Abstract

This review describes experiments and numerical simulations for auto paint process using rotary bell-cup atomizers, especially the fluid flow on the bell-cup surface. As numerical techniques for free-surface flow, the volume-of-fluid (VOF) method was introduced, and the details of the fluid flow, advection of the color function and those coupling were explained, respectively. The recent non-contact measurement and theory of liquid film were shown, and numerical simulations for low and high speed rotary atomizers using VOF method were also presented. The liquid film thickness on the surface was affected by the operation condition of the bell cup and properties of the paint.

Keywords: Auto painting, Rotary bell-cup atomizer, Numerical Simulation, Volume-of-fluid method