

# 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



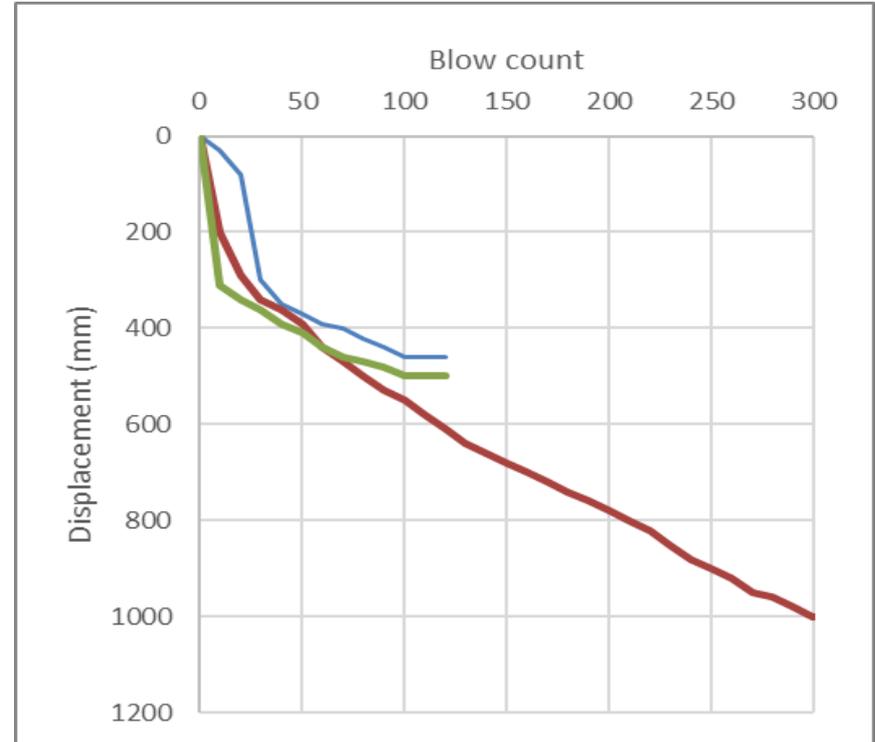
# Mzuzu University Manual Penetrometer

Advantage:

Quick, cheap and easy

Disadvantage:

Relative strength only



# Portable Penetrometer – ‘Penny’

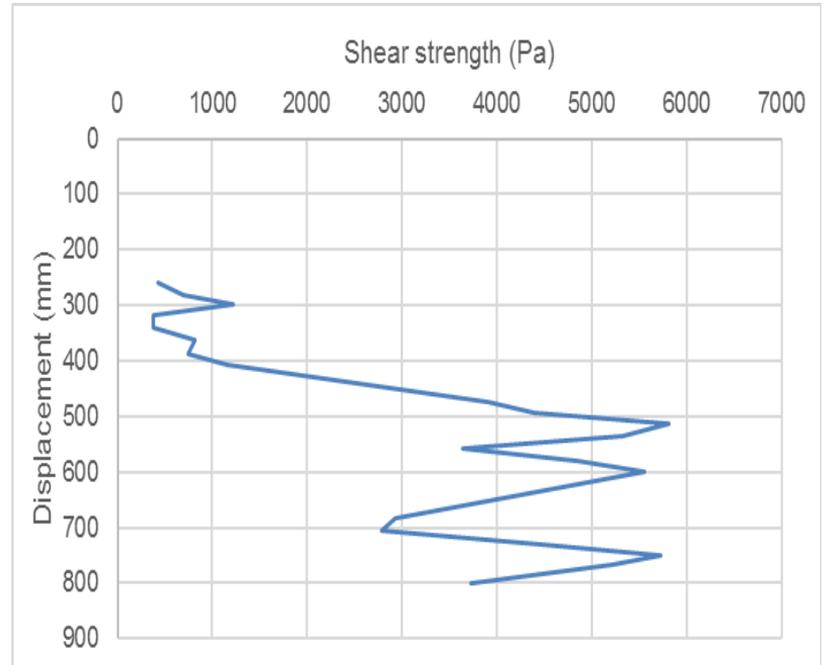
Mechanical, portable research tool

Advantage:

Continuous profile of shear strength

Disadvantage:

Slower, more costly

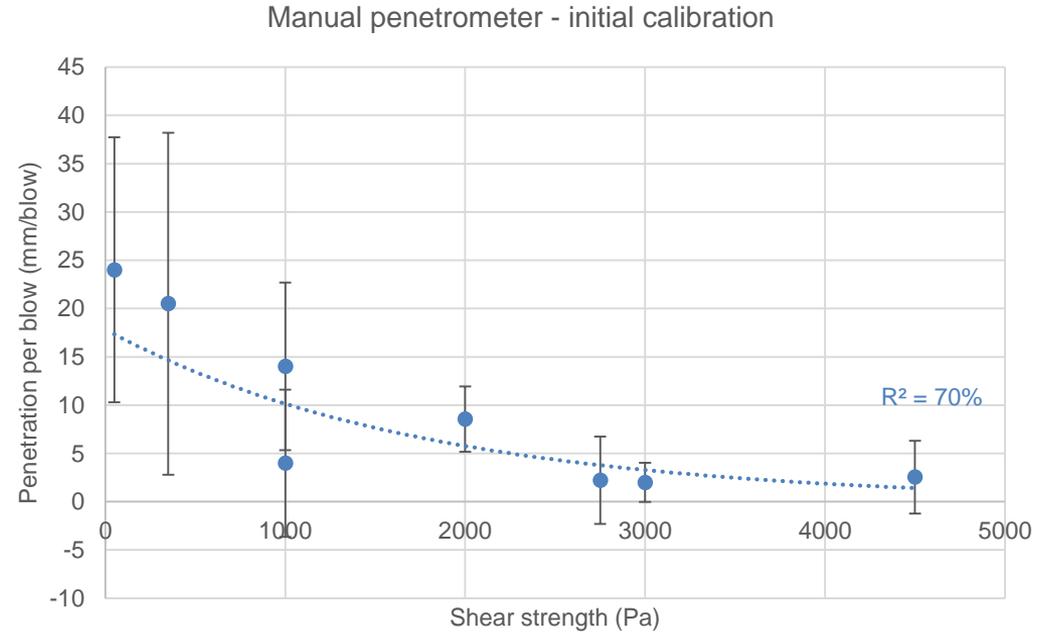


# Calibration Exercise



# Results

- Sludge often > 5kPa
- Approximate calibration generated



# Implications and Next Steps

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

