Sustainable Sand Management Control and Solutions - Balancing Performance, Costs, and Environment

20–21 AUGUST 2024 | KUALA LUMPUR, MALAYSIA

Analysis of the Effect of Fine Particles and Organization of the Early Arriving Particles on Experimental Sand Screen Retention Tests

'Amila Abu Bakar

Overview

- 7 Experiments were run to see the effects of fines.
- The screen size used is 115 microns.
- Sample A was used with size of 125-600 microns and 0-600 microns.
- All test were run in prepacked method.

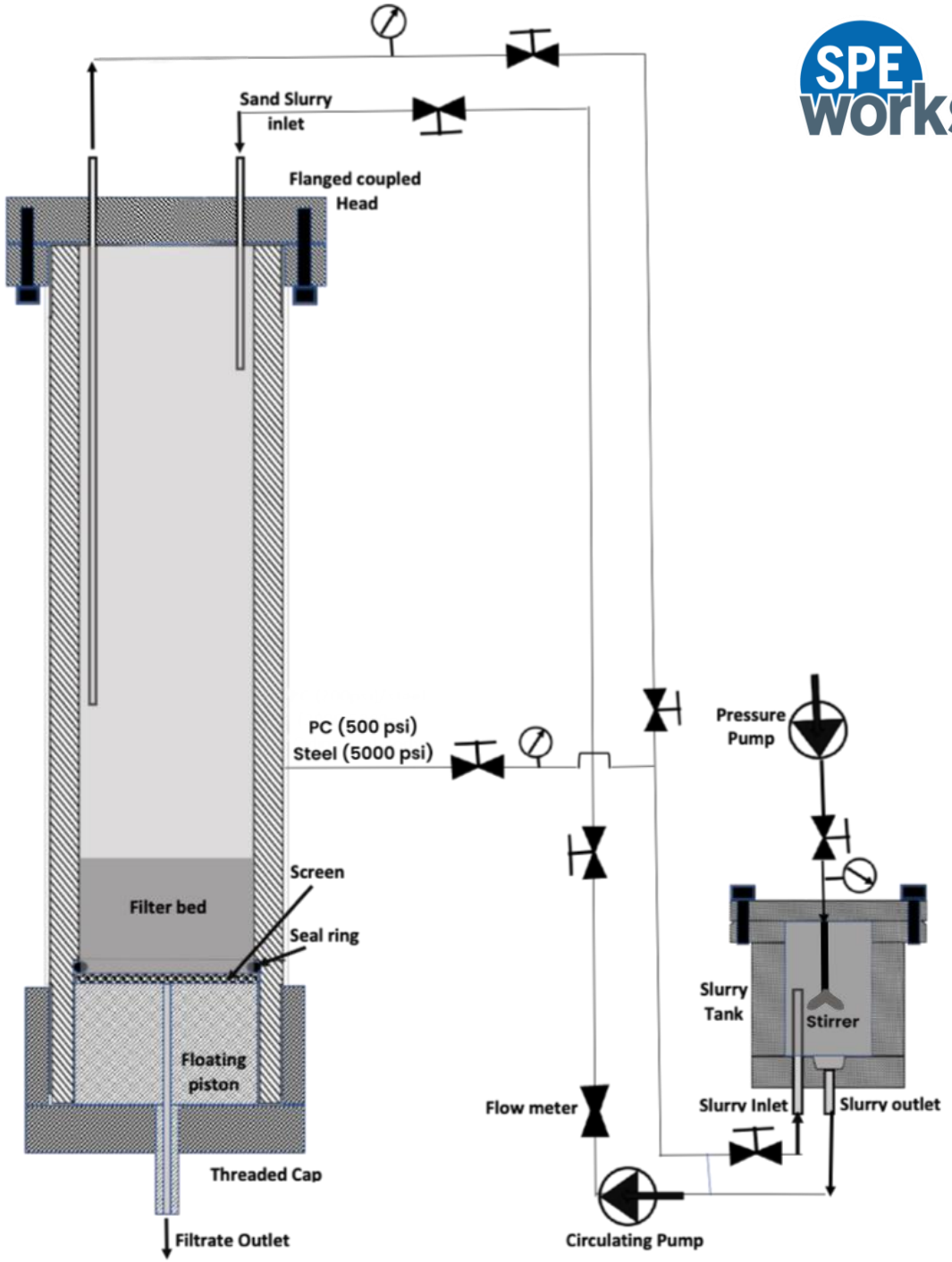
Objectives

- Evaluation of the impact of screen performance for finer grains.
- Assessment of organized single layer of particles against the screen.

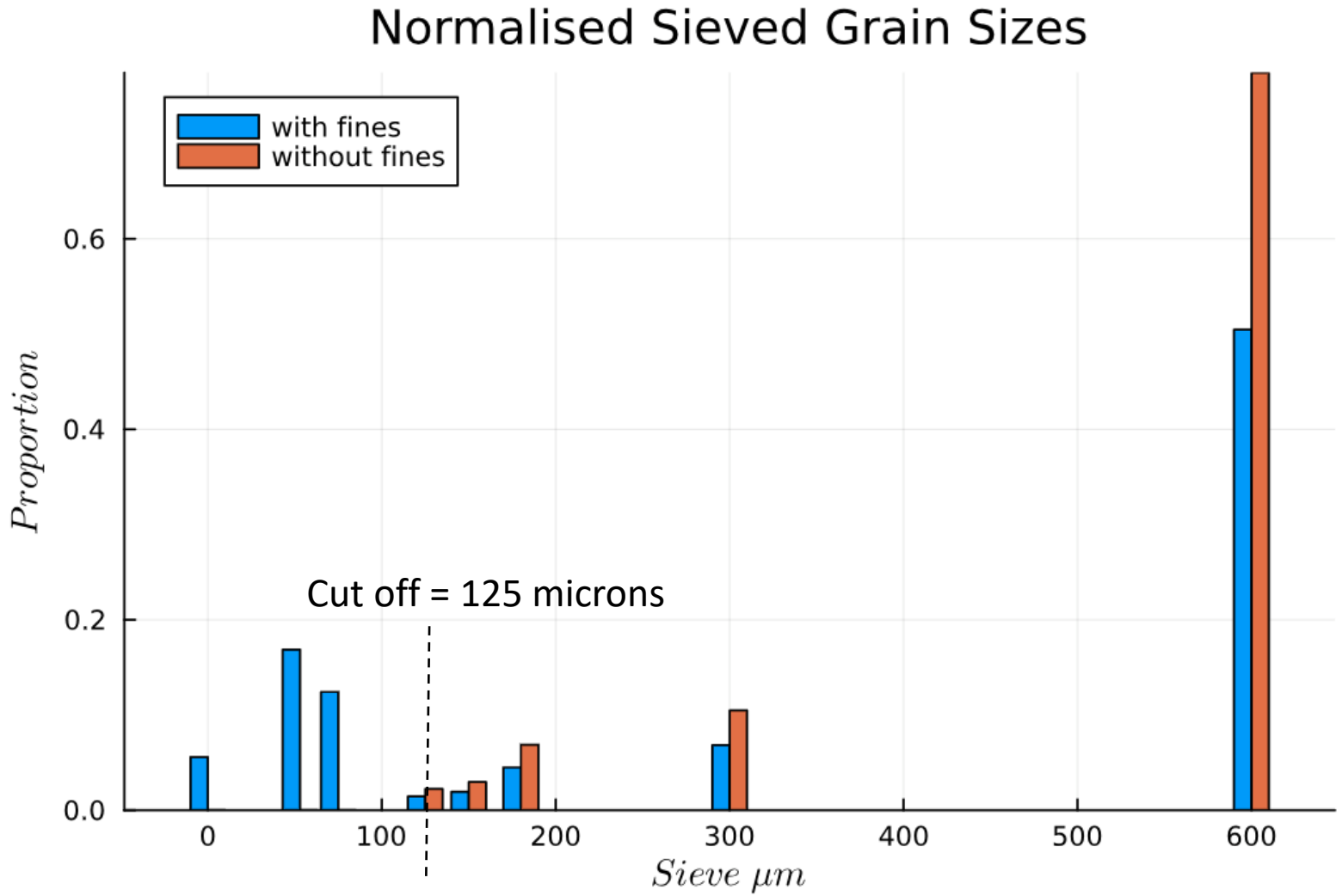
Schematic Diagram of the experiment set-up

- Two methods: Slurry method and Prepacked method
- Procedures:

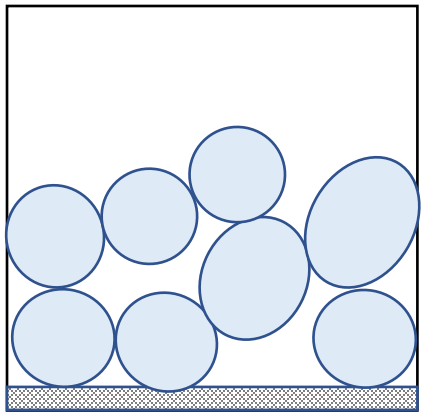
1. Prepare sample: 5% of the volume of the flow cell used.
2. Pressurized the system up to 100 psi.
3. Collect filtrate for 30 mins or 1000 ml.
4. Connect syringe pump for permeability measurement and apply constant flow rate of 60 cc/min.
5. Filtration for the filtrate and total amount of solid produced is measured.



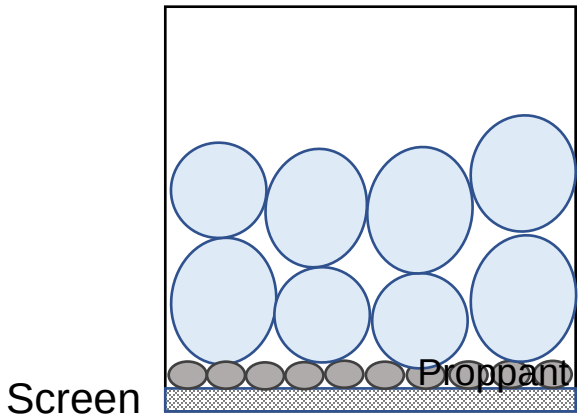
Particle Size Distribution of the sample used



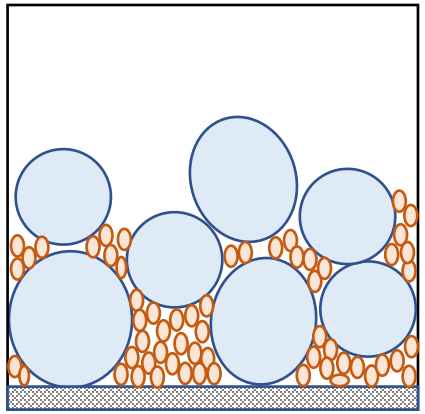
Results and Observations



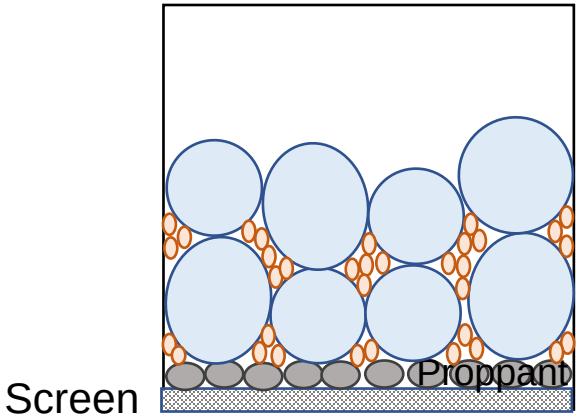
Without finer grains



Without finer grains and single layer of particles



With finer grains



With finer grains and single layer of particles

Results and Observations

	Without finer grains	Without finer grains and single layer of particles	With finer grains	With finer grains and single layer of particles
Permeability (mD)	110-170	160-190	11-17	21-24
Total solids produced (lb/ft^2)	0.033	0.032	0.023	0.017

Conclusion

- The analysis highlight the importance of studying the particle size distribution(PSD).
- Inclusion of fine particles significantly influences the permeability values and reduced it by a factor of 10.
- A more organized arrangement of particles enhances the screen permeability by twice the value.

Future works

- Obtain a detailed morphology and size distribution of fine particles using microscope and Scanning Electron Microscopy (SEM).
- Perform the same experiment with different sample for validation.