



COLLOQUIUM

Group: Engineering Fluid Dynamics

As part of his MSc thesis assignment

O.B.J. Sanderink

will give a presentation, entitled:

Experimental Study and Modelling of the Behaviour of Suspensions

Date: Wednesday December 12, 2012

Time: 14:00

Room: Horstring N109

Summary:

The flow of concentrated suspensions of solid particles in liquids is a common occurrence in present-day industry, such as dredging of sediment on sea beds. Suspensions have been investigated extensively for decades, but their behaviour is still not fully understood. The goal of the present study is to determine what mechanisms influence the flow resistance of suspensions. To this end, experiments have been performed in which a number of parameters were varied. These parameters include the shear rate, volume fraction, particle diameter and particle size distribution of neutrally buoyant, spherical polymethylmethacrylate particles, as well as the dynamic viscosity of the suspending fluid, glycerine. The shear stress, and thus the effective suspension viscosity, was measured using a Couette rheometer.

It is found that an increase in the volume fraction or a decrease in the dynamic viscosity of the suspending fluid or particle diameter results in an increase of the effective viscosity of the suspension. Concurrently, the behaviour of the suspension deviates from Newtonian behaviour: the suspension becomes shear-thinning. Furthermore, it was found that altering the fluid material gives significantly different results, even when the aforementioned parameters were kept approximately constant. This complicates the comparison of present results with results found in literature. The experimental results form a basis for the development of a mathematical model describing suspension behaviour.

Assessment committee:

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