

Water Mist in FDS

Simo Hostikka
VTT, Finland

Abstract

Numerical simulation of water mist systems is gaining interest among fire safety engineers due to the increasing range of water mist suppression and protection applications, and the lack of simple and general design rules. The existing Eulerian-Lagrangian framework of FDS can be used for water mist simulations, but the published reports on the simulation process and validations are few.

In comparison to traditional sprinkler technology, water mist has a wider range of physical suppression and cooling effects. An accurate modeling of such systems requires that all the relevant input parameters can be prescribed. From the modeling viewpoint, an important difference is the stronger exchange of momentum between the gas and liquid phases.

This presentation goes through a set of FDS capabilities and improvements concerning the spray dynamics and heat transfer, including the experimental validation. The experimental work includes the measurements of drop size, drop speed and mist flux profiles, gas phase entrainment speed in a channel geometry and radiative heat flux attenuation.