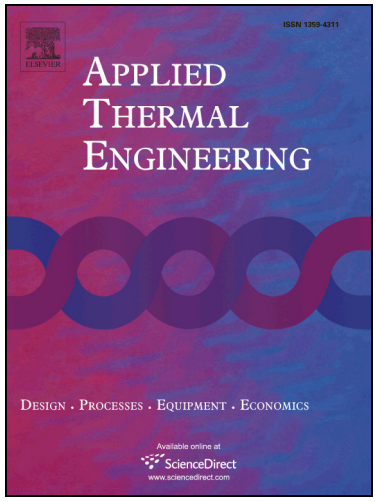

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Full-scale tunnel fire experimental study of fire-induced smoke temperature profiles with methanol-gasoline blends

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Abstract

The methanol-gasoline blends fire-induced smoke temperature profiles were measured in full scale tunnel fire experiments with different blends and different longitudinal ventilation conditions. The flow field profile, which was nonuniform in the full-scale tunnel, was characterized by the wind speeds of tunnel cross-sections. The experiments investigated the ceiling temperatures along the tunnel centerline, the smoke layer temperature profiles, the smoke transmissivities and other parameters. A model was developed for the ceiling temperature decay along the tunnel under stable fire-induced smoke layer conditions based on theoretical analysis and the curve fits of the ceiling temperature decay with distance from the fire source. Higher smoke transmissivity resulted in higher visibility and lower smoke concentration. The smoke concentration significantly influences the ceiling temperature decay with higher smoke concentration leading to faster decay of the ceiling temperature.

Key words: Tunnel fire; blends; ceiling temperature; smoke temperature profile; smoke