Fire Protection Engineering Department

MS Thesis Presentation

Tuesday, July 9, 2024
1:00-2:00pm
Zoom: https://wpi.zoom.us/j/3452347819
Meeting ID: 345 234 7819

Downward Opposed Flame Spread Response to Non-Steady Airflow

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Abstract

PMMA is burned in a bench scale wind tunnel under steady and oscillating airflows to characterize the downward flame spread response to non-steady airflow conditions. An opposed forced flow configuration is used with 0.5 and 1 mm thick black cast PMMA. The non-steady airflow oscillations for both PMMA thicknesses take the form of a transient sinusoidal profile with three amplitudes (0.1, 0.15 and 0.2 m/s), three frequencies (1/8, 1/16 and 1/32 Hz) and one baseline airflow (0.45 m/s). The time averaged and transient flame spread rate are measured using the change in pyrolysis front over time. The frequency response of the flame behavior, flame length and flame spread rate due to the impact of the non-steady airflow are investigated. A transient gas phase response is seen in all forced flow conditions. The smaller sample thickness displayed a clearer response in the transient flame spread to the non-steady airflow. This behavior is analyzed using physical timescales for solid phase heating.

Committee

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