

I.CARE.fire

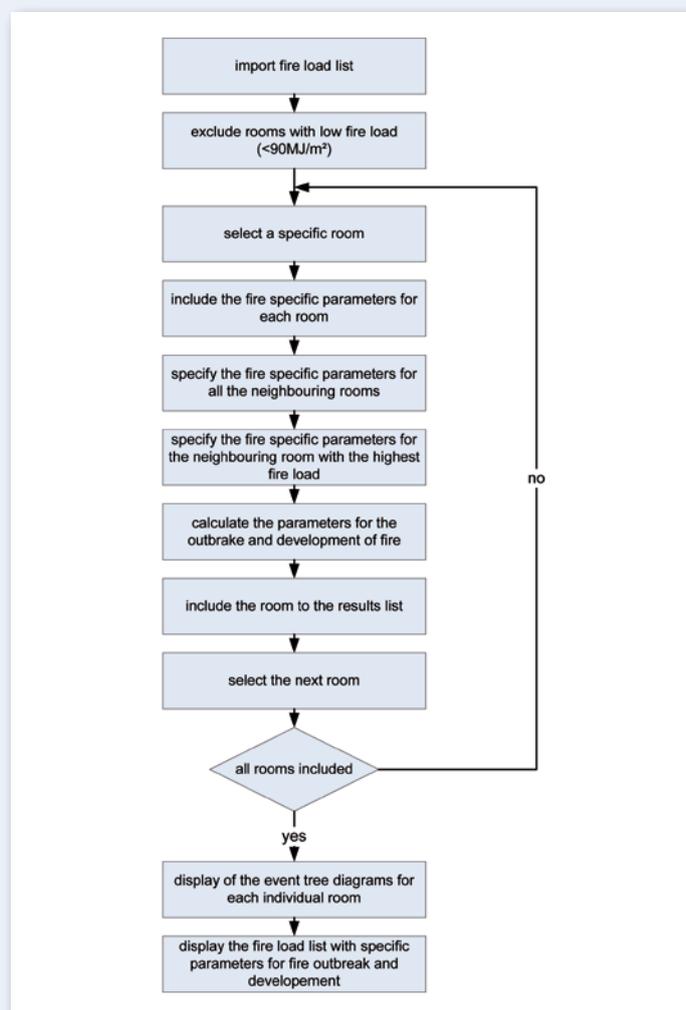
Customised Software for Fire-PSA-Applications

Fire PSA

- Essential part of a level 1 PSA
- Reveal and resolve weak points in the fire safety concept
- Demonstrate safety margins
- Optimise the fire safety concept
- During the design and licensing process a Fire PSA can be requested by the authorities

Software features

- Convenient import of existing fire load lists
- Application of customisable exclusion criteria
- Inclusion of fire specific parameters for each room
- Specification of fire relevant parameters for all adjacent rooms
- Already applied for the screening and ranking process of a Fire PSA for a non-reactor nuclear facility



Software outline

Graphical User Interface

- Room information extracted from the fire load list
 - Fire compartment
 - Room number
 - Room name
 - Fire load
- Specify every room
 - Persons in the room
 - Constructional separation
 - Amount of mechanical equipment
 - Amount of electrical equipment
 - Ignition temperatur of the considered material
 - Distribution of the inflammable material
- Fire fighting arrangements
 - Hand-held fire extinguisher
 - Automatic fire detector
 - Fire damper
 - Automatic fire extinguishing system
- Relevant room of the surrounding area
 - Constructional separation to the considered room
 - Fire fighting arrangements
- Surrounding area
 - Persons in the surrounding area
 - Fire fighting arrangements

The screenshot displays the I.CARE.fire software interface, which is used for fire risk assessment. The interface is divided into several sections:

- Room information:** A table listing fire compartments, room numbers, room names, and fire loads.

Fire compartment	Room number	Room name	Fire load MJ/m ²
UKS13C1FZ3	+00UKS13R003	Material Lock	93,62
UKS13C1FZ5	+00UKS13R029	Ventilation 1	101,33
UKS13C1FZ6	+00UKS13R002	Storage Sorting	299,5
UKS11C2FZ1	+00UKS11R001	Lock	177,7
UKS11C2FZ1	+00UKS11R002	Delivery	300,2
- Results:** A table showing the results of the assessment for a specific room.

Fire compartment	Room number	Room name	Fire load MJ/m ²	Pi	Ai
UKS11C1FZ1	+00UKS11R005	Storage Plasma	3127,44	0,00547	0,555
- Data input:** A section for entering specific room information and surrounding area details.
 - Specific room information:**
 - Room identifier: UKS13C1FZ3 +00UKS13R003 Material
 - Persons in the room: All of the time
 - Constructional separation: Small opening available
 - Amount of mechanical equipment: Large
 - Amount of electrical equipment: Large
 - Ignition temperature of the considered material: Flashpoint < 20°C
 - Distribution of the inflammable material: Distributed all over the room
 - Radioactive material:
 - Fire fighting arrangements:
 - Hand-held fire extinguisher
 - Automatic fire detector
 - Fire damper
 - automatic fire extinguishing system
 - Relevante room of the surrounding area:**
 - Constructional separation to the considered room: Small opening available
 - Fire fighting arrangements:
 - Automatic fire detector
 - Hand held fire extinguisher
 - Automatic fire extinguishing system
 - Surrounding area:**
 - Persons in the surrounding area: All the time
 - Fire fighting arrangements:
 - Automatic fire detector
 - Hand held fire extinguisher
 - Automatic fire extinguishing system
- Calculations:**
 - Calculate button
 - Parameter for the characterisation of the ignition sources in room i (Ai): **Ai = 0,895**
 - Parameter for the outbreak of a fire in room i (Pi): **Pi = 0,4429355**
 - Fire event frequency for the facility: **HG = 1**
 - Copy into the results list button

Graphical User Interface I.CARE.fire

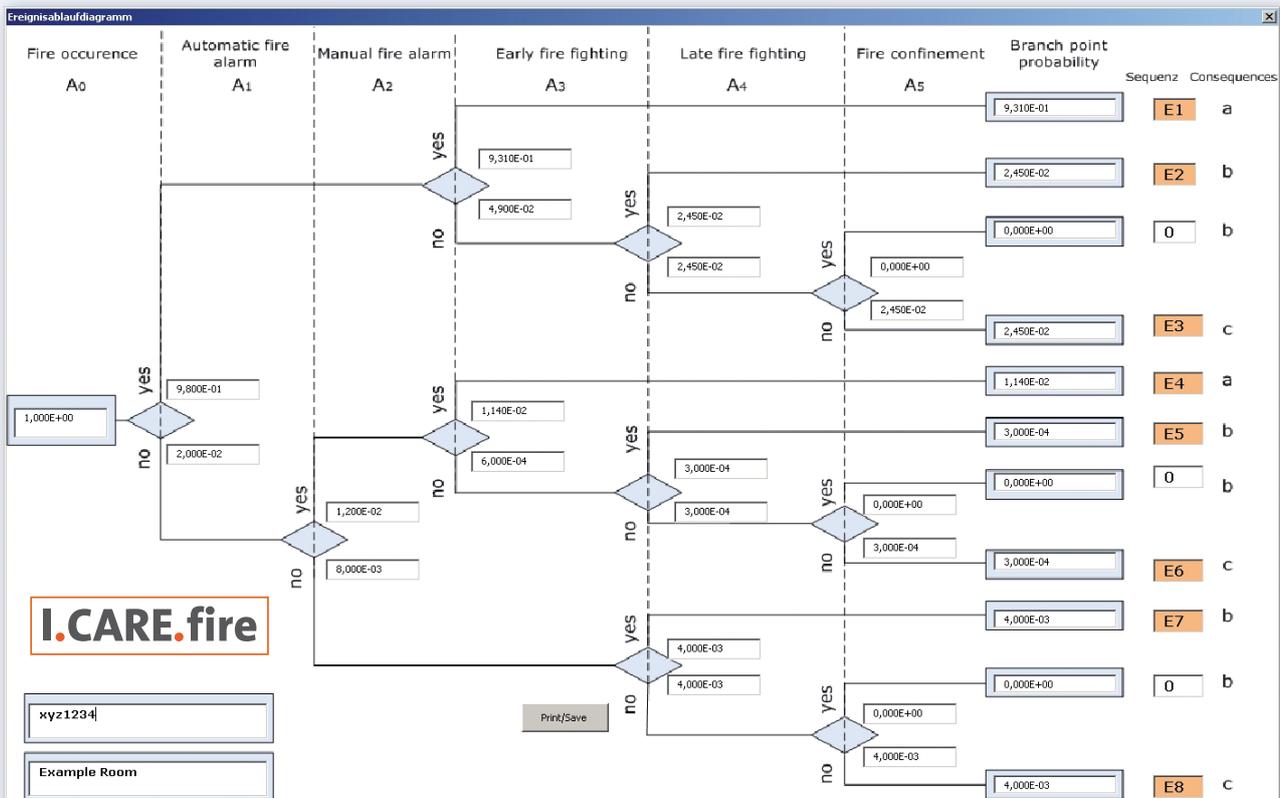
Calculations

- Parameter for characterisation of ignition sources dependent on:
 - Persons in the room
 - Amount of mechanical equipment
 - Amount of electrical equipment
- Parameter for occurrence of a fire dependent on:
 - Parameter for ignition source
 - Ignition temperature of the considered material
 - Persons in the room
 - Fire extinguishing probability
 - Distribution of the inflammable material

The fire event frequency for the facility can be varied by the user.

Results

- Event tree diagram for every individual room
- Consequence levels
 - a) Early fire fighting successful, no severe damage to the considered room
 - b) Late fire fighting or fire confinement successful, severe damage to the room, no damage to adjacent rooms
 - c) Fire propagation to adjacent rooms
- Early detection of weak points and deficiencies



Exemplary event tree diagram

Benefits

- Computes the screening and ranking process of all the rooms in the facility fast and convenient
- Analyses weak points already in the design phase
- Simulates the availability and unavailability of the individual fire fighting and preventing measures
- Saves time and reduces cost with this computer aided design tool

Fit for future

- Upcoming developments
 - Increase the functionality of **I.CARE.fire** with a fault tree analysis tool
 - Development of toolboxes for Flood-PSA and Seismic-PSA

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