

عنوان مقاله:

Numerical and analytical prediction of near tunnel wall fire flame length

محل انتشار:

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نویسنده:

behzad Niknam - MSc mining engineering Amirkabir University

خلاصه مقاله:

In most fire accidents inside road tunnels, the fire starts from one or two cars and is then spread to other cars after sometime. The flame length is the most important parameter for controlling the spread of fire from the fire source to the nearby trucks, therefore, knowledge of flame length and behavior is the most important challenge in controlling the fire consequences. In the previous studies, fire is arbitrarily assumed at the center of the tunnel and some specific equations are developed for those cases, however, in real conditions, the fire mostly takes place near the walls of the tunnel and the nearwall fire is very different from the central fires in a tunnel. In this study, analytical analyses and computational fluid dynamics simulation were performed through FDS software, to determine the length of the flame near the tunnel wall. In addition, support vector machines and fuzzy clustering model were used to develop a code to obtain better data from the FDS software. The results of empirical analyses indicate that in cases of near-wall fires, the fire flame is longer compared to the cases where the fire occurs at the center of the tunnel. In a fire with the power of 130 kW , the ratio of flame length near the wall to the flame length at the center of the tunnel was equal to 1.74 . The results of CFD simulations, with wood as the fuel source, indicate that any rise of fire heat leads to decreasing ratio of flame length in near-wall fires to the flame length at the center of tunnel until this ratio reaches unity

کلمات کلیدی:

FIRE, FLAME LENGTH, TUNNEL WALL, CFD, SUPPORT VECTOR MACHINES, FUZZY CLUSTERING

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