

ABSTRACT

Procedures for Quantitative Sensitivity
and Performance Validation Studies of a
Deterministic Fire Safety Model. (May 1987)

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The increasing number of users of fire models demands their validation by a third party team to investigate the reliability of the models with respect to concerns of potential users. Due to insufficient documentation of the subject fire model, verification of it was limited and informal. However, quantitative and detailed procedures for sensitivity study and performance validation were applied. A deterministic model, predicting fire behavior in structure, was selected to illustrate partial model assessment procedures.

The development and application of two generic methodologies for sensitivity analysis and performance validation are described. The subject fire model is FAST from which 16 input parameters were selected for sensitivity analysis study. Comparative graphical results are illustrated over simulation time for the input parameters.

Output variables for both sensitivity analysis and performance validation were chosen to be the upper layer temperature and the smoke layer thickness. These two variables, among an array of variables, are viewed to be most informative and compromising. A set of 100kW fire size was chosen with all possible configurations of the experimental set ups to conduct the performance validation. A nonparametric statistical methodology (Mann-Whitney Test) based on ranking was utilized. Graphical statistical results illustrate the quantitative comparison of the fire model's data to experimental data.