

## **Evaluation Method of Hot Gas in Tunnel Fire by Numerical Analysis**

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The authors conduct Fire Dynamics Simulator (FDS) simulation for tunnel fire on a single-track railway mountain tunnel with a small cross-sectional area. FDS gives calculation results of the arrival time, moving speed, and temperature rise of the hot gas. The heat transfer coefficient between the hot gas and the tunnel wall can be identified from the theoretical formula and the numerical simulation results. In addition, simple formulas for the arrival time, moving speed, and temperature rise with the distance from the fire source and the heat release rate can be also obtained.