Particle dynamics class, SMS 618, Emmanuel Boss (Last modified 10/2/2003)

Settling lab (based on Ch. 3 of J. R. L. Allen's: Principle of Physical Sedimentology, 2001, Blackburn press):

Material:

Glass and metal beads of different sizes. Sieved sand from ¼→4mm size. Shells of different size and shape. Disks made of aluminum foil. 2 21' Cylinders one with H₂O the other with Karo syrup.

Methods:

1. Release the sand grains with forceps one by one and measure the settling velocity in both fluids starting the measurement from 10cm below the release point to 10cm above the bottom. If the small grains take to long to settle in Karo skip to larger sizes.

2. Measure the settling velocity of glass beads in water and Karo.

Measure the settling velocities of shells released in different orientations in the fluid.
Observe the settling velocity of disks made out of aluminum foil in <u>air</u>, water and Karo.

Assignment:

Use the different glass beads settling in Karo to back out the density and viscosity of Karo assuming Stokes settling.

Plot the settling velocity of sand grains as function of size. Is it consistent with Stokes's settling? What are the Reynolds' numbers of the particles? Can differences be explained based on the non-sphericity of the particles?

φ	Diameter [mm]
2	0.25
1.5	0.3536
1	0.5
0.5	0.707
0	1
-0.5	1.414
-1	2
-1.5	2.828
-2	4

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