

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

The Latest on Segregation-Banding in Suspensions: From Bench-top Experiments to a New Large-Scale Rotating-Cylinder Facility¹

PETER J. THOMAS, University of Warwick, School of Engineering — Segregation-banding in suspensions was first described in Refs. 1 and 2, for flow in a partially-filled horizontal rotating cylinder, and in Ref. 3, for flow in a horizontal Taylor-Couette system. Here new experimental results are reported that reveal how the phenomenon, in horizontal rotating cylinders, is affected by some of the governing experimental parameters. It is possible to suppress banding for certain particle-fluid combinations, indicating that surface tension is important to the initiation of the process. The phenomenon becomes increasingly non-stationary as the cylinder diameter is reduced from about 10cm to 3cm. Banding patterns in a 10cm-cylinder appear quasi-stationary. However, the bands in the 3cm-cylinder merge on time scales of 100 hours. Our research program is presently extended to very large rotating cylinders (length:4m, diam.:1m) to study scaling issues in particle-laden flows. Our new large-scale rotating-cylinder rig, currently under construction, is briefly introduced here for the first time.

[1] Boote and Thomas, *Phys. Fluids* **11**, p.2020, 1999.

[2] Thomas *et al.*, *Phys. Fluids* **13**, p.2720, 2001.

[3] Tirumkudulu *et al.*, *Phys. Fluids* **11**, p.507, 1999.

¹Support for the new, large-scale rotating-cylinder facility from the Engineering and Physical Sciences Research Council (UK) is acknowledged.

Peter J. Thomas
University of Warwick, School of Engineering

Date submitted: 28 Jul 2005

Electronic form version 1.4