

### WG3 (MULTIPHASE FLOW MODELLING) Meeting minutes Nancy, 14<sup>th</sup> October 2011

Nine action members were present in the meeting:

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After a brief introduction of the members present, the meeting has been co-chaired by WG leader J. Hamalainen and WG deputy leader H. Andersson.

Group discussion was directed, mainly, to the items proposed by the management committee:

1. **Definition of test cases** including definition of geometries to be studied transversely by the WG members and by the different Working Groups

The WG proposal is to focus first on simplified reference flow configurations:

- Fibre-laden turbulent flow in a converging channel (mimicking the headbox geometry)

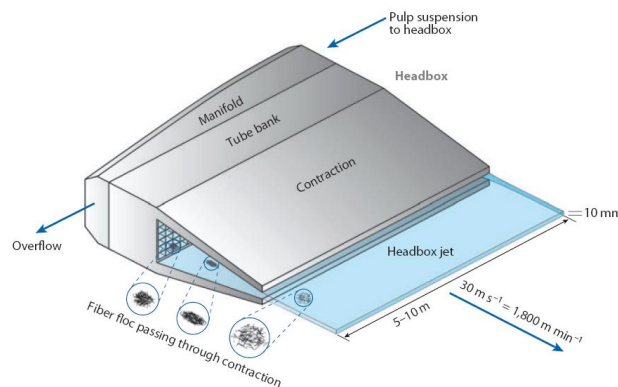


Fig. 1 Schematic of the headbox (Lundell et al., 2011).

- Fibre-laden turbulent flow through a circular sudden expansions (which are typically found in the crossflow distributor, the turbulence generator, and the headbox nozzle).

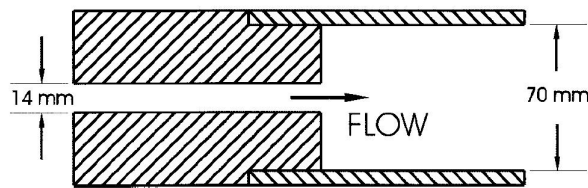


Fig. 2 Schematic of the sudden expansion (Heath et al., 2007).

- Fibre-laden turbulent flow in a inclined open channel (“water table”)

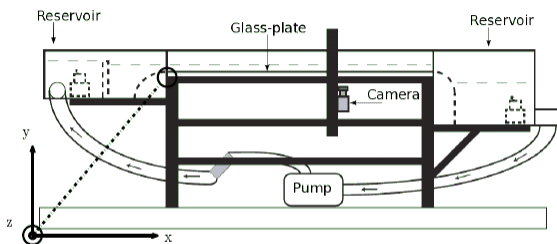


Fig. 3 Schematic of KTH water-table (Kvick et al. 2012)  
The glass plate is ~2m long and ~0.6m wide.

Simulations should consider fibres with length  $0.8 \text{ mm} < L < 2.5 \text{ mm}$  and diameter  $30 \text{ micron} < d < 50 \text{ micron}$  and consistencies of order 1%. Quantities to be measured are fibre mixing (wall-normal and spanwise concentrations), fibre orientation, position and velocity.

## References

Converging channel – headbox:

Carlsson A (2009), *Near wall fibre orientation in flowing suspensions*, PhD Thesis

Sudden expansion:

Heath SJ, Olson JA, Buckley KR, et al. (2007) *AICHE J.* **53** pp. 327-334

Yasuda K, Henmi S, Mori N (2005) *Polymer Composites* **26** pp. 660-670

Olivero KA, Altan MC (1999) *J. Thermoplastic Comp. Mat.* **12** pp. 242-256

Arola DF, Powell RL, McCarthy MJ, et al. (1998) *AICHE J.* **44** pp. 2597-2606

Water channel:

Kvick, M., Hakansson, K, Lundell, F, Prah-Wittberg, L, Soderberg, D. (2012) *Fibre orientation and fibre streaks in turbulent half channel flow*, *Exp. Fluids*

2. The group discussed the importance of **attracting industrial partners** to the COST action. We will prepare a text describing the objectives of WG3, which will be proposed to the Action executive committee, and later distributed by the WG members to possible industrial partners.

Finally, the group agreed that it would be more convenient to have the next WG meeting at the same time as the next MC meeting.

Nancy, October 14<sup>th</sup>, 2011