

Computer Models For Fire and Smoke

Model Name: TDISX

Very Short Description: Sprinkler response prediction for warehouse applications.

Modelers, Organization: Hong-Zeng Yu, Factory Mutual Research Corporation, Horwood, Nass. (U.S.A.)

References: Yu, H-Z, "A Sprinkler-Response-Prediction Computer Program for Warehouse Applications," FMRC Technical Report, J.I. OR2E1.RA, 1991.

Availability: Restricted.

Hardware: IBM PC and compatibles.

Language: FORTRAN 77 and C

Size: 120 KB

Detailed Description:

The model is intended to predict sprinkler response in large warehouses and other industrial facilities where the accumulation of hot gas underneath the ceiling is not pronounced before sprinkler actuations. The prediction model takes into account the convective heat transfer from the hot ceiling gas flow, the radiative heat transfer from the fire plume to the sprinkler link, and the conductive heat loss from the link to the sprinkler body.

The program predicts sprinkler response in concert with a fire's development (steady, quasi-steady or transient). To run this program, you may provide your own fire growth input or select from a library of fire growth data of typical warehouse fires supplied with the program. In addition to the fire growth history, the program needs the following inputs: ambient conditions, description of burning object (storage height and fire source diameter), sprinkler link specifications (RTI, temperature rating, specific heat, surface area, temperature, mass and conduction loss factor), sprinkler location (radial distance from the fire and vertical distance from the ceiling) and ceiling height.

The program runs in a self-explanatory fashion. During run time, the calculated results are displayed graphically on the monitor. At the same time, the predicted results and their associated inputs are stored in a file for further analysis.

This program differs from the DETACT program in that it takes into account the transient nature of the ceiling jet resulting from a rapidly growing fire.