

# **Advanced CFD Modeling Of Slurry Flows: A Practical Review**

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## **Abstract**

This keynote talk will propose a comprehensive summary of the numerical models developed to investigate the fluid flow and heat transfer involving slurries, with a particular emphasis on ice slurries. Such heat transfer fluids are very challenging for numerical methods due to their complex nature: three-phase flows in thermal non-equilibrium, phase-change and non-Newtonian behavior (yield stress, shear-thinning or thickening behavior). Depending on the operating parameters, the flow structure may get complex too with multiple stratifications, a fixed or moving bed, local heterogeneities... In the turbulent regime, the bulk flow is the result of a strong competition between turbulent dispersion and buoyancy, while the particle repelling phenomenon may get preponderant close to the walls. All in all, the choice of the appropriate multiphase and turbulence models remains the subject of debate in the community. The talk will end with some perspectives to better model and understand the physics of slurry flows.

**Keywords:** CFD, two-phase flow, turbulence modeling, ice slurry