Abstract

Masters of Engineering Degree (Aerospace)

Project Title:

Granular Dynamics of Non-Spherical Particles

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Abstract:

This research project in the Computational Thermo-Fluids Laboratory analyzes the granular dynamics of non-spherical particles in a fluidized bed reactor. Current computational models of this multiphase particle-laden flow classically assume spherical particles. A literature review of drag correlations for non-spherical shapes was studied. The effective diameter and shape factor of arbitrary particles nondimensionally quantify particles shapes for numerical analysis.

This project adapts the developed NGA research code to represent the particles as a collection of overlapping spheres. Modeling collisions using the soft sphere model, a pseudo three-dimensional setup uses two-sphere fluid particles to simulations the intermolecular and intramolecular interactions of dense particle-laden flow. The effects of particle shape and flow dynamics are examined to determine the mixing quality.