

# Fire Fighting Access

A probabilistic approach

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# Presentation

- Introduction
- Analysis process - General
- Event tree analysis
- Fire scenario modelling
- Fire fighting access analysis
- Evaluation
- Conclusion / Discussion

# Introduction

- Urban road tunnel
- Fire fighting access analysis
- Probabilistic

# Analysis process

- Steps of analysis
  1. Event tree analysis
  2. Fire scenario modelling
  3. Fire fighting access analysis
  4. Evaluation

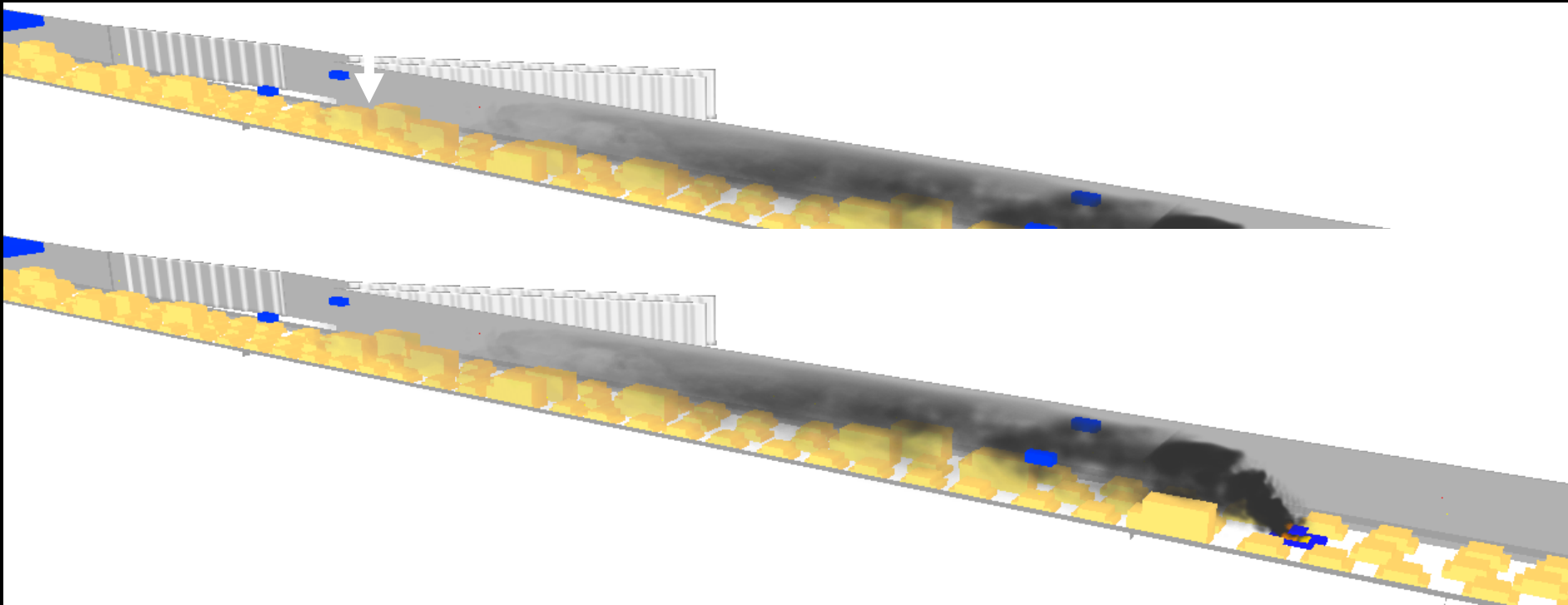
# Step 1: Event tree analysis

- Event tree

Initial event, frequency: 1.22 fires/year		Fire development. 90% probability of extinguished		Detection (early or late), 90% probability of early detection		Scenario No.	Frequency
		Extinguished <b>0.900</b>				1	1.098
Fire in vehicle <b>F=1.22</b>				Early <b>0.900</b>		2	0.1098
		Not extinguished <b>0.100</b>					
				Late <b>0.100</b>		3	0.0122

## Step 2: Fire scenario modelling

- CFD modelling
  - FDS analysis



## Step 3: Fire fighting access analysis

- Analysis

- Tactics
- Working environment
- Efficiency
- Moving speed



- Operating time for different scenarios
- Success criteria

## Step 4: Evaluation

- Evaluation
  - Fire modelling + Fire fighting access analysis
  - ↓
  - Results for different scenarios (events)
  - Success of operation

## Conclusion / Discussion

### Analysis

- Access points distance → 100m / 200m
- Infrared equipment → Higher probability of success

### General

- Probabilistic analysis:
  - Specific for tunnel
  - Hi / Low frequent events
  - → exercises / training + importance of system
- Infrared equipment
- Ventilation system: Fire size / Fire location (slope)
- Suppression system

THANK YOU