

Field Sand Sieve Analysis

Preparation

To be able carry out a sieve analysis, the following materials are needed:

- 3-cycle logarithm paper. An example is annexed to this document. Also downloadable from www.engj.ulst.ac.uk/sidk/graph/graph.htm;
- Set of sieves for sand analysis. A plastic set is available from www.geosupplies.co.uk. This set does not have larger mesh sizes, but is useful for field trips due to their weight. Larger mesh sieves could be made from available materials to add to the set, for example by using mosquito mesh and small chicken wire;
- Electronic scales with the ability to weigh 200 grams accurately to within 0.1 gram;
- At least 200 grams of very dry sand.

Instructions

1. Stack the sieves with the coarsest at the top and the finest at the bottom.
2. Place a small container on the scales that will receive the sand, and then zero the scales.
3. Mix the sand and then measure out approximately 200 grams into the top sieve.
4. Put the lid on and shake the sieve column. Theoretically you should shake for 10 minutes, but several minutes should suffice.
5. Weigh the sand retained by each sieve to the nearest 0.1 gram. This is done in a cumulative way – this means that you add what is remaining on the coarsest sieve on top to the container on the scales, and measure the weight. Following this, you add the material from the second sieve down, and again note the combined weight of both samples. Continue in this way for the whole set. When finished, check that the final weight corresponds to the initial weight of the sample.
6. Clean each sieve as it is emptied and return the sand to the stock.
7. Enter the results in Table 1. From this, you can calculate the percentage retained on each sieve, and correspondingly, the percentage passing.
8. Plot the results on 3 cycle logarithm graph paper.

For a worked example, see the table and graph on the next page.

Document prepared by:

Eric Fewster,
BushProof
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Worked example: recording results in the table

Source of sample: Sand riverbed 5 km east of town

Description of sample: Fairly well graded brown river sand

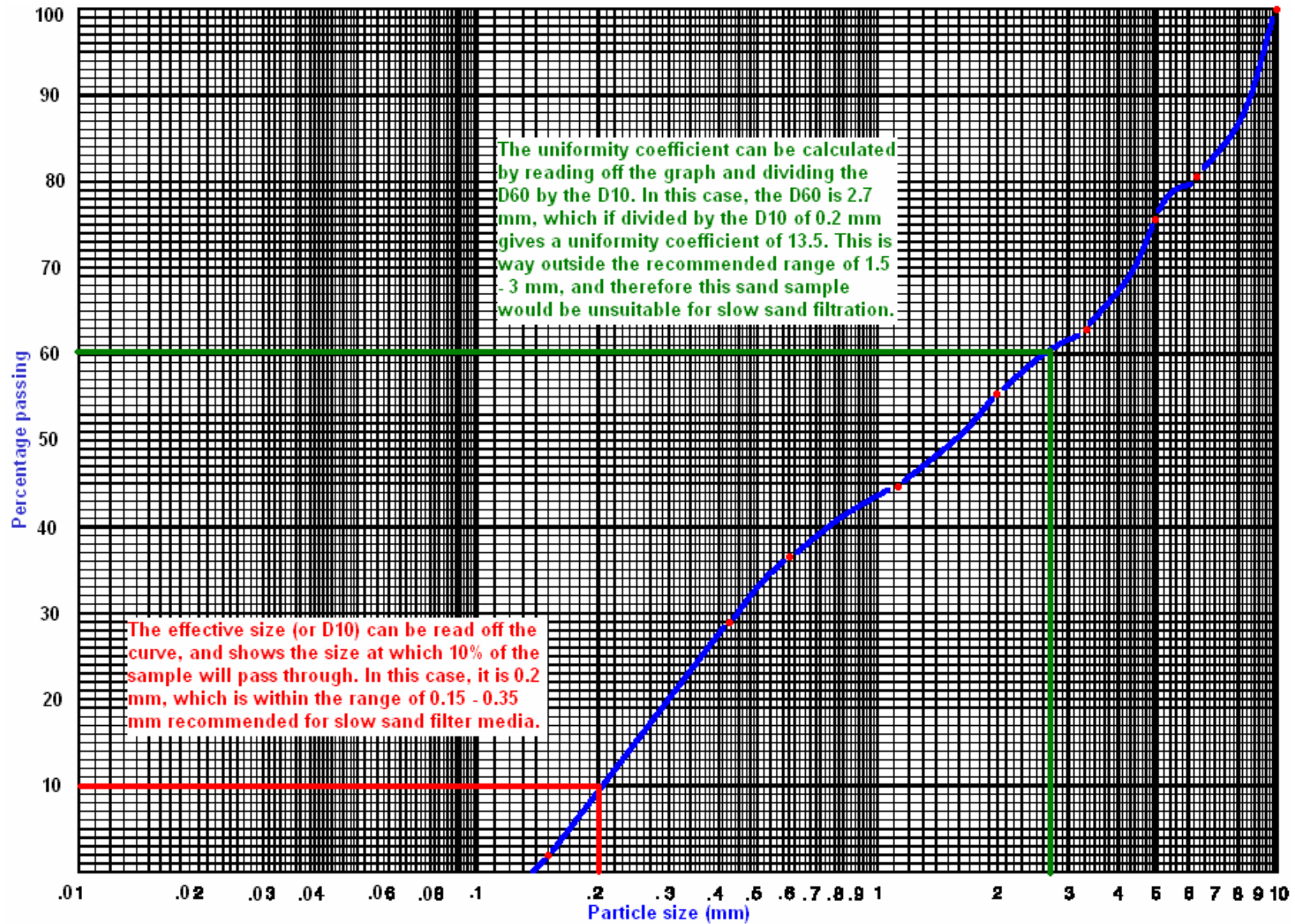
Initial weight: 200 grams

Final weight: 200 grams

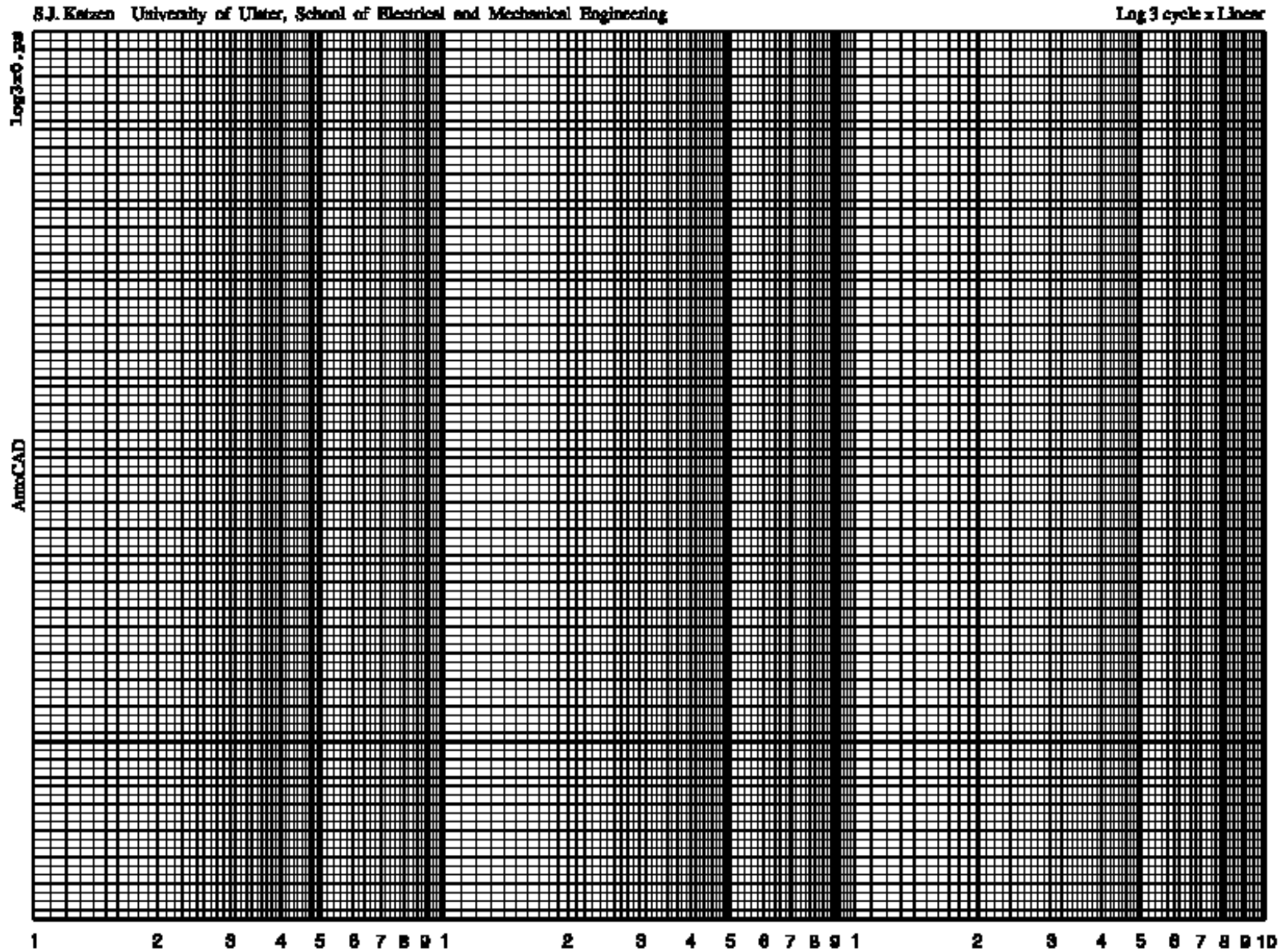
Sieve size (mm)	Weight retained (grams)	% Retained	% Passing
10.00	0	0	100
6.30	39.2	19.6	80.4
5.00	48.6	24.3	75.7
3.35	74.1	37.1	62.9
2.00	92.4	46.2	55.8
1.18	110.2	55.1	44.9
0.60	126.9	63.5	36.5
0.425	142.3	71.2	28.8
0.15	196.0	98.0	2.0
< 0.15	200	100	0

For sieve size 3.35 mm, a cumulative total of 74.1 grams were retained (which included the material from sieves 10.00 mm, 6.30 mm and 5.00 mm). This represented 37.1% of the total sample ($74.1/200 \times 100$). The percentage passing was therefore 62.9% of the total sample ($100 - 37.1$).

Worked example: plotting the grading curve



Example of 3-cycle logarithm paper¹



¹ Downloadable from www.engj.ulst.ac.uk/sidk/graph/graph.htm.
BioSandFilter.org is a BushProof product