Computer Models
For
Fire and Smoke

Model Name: HAZARD I
Version: 1.2
Classification: Zone model

Very Short Description: A methodology for modeling the effect of fire on humans in buildings. It combines expert judgment, with computer-based calculations and the physiological impact of fires and smoke on humans to predict the possibility of and time to escape from a burning building.


Technical References: See User’s Guide

Validation References: -----

Availability: Limited availability from the National Fire Protection Association, One-Stop-Data-Shop, Quincy, MA (U.S.A) Information is available at the NIST web site (http://fast.nist.gov/)

Price: -----

Necessary Hardware: IBM or compatible micro-computer, with a numeric co-processor, graphics adaptor and graphics display. Programs run from DOS or in DOS window under WINDOWS 3.x, 95, 98, 2000 but not NT4.

Computer Language: FORTRAN/BASIC
**Size:** Requires about 512 kB of RAM, and 3 MB of disk space for installation.

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**Detailed Description:**

The HAZARD Methodology is a method for predicting the hazards to the occupants of a building from a fire therein. Within prescribed limits HAZARD I allows the user to predict the outcome of a fire in a building populated by a representative set of occupants in terms of which persons successfully escape and which are killed, including the time, location and likely cause of death for each. It consists of a two volume report and a set of computer disks containing the software necessary to conduct hazard analyses of products used in residential occupancies.

HAZARD I is a set of procedures combining expert judgment and calculations to estimate the consequences of a specified fire. The fire model is FAST, version 18.5, described elsewhere. The procedures involve four steps: first, defining the context; second, defining the scenario; third, calculating the hazard; and fourth evaluating the consequences. Steps one, two and four are largely judgmental and depend on the expertise of the user. The third step, which involves extensive use of the HAZARD software, requires considerable expertise in fire safety practice. The heart of HAZARD I is a sequence of procedures implemented in computer software to calculate the development of hazardous conditions over time, calculate the time needed by building occupants to escape under those conditions, and estimate the resulting loss of life based on assumed occupant behavior and tenability criteria. These calculations are performed for a specified building and set of fire scenarios of concern.

Component programs are used sequentially to perform a fire hazard analysis. FASTin is the data editor to create the FAST data file, FAST is the multi-compartment zone fire model, FASTplot is an (engineering) graphing package for data from FAST, EXITT is an evacuation model that includes behavioral routines for interactions among family members, and TENAB performs toxicology evaluations from FAST data for room environments and EXITT data for room locations over time.

FAST, along with its input editor and graphing package has been replaced by the CFAST suite of programs.