Computer Models
For
Fire and Smoke

Model Name: Modified UNDSAFE (3-D and 2-D)

Very Short Description: Predicts fire environment in open space and in enclosures, using 3-D finite difference scheme (field model).

Modelers, Organizations: K. Satoh (Fire Research Institute of Japan)
K.T. Yang (University of Notre Dame)
J.R. Lloyd (Michigan State University)

References: Technical Report of University of Notre Dame (1974)

Availability: Program listings of unmodified 2-D version are found in the reference above, but 3-D version and modified 2-D one are not published yet.

Hardware: Mainframe (More than 1MB of memory size is needed.)

Language: FORTRAN

Detailed Description:
Inputs:

Boundary conditions, initial conditions

Outputs:

Isotherms, wind velocity distributions, pressure contours

Features:

More detailed information, e.g., high-resolution flow patterns and time-dependent changes of flows, can be obtained than with the results of zone models.

Applied cases:

1. Aircraft passenger cabin fire (3-D)
2. Aircraft hangar fire (3-D)
3. Smoke filling in a compartment (3-D)
4. Plume's swaying motion above a heated wire (2-D)
5. Smoke and heated air flow at openings of enclosures (2-D & 3-D)

6. Tunnel fire (3-D)
7. T-pattern flame (3-D)
8. Jet flow from a nozzle (2-D)
9. Window-to-window fire propagation in buildings (2-D)