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A Numerical Study of Water Mist Behavior Using the Multiphase Models with Lagrangian and Eulerian Approaches

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Summary

In this study, analyzing on water mist behavior is performed using numerical simulation with Lagrangian and Eulerian methods. Water mist is the droplet flow which is one of the multiphase flows and is discrete fluid droplets in a continuous air. It is important to choose the proper multi phase model to analyze the behavior of water mist because it behaves like particles or continuous dense gas. So the transport of mist and its interaction with the fire was simulated by Fluent, a commercial computational fluid dynamics (CFD) program, with Lagrangian Discrete Phase Model (DPM) and Eulerian multiphase model. CFD calculations were carried out to analyze total flooding fire in a $27m^3$ compartment with multiple mist-holes which is equally spaced in floor around centrally located 120kW pool-like gas fire. According to the quantity of droplets, the results of analysis between Lagrangian and Eulerian approach were compared.

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