Computer Models
For
Fire and Smoke

Model Name:	BuildingQRA – Quantified Fire Risk Assessment
Version:	2.04
Date:	February 2014
Model Actively Supported?:	Yes.
Classification:	Fire Risk Assessment
Very Short Description:	BuildingQRA is designed to provide a broad understanding of safety and financial risk associated with fires in buildings. Many different scenarios can be assessed allowing comparison of various design options including most fire safety control measures such as sprinklers, smoke control, compartmentation, egress conditions etc. The software assesses both smoke movement, based on a set of initial prescribed conditions and relationships detailed within BS 7974 Part 3, and egress conditions based on principles defined within the SFPE handbook. The software includes option assessment and cost-benefit prioritization, multiple scenario assessment including discrete hazard (smoke) and egress analysis for each scenario, user defined event trees, distributions for input parameters; and, user defined functions including fault trees.
Modeler(s), Organization(s):	Matthew Salisbury BEng CEng MIFireE MSFPE, SFES
User's Guide:	A user guide is provided as part of the installation, accessed from the Help menu in the software.
Technical References:	BS 7974-0, PD 7974-1, PD 7974-2, PD 7974-4, PD 7974-6, PD 7974-7, CIBSE Guide TM19, BRE 368, BS 5839, SFPE Handbook of Fire Protection Engineering, 3rd Edition.
Validation References:	There are no independent validation reports available.
Availability:	www.fire-engineering-software.com

Price:	Freeware
Necessary Hardware:	Windows
Computer Language:	Visual Studio
Size:	12MB
Contact Information:	support@fire-engineering-software.com

Detailed Description:

Building Quantified Risk Assessment (BuildingQRA) has been developed to provide an overall understanding of fire safety within new and existing buildings based on the calculation of risk.

The term Quantify means to discover or express the quantity of, for example to count, to measure or to compute. This seems clear. Something you would readily expect to be completed as part of the appraisal of a new or existing building. However it would be rare to define the quantity of how 'safe' a building is. Although much work has been done in the field of fire engineering including disciplines such as Fluid Dynamics, Thermodynamics, Combustion, Heat Transfer, Structural Mechanics, Human Behaviour etc; at present, it would be unusual to address these aspects (or how they affect safety) together, in the form of a quantitative assessment.

The reality of our built environment, both now and in the future, is that safety is a function of a variety of active, passive and managerial systems which all contribute to improving safety and reducing risk. Safety cannot be fairly understood or compared if those key design parameters, such as travel distance, detection, smoke control & suppression, compartmentation and structural fire protection etc are assessed separately. BuildingQRA is designed to help understand how all these variables work together in providing safer buildings.

At least one part of traditionally complex QRA risk assessments in buildings is the unpredictability of future events. It would be relatively straightforward to make buildings safe if we knew when fires would happen (and how they escalate), who would be affected and what would and would not work as requested. Unfortunately we do not know exactly what a future fire event will involve. However we can predict certain events may or may not occur. The knowledge that certain events will happen in the future, to varying degrees of course, is key to the understanding of safety in our buildings.

BuildingQRA's primary function is to assess many fire scenarios using probability distributions, smoke modelling and egress analysis to help understand safety as a system.

BuildingQRA may be used to assess:

- the probability of certain fire scenarios occurring including very severe and optimistic outcomes;
- the overall level of risk associated with these fires; and,
- the measures required to reduce any unacceptable risks cost effectively.

The software provides a rational methodology for design of buildings using a fire safety engineering approach based on the application of scientific and engineering principles - to the protection of people, property and environment from fire.

Results are presented as Fn Curves and Payback Periods. Graphical outputs of each scenario can also be viewed.