Using risc identification and scenario assessment to create a well balance engine fleet

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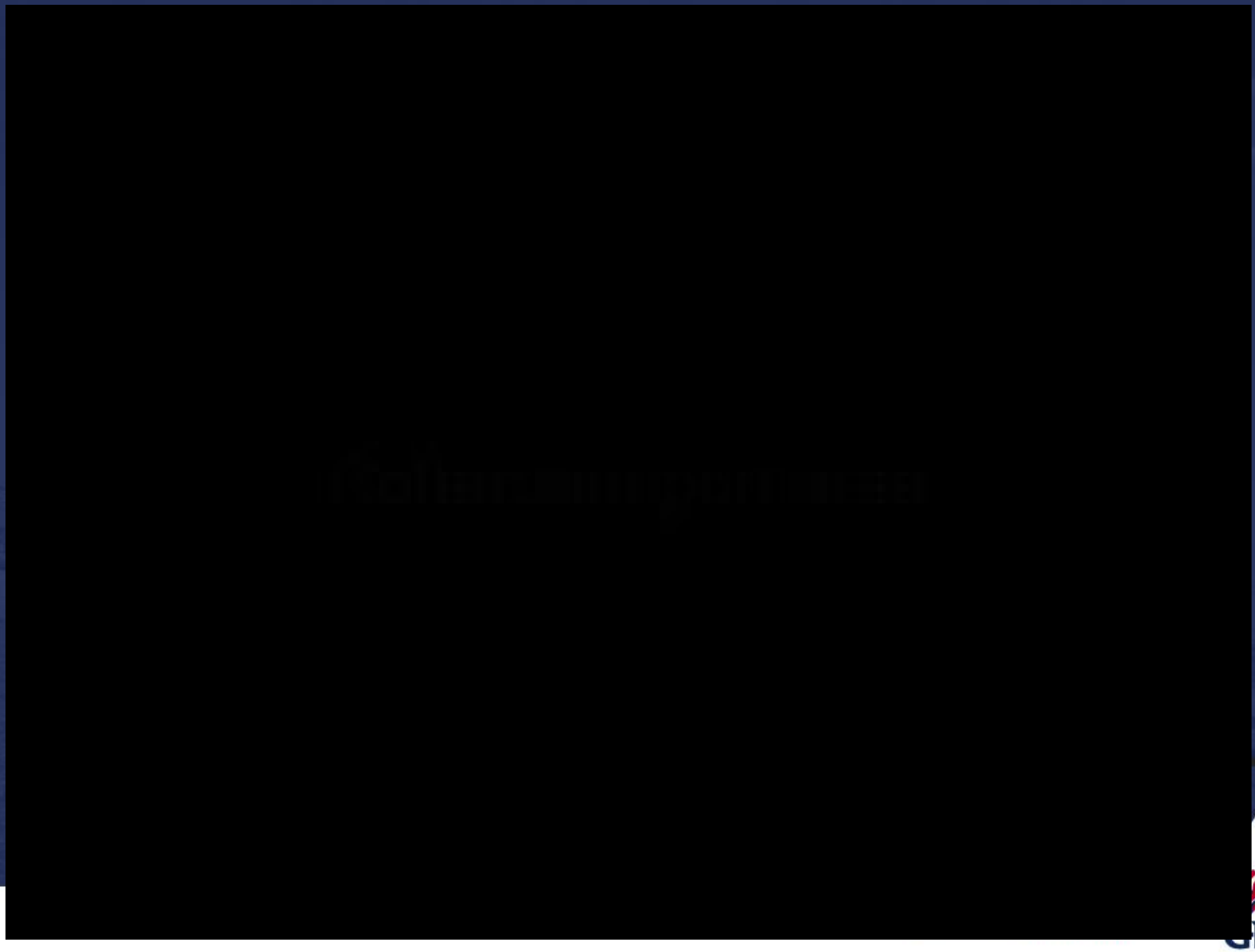
Theme's of the presentation

- Overview of the our operational area
- Introduction of the unified fire brigade of Rotterdam
- Dutch legislation
- The bow tie and reference scenario's
- Standard vehicles and personal equipment to handle standard industrial incidents
- Big equipment for big fires
- Rope resque for high buildings and objects
- Special equipment for concealed fires and fire in houses
  - (Cobra-system)
- A quick strategy for incidents with hazardous chemicals
- Future developments

- Questions?



Unified fire brigade Rotterdam

Public body Joint Fire Department (board on equal terms)

-Co-operation of 52 companies (3 members)

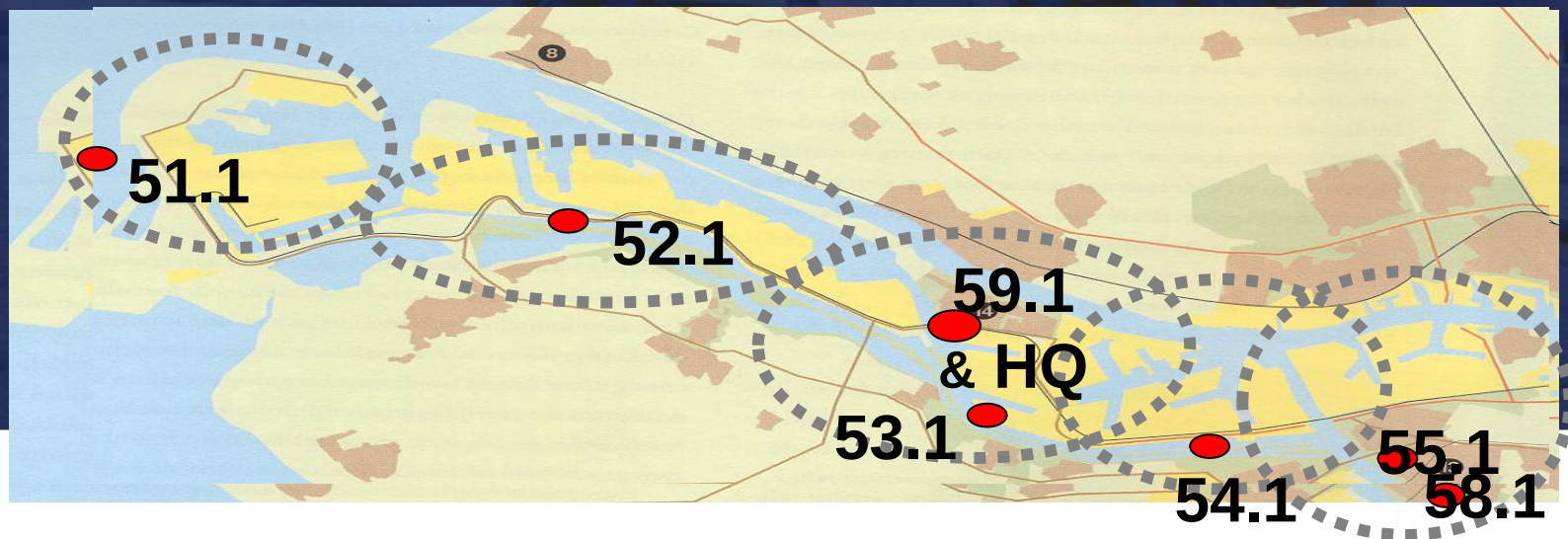
-City of Rotterdam (2 members)

-Village of Rozenburg (1 member)

7 Fire stations (incl. 2 part-time)

138 full time fire fighters (3-shift)

60 part-time fire fighters

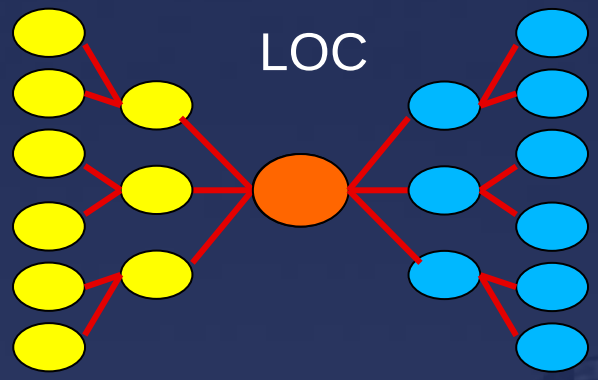


The origin of the unified firebrigade

Fire Services Act; Article 13

- Establishments, which could develop an **exceptional** risk to the public safety in the event of a fire or accidents, must maintain a company fire service;
- the Mayor, i.e. the Municipal Fire service, defines the extent of persons and materials that the company should have;
- Safety Report, part Company fire services:
  - measures concerning prevention, preparation, intervention
  - fire services scenarios descriptions

Risc indentification



Preventive LOD's

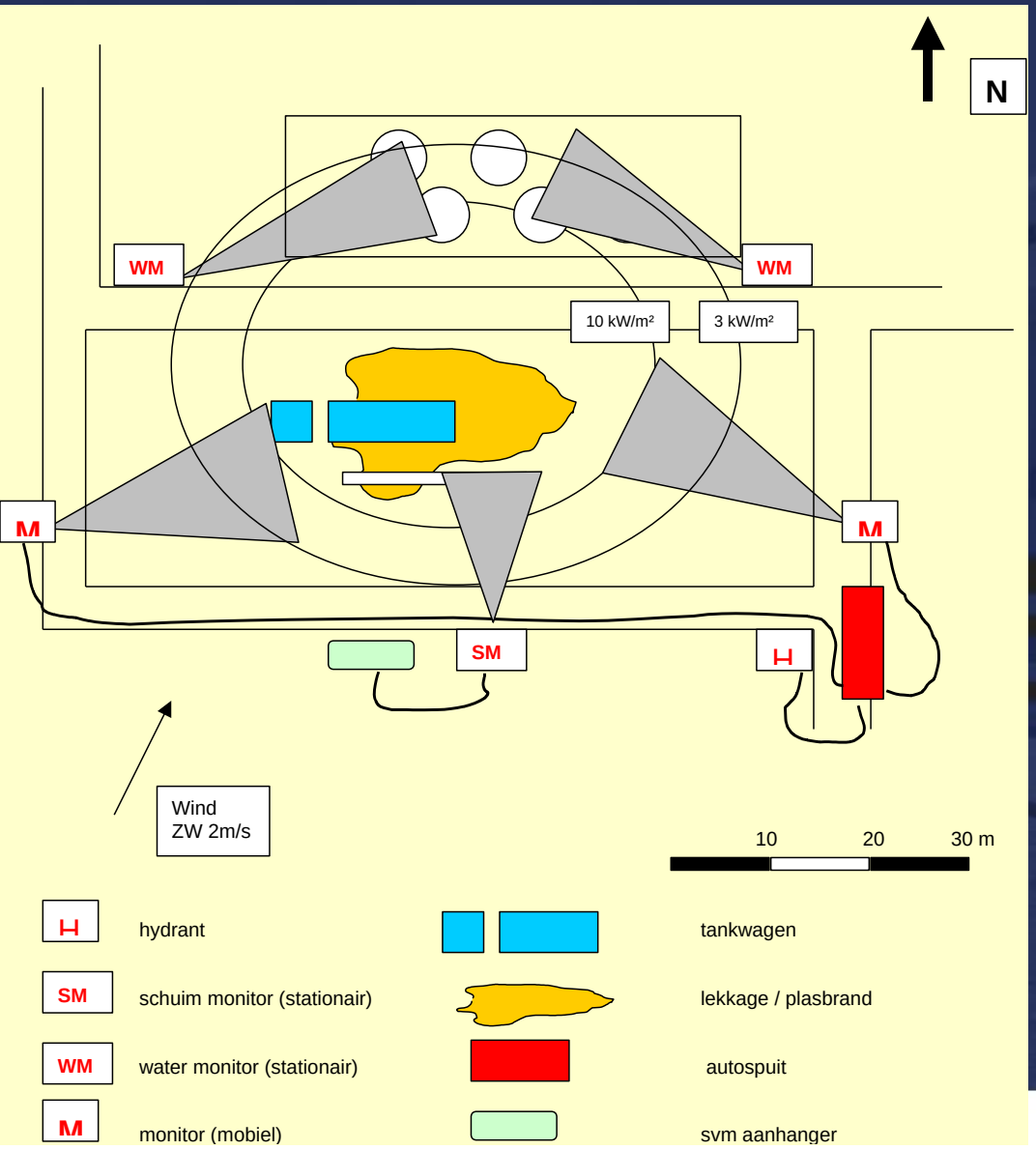
LOD's that prevent any escalation

Essential means to contain a incident

- Stationary equipment
- Mobile equipment
- Fire fighters

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Severe
Almost certain	M	H	H	E	E
Likely	M	M	H	H	E
Possible	L	M	M	H	E
Unlikely	L	M	M	M	H
Rare	L	L	M	M	H

Visualisation of scenario's



Essential means to contain this incident (LOD's)

- Stationary equipment
- Mobile equipment
- Fire fighters

Results;

- Quantity of water needed
- Quantity of foam needed
- Number of fire fighters
- Specs of roof monitor and mobile monitors

Reference scenario's

- Fires in a oil storage parks
- Fires in process installations like refineries
- Fires in cargo storage and transport sites
- Leakage of toxic gasses
- Leakage of toxic fluent
- Rescue from high altitudes
- Fires in ships
- Fires in municipal buildings
- Rescue in traffic incidents

General equipment for every firestation

Industrial fire fighting vehicle

- Crew of 6 firefighters
- Pumpcapacity of 6000 till 8000 liter/min
- 4 m^3 of 3/3% foamconcentrate
- Monitor of 6000 liter/min or 2 of 3000 liter/min each
- basic rescue equipment
- 2 gas suites and basic decontamination products

General equipment for every firestation

Rapid intervention foamtrucks

- 1 driver
- Multifunctional truck with hook with a container 10 m^3 of 3/3% foam concentrate
- 1 two cylinder pump with a maximum capacity of 150 l/min

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When we have this

Why can't we have this

or this

and this

Startings points

Decisive fire scenario's:

? "Largest possible tank surface" ?

Defined as:

Largest tank (mineral: d = 89 m; h = 22 m)

Largest tank (polar : d = 65 m; h = 30 m)

Existing equipment Unified Industrial & Harbour Fire Department insufficient.

What is the likelihood; Unlikely

What is the consequence; Severe

Startings points

Mobile FiFi system with a capacity of:

Mobile – large surface (NFPA 11): ➔ 10,4 liter/m2/min
Mineral: 89 m ➔ 6221 m2 ➔ 65 m3/minuut
Polar: 65 m ➔ 3318 m2 ➔ 35 m3/minuut
Concentrate ind.: (3%) ➔ 2 m3/min ➔ 120 m3 (3%) + 100% spare
Distance: 115 m to centre of tank at 22 m height
Transportation length: max. 1500 m from waterside

And employable within 4 hours

High rope rescue

- Risc identification; buildings/objects are getting taller and rise beyond the reach of rescue vehicles.
- What is the likelihood; possible and increasing
- What is the consequence; moderate

- After a cost/benefit analyses;
- The formation of a rope rescue team; the first in the Netherlands
- Latest developments; further cooperation with the police.
- Negotiations with several windmill cooperation's for nationwide assurance to assist

High rope rescue training facilities

High rope rescue // incident

Urban and concealed areas

Recent fatal accidents;

- Discussion about indoor firefighting;

Alternatives;

- Non (not going indoor);
- Aerosol ‘bombs’;
- Prediction of possible flash-over.

Urban and concealed areas

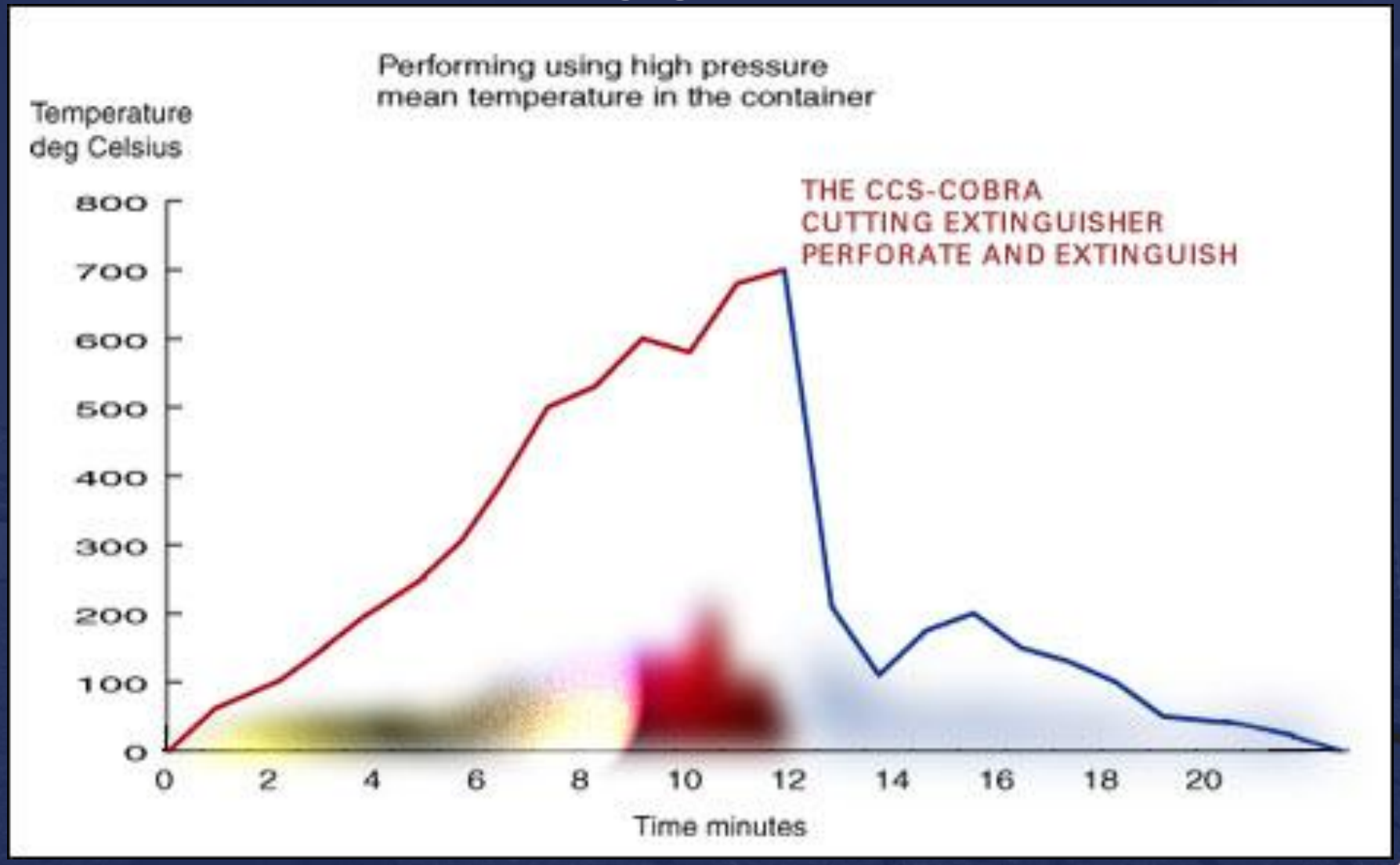
- Riscs:
  - Getting trapped
- Why:
  - Rescue
  - Reduce material damage

Likelihood: Possible

Consequence: unknown (still on debate)

COBRA

COBRA


Performing using high pressure
mean temperature in the container
Temperature
deg Celsius
800
700
600
500
400
300
200
100
0
THE CCS-COBRA
CUTTING EXTINGUISHER
PERFORATE AND EXTINGUISH
0
2
4
6
8
10
12
14
16
18
20
Time minutes

Cobra

- Advantages:
  - Creating safe area from outside;
  - Less water usage;
  - Useful in containers, ships, and other difficult to reach areas.

COBRA


BM 50-1
BRANDWEER
HA SS-1
112
BRANDWEER
BRANDWEER
DAF
CF
BP-SP-30

equipment for incidents with hazardous materials

Equipment for incidents with hazardous materials

Incidents were hazardous materials are involved;

- **Likelihood; rare**
- **Consequence; moderate/major**

<u>Main objectives</u>

- **Contain and secure the hazard**
- **Quick, (dirty) but safe**
  - **Watershields**
  - **Personal in protective clothing**
  - **Special equipment to close leaks or contain it**

Decontamination unit

Decontanimation unit

Main objectives

- **Quick deployable (within 10 minutes after arrival)**
- **Decontaminate own personal in protective suites**
- **Quick decontamination of badly wounded civilians**

Decontamination unit

Electric generator

Hot water box

High pressure water generator

Extended air supply system

Decontamination unit

Special foam concentrate to decontaminate protective clothing

Future developments

Vapor suppression

- covering of volatile and flammable liquids with balls
- Appliance of polymeric liquids which reacts to a solid layer
- The appliance of an inert liquid which floats on the spill

Situational awareness

- **Looking through the wall radar**
- **Indoor navigation**
- **Information management system (HIMS)**

BIMS demo v02b.exe

Questions?