

## An Experimental Investigation of Air Entrainment Due to Water Jets in Crossflows

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**Abstract :** Vertical water jets discharging into free surface turbulent cross flows result in the ingress of a large amount of air in the body of water and form a region of two-phase air-water flow with a considerable interfacial area. This research presents an experimental study of the two-phase bubbly flow using image processing technique. The air ingress and the trajectories of bubble swarms under different experimental conditions are evaluated. The rate of air entrainment and the bubble characteristics such as penetration depth, and dispersion pattern were found to be affected by the most influential parameters of water jet and cross flow including water jet-to-crossflow velocity ratio, water jet falling height, and cross flow depth. This research improves understanding of the underwater flow structure due to the water jet impingement in crossflow and advances the practical applications of water jets such as artificial aeration, circulation, and mixing where crossflow is present.

**Keywords :** air entrainment, image processing, jet in cross flow, two-phase flow

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