observations



P-lite Performance

- Easy to use
- 5 minutes / test
- Quantitatively evaluate pump performance



How to improve digital measurement?

How good is your emptying technology?