Computer Models
For
Fire and Smoke

Model Name:	Allsafe
Version:	1.0
Date:	1998
Classification:	Deterministic computation of necessary time to escape.
Very Short Description:	Computation of necessary time to escape from structures as a function of behavioural factors, design fire scenario plus technical and organizational safety measures. ALLSAFE complements advanced flow calcuation models – these are a recommended to determine minimum time of movement.
Modeler(s), Organization(s):	COWI AS (formely Interconsult ASA)
User's Guide:	User Guide ALLSAFE 1998 (Norwegian language only)
Technical References:	1 *ALLSAFE Main Report, COWI* (Norwegian language) *2* Various papers, reports, sub-reports available at COWI. 3 Kuligowski; Peacock: *A Review of Building Evacuation Models, Technical Note 1471*. NIST, pp A59-A61. 2005.
Validation References:	1 Comparison study against Simulex - on a public theater 2 Comparison study against flow based models – on ferries 3 Comparison study against Simulex - College University
Availability:	Available at COWI or e-mail fak@cowi.no
Price:	Free
Necessary Hardware:	Computers running MS Windows
Computer Language:	MS Windows
Size:	7 MB

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Detailed Description:

The purpose of ALLSAFE is to determine whether or not occupants are at risk depending upon input data for the building, the building use, the occupants and design fire scenarios. ALLSAFE is a behavioral based model that complements advanced flow calculation models. The latter are recommended to determine minimum time of movement, although ALLSAFE include basic recognized formulaes to calculate.

Allsafe computes the time necessary to escape. Consideration is given to the reaction time and the influence of human factors. The influences of human factors are corrected according to the benefits of technical and organizational fire safety measures.

ALLSAFE assigns behavioural characteristics to groups of the population considered to be the worst-case of the evacuation scenario. The model includes such input data as background noise, social and economic barriers among the occupants, language, the fire protection system measures, and the fire scenarios. These input data affect the evacuation time by adding or subtracting times (as obtained from the database within the model). The model also incorporates time delays and time improvements due to voice alarm systems, sprinklers, compartmentation, etc. The model calculates these from tables of data. The effects were gathered from literature and/or by using Delphi-panels.

ALLSAFE are developed to calculate evacuation scenarios by estimating delay time of the occupants prior to evacuation. ALLSAFE defines the “minimum time of movement” or “unimpeded time” (no behavioral delays) and this time is determined by flow calculations, preferably by recognized flow models whenever movement time is critical. After determining the minimum movement time, an ALLSAFE database is used to add delays and subtract reduction in evacuation times due to different kinds of safety measures, such as alarm systems, staff guidance, unfamiliarity, disabillities, immobility, social affiliation, signage, etc. The final result obtained from the model is the “necessary time to evacuate.” The input data affects all identified consequential factors of the evacuation process, based on the study of recognized literature on the interaction of behaviour of evacuation and the fire in actual fire incidents. Assigned delay or pre-movement times are based on real life evacuation experience determined through liteerature studies.

Data obtained from the output (for the entire population):

- Time to fire detection
- Time to react to the fire detection by the occupants
- Time to interpret the situation by the occupants
- Time to decide where to escape by the occupants
- Time to evacuate a room or corridor
- Time to evacuate the building

The fire scenario can be calculated by fire models, such as FDS, or default values for the scenario can be chosen from ALLSAFE. More information in English: Ref 3 (Kuligowski)