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Experimental study on fire smoke control using water mist curtain in channel

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Highlights

- A new effective method for fire smoke control in a channel was proposed and tested.
- Each nozzle type had an optimal working pressure for smoke control.
- The flow field of the induced smoke was visualized by means of sheet illumination and FDS.
- A mathematical model for the stability of the smoke layer was developed.

ABSTRACT

The hazards of the spread of fire smoke in a channel have been recognized. This paper relates to the potential use of a water mist curtain (WMC) for preventing the spread of fire smoke, focusing particularly on smoke control at the early stage of a fire, with the aim of reducing the harm of fire smoke and allowing time for people to escape. Fatal factors for occupant evacuation in a fire, such as carbon monoxide concentration, smoke temperature, and visibility, were measured in the section controlled by the WMC. The results indicate that the WMC can be effective in preventing fire smoke from spreading at the early stage, and may provide a useful reference for developing a novel method of smoke control. Furthermore, the effects of nozzles with different spray characteristics were investigated and an optimal