

## Evaluation of Radiative Heat Transfer Effect on Fire Whirlwind

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Radiative-convective heat transfer analysis with respect to fire whirlwind is performed in consideration of participating media using Radiation Element Method by Ray Emission Model (REM<sup>2</sup>), in which three dimensional analyses are then performed to investigate the thermal and flow fields by using the Finite Volume Method with introducing divergence of radiative heat flux for gas medium. The SIMPLE method is utilized to solve the discretized equations. Natural convection is caused from a plane source of constant temperature in the flat ground. Fire whirlwind is forcibly generated stably just above the heat source with introducing air currents from four corners. In the analysis, one dimensional radiative exchange analysis above the heat source is compared with three dimensional one to reduce the computational load and time. Then, the composition of participating gases is altered to discuss the effect of radiative heat exchange to the whirlwind flow field.