Calibration of manual cone penetrometer for testing faecal sludge strength in Mzuzu, Malawi

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Why measure sludge strength?

- Key to design and operation of latrine emptying equipment
- Correlates to total solids and therefore treatment needs
Mzuzu University Manual Penetrometer

Advantage:
Quick, cheap and easy

Disadvantage:
Relative strength only
Portable Penetrometer – ‘Penny’

Mechanical, portable research tool

Advantage:
Continuous profile of shear strength

Disadvantage:
Slower, more costly
Calibration Exercise
Results

- Sludge often > 5kPa
- Approximate calibration generated

![Graph showing Manual penetrometer - initial calibration with R² = 70%](image-url)
Implications and Next Steps

- Sludge exceeds emptying technology capacity
- More data required to refine calibration
- Developing generic calibration for manual penetrometers