

121h Integration of Ect Measurements with Hydrodynamic Modelling of Conventional Gas-Solid Bubbling Bed

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Twin-plane Electrical Capacitance Tomography (ECT) provides fast images of the cross-sectional volume fraction distribution of solid-gas flow in a confined volume at two different levels simultaneously. This information can be integrated with numerical simulation techniques to estimate some of the most important parameters in solid-gas flow hydrodynamics, such as the particles velocity, interstitial gas velocity and particle-particle contact forces.

In this study, using the two-fluid approach, the conservation and momentum balance equations, along with the appropriate boundary conditions, have been solved by integrating the numerical procedure with the experimental data of the fluidised bed pressure drop and pixel distribution of solid fraction available from the ECT measurements. Preliminary results of time-dependent hydrodynamic features of the bed will be presented. These results were analysed to assess various forms of solid stress models available in the literature for accurate prediction of conventional bubbling fluidised bed. In general, it is demonstrated that integration of ECT measurement with numerical modelling offers a unique and promising technique for comprehensive non-intrusive information of gas-solid flow systems.