

Infrared (IR) Investigation of the Flame Structures in Laboratory Scale Fire Whirls

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ABSTRACT

Fire whirl, or used to be known as Firenado, has been very catastrophic to the nature as well as the property and life. Due to that fact, this research is being done to better understand the disaster. This report discusses the fire whirl in a laboratory-scale experiment with the objective to enhance the understanding of fire whirl by investigating the flame structure using IR camera, observing the fire characteristic from several orientations, analyzing the fire whirl state which are categorized to pool fire, small fire whirl, medium fire whirl, and long fire whirl. The experiment was set up with one half acrylic cylinder and 3 sizes of pan which are 0.045 m, 0.058 m, and 0.066 m respectively. The pan was placed in 2 placements. First placement is to be set with 5 inch/ 0.127 m gap and another placement are 0.076m. It was found that the fire will always twist to the direction of air entering the boundary. Also, throughout the scenario, medium fire whirl which is ranging from 0.15m to 0.3m is more dominant as it occurs about 50% to 70% for 3-inch gap and 70% to 80% for 5-inch gap. It was also observed that small pan has the highest fire whirl among all the three pans. When the fire is given more spaces or gaps, it tends to have a longer fire whirl.