

## **Simulations of Temperature and Smoke Distributions of On-fire High-speed**

### **Train Moving in super-long railway tunnel**

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Typically, the high-speed train catching fire in the super-long tunnel should drive into the emergency station from the viewpoint of personnel safe evacuation. Three-dimensional flow field induced by an on-fire high-speed train inside a super-long railway tunnel is studied based on the numerical simulation of the three-dimensional Euler/Navier-Stokes equations formulated in the finite difference approximation. And the sliding grid approach is used to simulate the on-fire train movement. The results show that the wind caused by the moving train controls the track of the gas and smoke of the fire. All the gas and smoke move downstream instead of moving upstream, so the upstream zone are safe when the high-speed train continues moving for evacuation, and the gas temperature and smoke in downstream zone keep up increasing with time. The fire heat release rate and train velocity have important effects on the rate of gas and smoke spread in the downstream zone during the evacuation. The work will provide scientific and theoretical basis for scientific evaluation in the super-long tunnel fire. And it has a significant role in promoting safety and disaster prevention and rescuing the scientific assessment of the tunnel fire.

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