Computer Models
For
Fire and Smoke

Model Name:	TASEF
Version:	-----
Classification:	Structural
Very Short Description:	TASEF is a computer program for temperature analysis of structures exposed to fire. TASEF stands for Temperature Analysis of Structures Exposed to Fire. The program is based on the finite element method. It is developed for temperature analysis of two dimensional and axisymmetrical structures.
Modeler(s), Organization(s):	Ulf Wickstrom, SP
User's Guide:	Sterner, E. and Wickstrom, U., "TASEF – Temperature Analysis of Structures Exposed to Fire- User's manual." Swedish National Testing and Research Institute (SP), *SP Report 1990:05*, Boras 1990.
Technical References:	Wickstrom, U., "TASEF 2 – A computer Program for Temperature Analysis of Structures Exposed to Fire." Lund Institute of Technology, Sweden, *Report No. 79-2*, Lund 1979. Wickström, U. and Tuovinen, H., "Calculation of Fluid Temperatures in Circular Tubes Using Tube-TASEF". SP Swedish Testing and Research Institute, SP REPORT 1997:29, Borås 1997.
Validation References:	Wickström, U. and Pålsson, J. " Scheme for Verification of Computer Codes for Calculating Temperature in Fire Exposed Structures", SP Swedish Testing and Research Institute, SP REPORT 1999:36, Borås 1999. Thomas, G. C., "Fire Resistance of Light Timber Framed Walls and Floors", Fire Engineering Research Report 97/7

(Chapter 3), School of Engineering, University of Canterbury, New Zealand, 1997.

Gerlich, J. T. C., Collier, P. C. R. and Buchanan, A. H., "Design of Light Steel-framed Walls for Fire Resistance", Fire and Materials, vol. 20, pp 79 – 96, (1996).

Availability: For sale. Contact:
Heimo Tuovinen
SP Swedish National Testing and Reserach Institute

Price: -----

Necessary Hardware: IBM-compatible PC's under PC/MS-DOS, Win9x/NT or Macintosh.

Computer Language: An executable program is available. Source code in FORTRAN.

Size: 550 kB

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Detailed Description:

TASEF is developed for calculating temperature in fire exposed structures and has a number of features that makes it particularly suitable for that purpose.

Structures may contain several materials with thermal properties varying with temperature. Latent heat, for instance due to evaporating water, may be considered.

Heat flux to boundaries by convection and radiation from fires may conveniently be specified. The fire impact is expressed as time-temperature relations.

Heat transfer across internal voids by radiation is calculated considering view factors. Heat transfer by convection may be approximated assuming appropriate heat transfer parameters.

Input:

Input data to TASEF is most conveniently specified by interaction between the user and the input generator INTASEF. INTASEF creates an input file to TASEF.

Rectangular finite element meshes are generated automatically with a minimum of input. Voids and cutouts may be defined and triangular elements may be added at boundaries.

Material properties may vary with temperature. For steel, concrete and some mineral woods, material property values are available in the program. These materials are called the 'standard materials.'

Prescribed temperature, heat transfer conditions by convection and radiation and prescribed heat flux can be specified at the boundaries. Heat transfer by radiation and convection in voids can be considered; this is a special feature for TASEF. Temperature of boundary nodes or of the surrounding gas can be defined as constant or time dependent. The ISO 834 standard fire curve, the hydrocarbon (HC) curve as well as natural fire curves are coded into the program and may conveniently be specified.

Output:

Computed nodal temperatures are printed at specified times, and when the analysis is terminated maximal nodal temperatures are printed. All output data are saved on the specified output file.