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Characterization of Plunging Water Jets in Crossflows: Experimental and Numerical Studies

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Abstract : Plunging water jets discharging into turbulent crossflows are capable of providing efficient air water interfacial area, which is desirable for the process of mass transfer. Although several studies have been dedicated to the air entrainment by water jets impinging into stagnant water, very few studies have focused on the water jets in crossflows. This study investigates development of the two-phase flow as a result of the jet impingements into crossflows by means of image processing technique and CFD simulations. Investigations are also conducted on the oxygen transfer and a correlation is established between the aeration properties and the oxygenation capacity of water jets in crossflows. This study helps the optimal design and the effective operation of the industrial and the environmental equipment incorporating water jets in crossflows.

Keywords : air entrainment, CFD simulation, image processing, jet in crossflow, oxygen transfer, two-phase flow
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