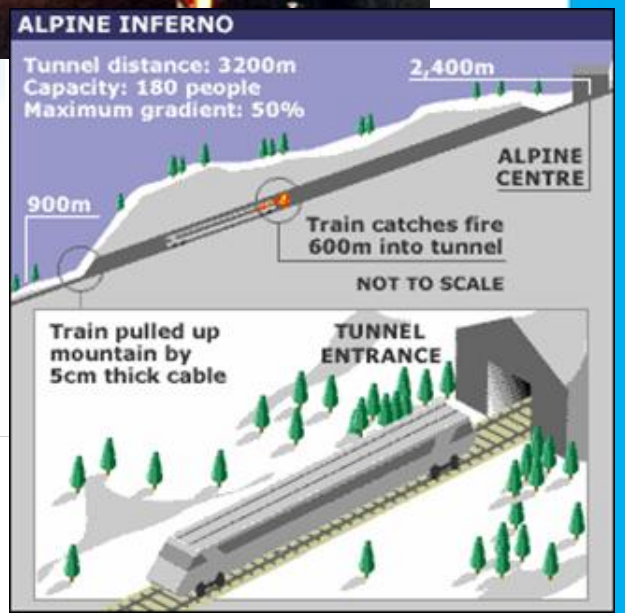
TNO
ctcm
efectis france
efectis nederland
SINTEF
AFITI
ift ROSENHEIM

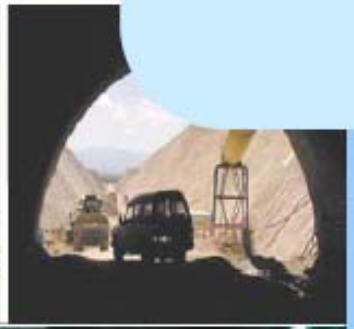
this happened ...



European Commission








Safety in European Road Tunnels

Proposal for a Directive on minimum safety requirements for tunnels in the Trans-European Road Network

December 2002

Puzzle ...

Existing Knowledge 2001 2004

New tunnels (design) 2001 2003

Legislation 2003 2006

Existing tunnels 2002 2006

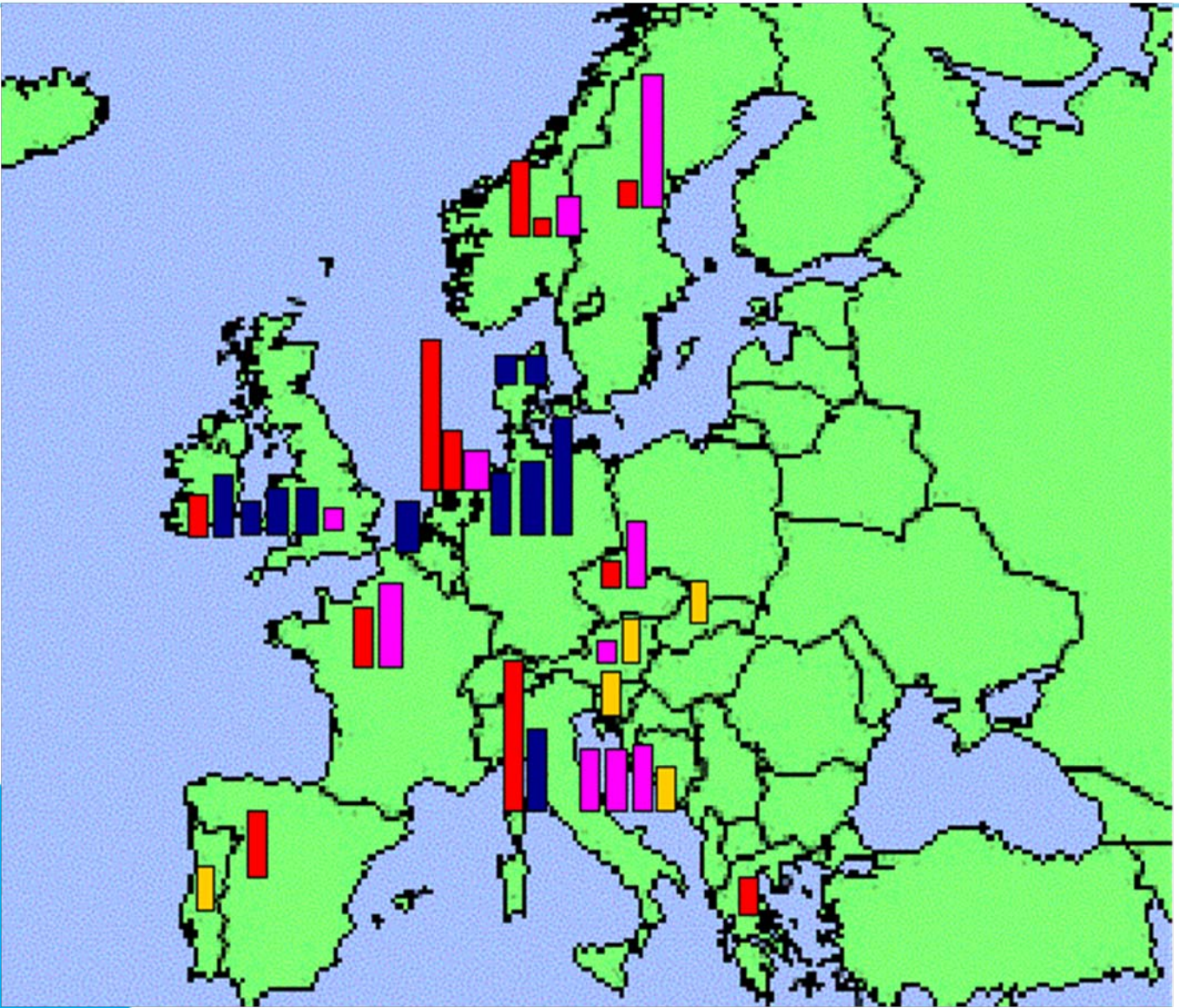
Kick-off, September 2002, Delft

Main objectives

- New methodologies and technologies to assess and improve fire safety

- Develop, demonstrate and promote procedures for rational safety level evaluation and knowledge transfer

Consortium



- 41 partners:

- 12 consultants
- 3 owners
- 7 suppliers / manufacturers
- 14 research institutes
- universities

- 19 countries

UPTUN – Cost-effective, sustainable and innovative upgrading methods for fire safety in existing tunnels
Project funded by the European Community under the 'Competitive and Sustainable Growth' Programme (1998-2002), Contract G1RD-CT-2002-0766, Project GRD1-2001-40739.

UPTUN

Key figures

- Start: September 2002
- Duration: 48 months
- Budget: 12 M Eur

- More than 50 final reports
- External review: very good project

Some results


0000307
FIRE


KT88I1

Runehamar fire tests

The European Commission
Community Research
Competitive and Sustainable Growth

Runehamar fire tests

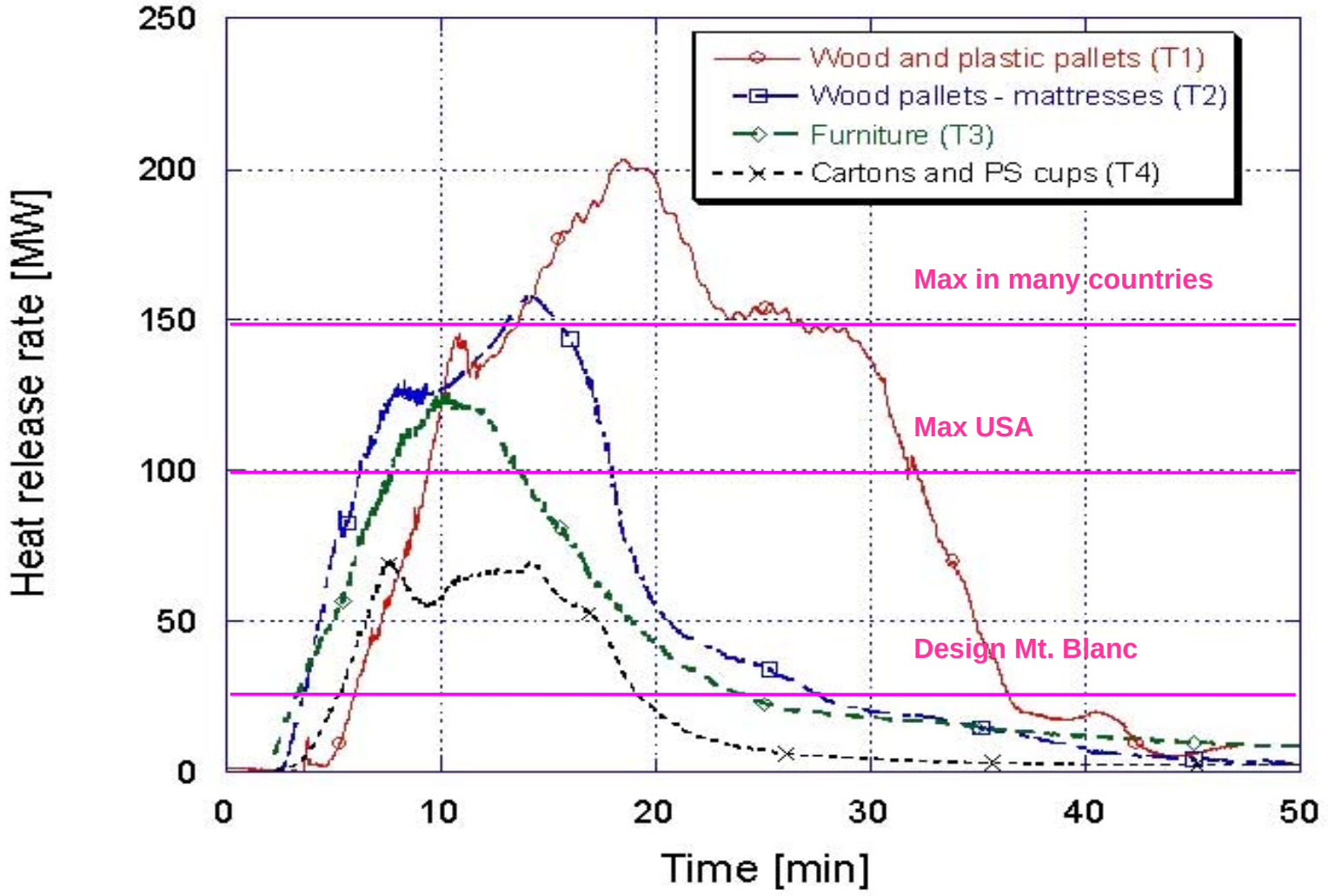
Test	Fire load
1	10,9 ton wood and pla
2	6,8 ton wood and (PUR
3	8,5 ton furniture
4	3,1 ton carton and plast

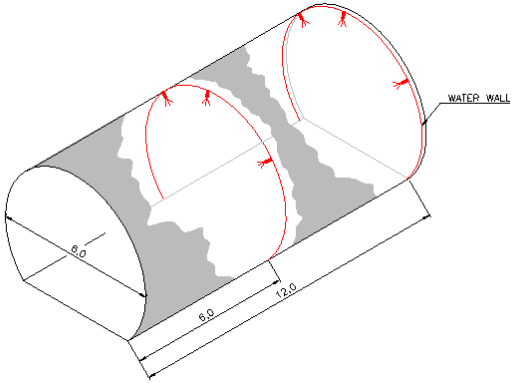
Dangerous goods?

6 min.

30 min.

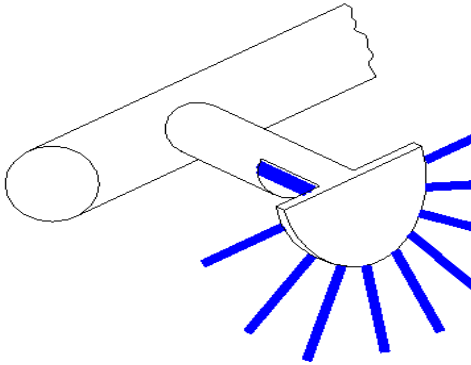
Heat release rate

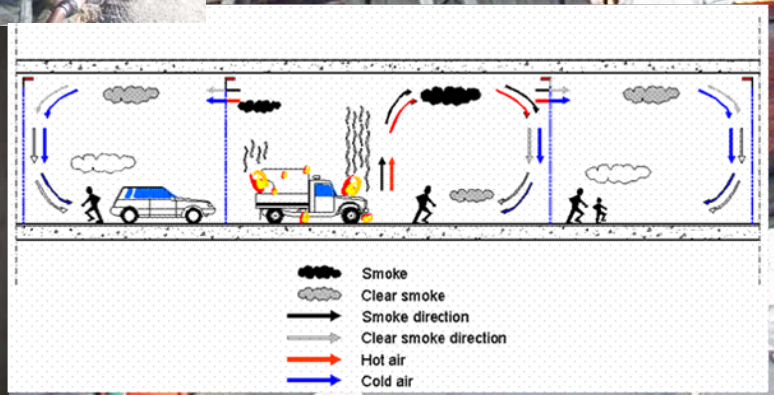


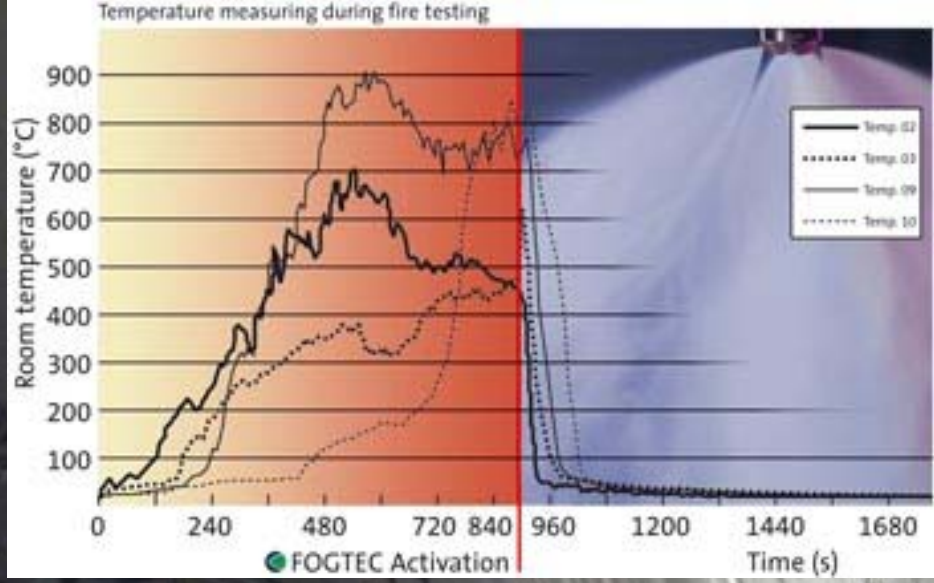

WATER WALL
6.0
6.0
12.0


Before ...


apt
After activating
waterscreen




Smoke
Clear smoke
Smoke direction
Clear smoke direction
Hot air
Cold air



Watermist: spray with 99 % droplets < 1 mm

- Cools

- Suppresses oxygen

- Blocks radiation

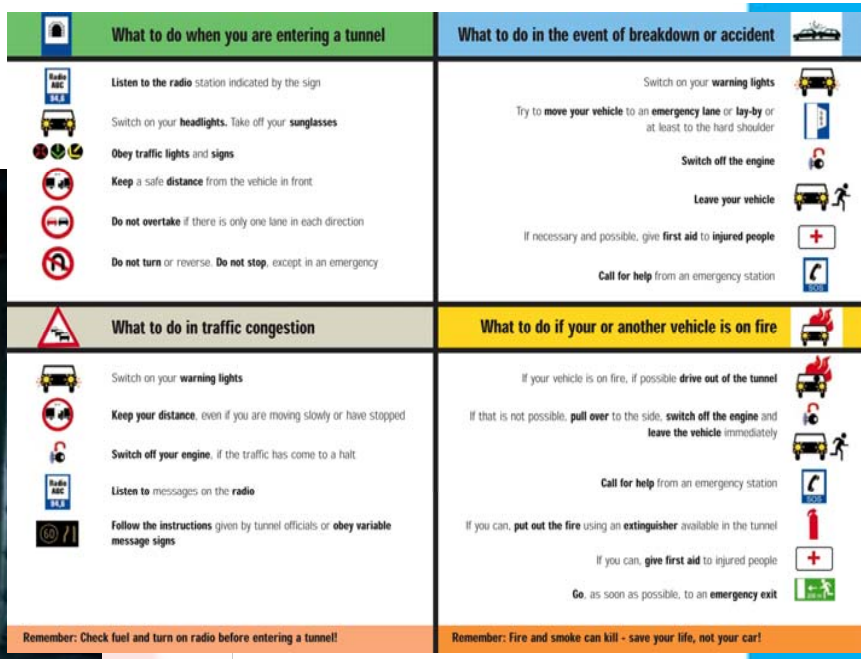
Diameter (mm)	reaction(evaporation) surface m2/l
1	2
0,1	20
0,01	200

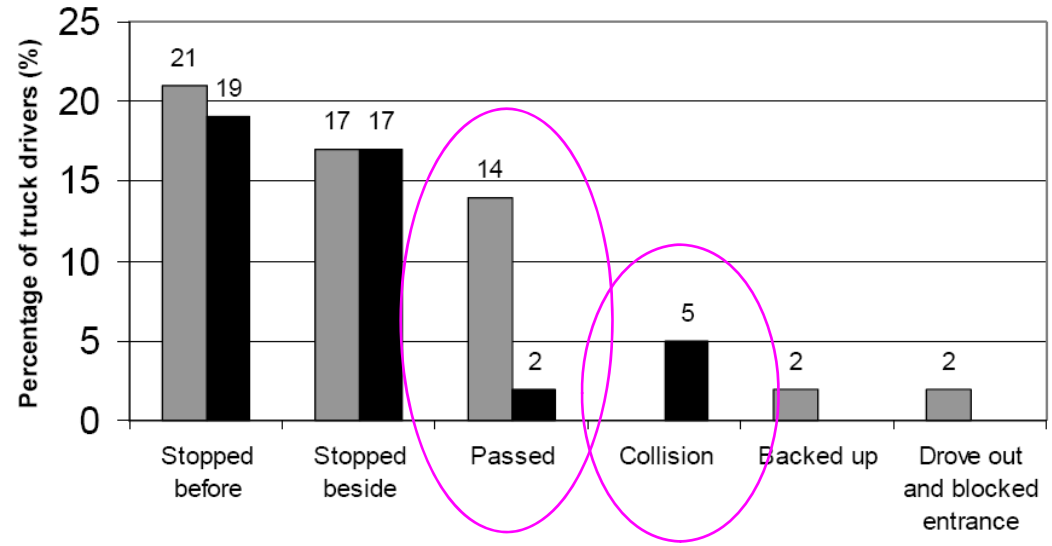
Watermist

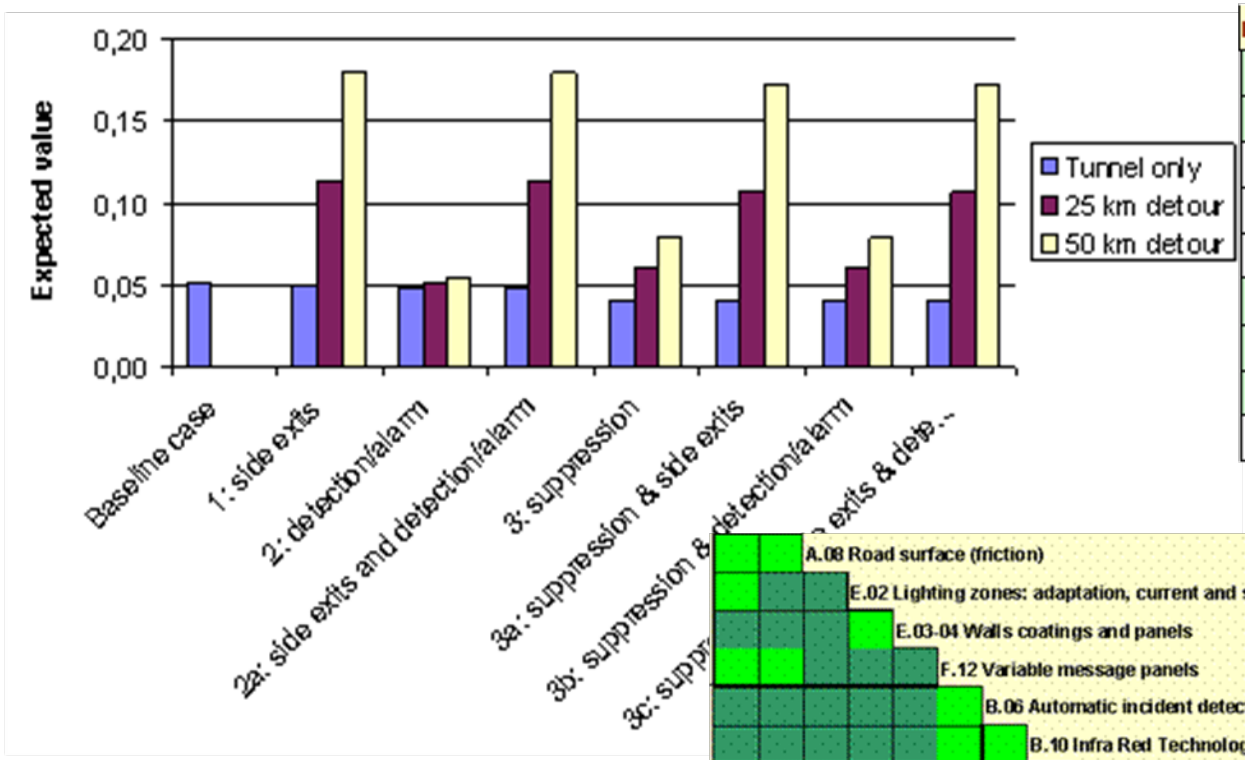
Without

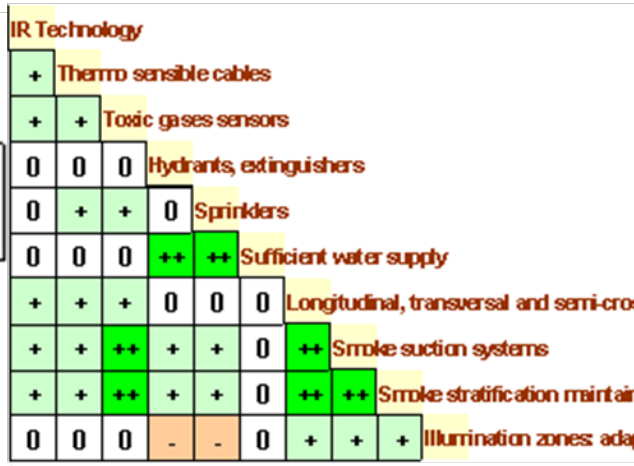
With

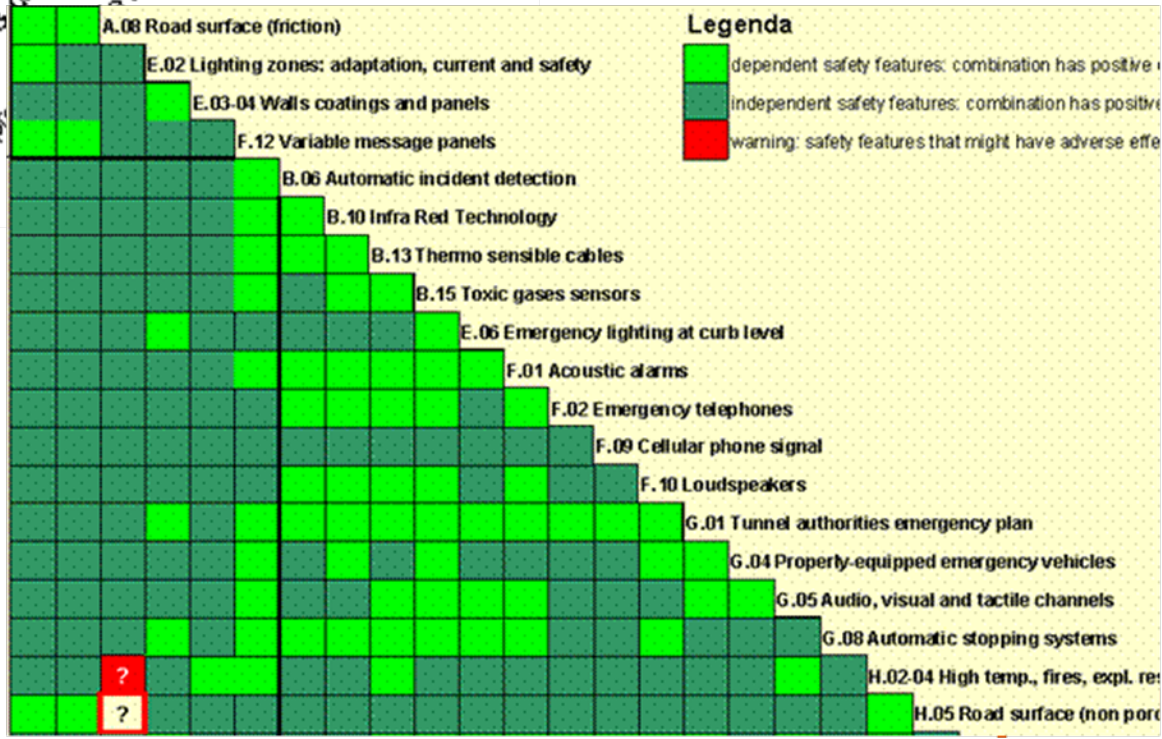
Training


What to do when you are entering a tunnel
Listen to the radio station indicated by the sign
Switch on your headlights. Take off your sunglasses
Obey traffic lights and signs
Keep a safe distance from the vehicle in front
Do not overtake if there is only one lane in each direction
Do not turn or reverse. Do not stop, except in an emergency
What to do in the event of breakdown or accident
Switch on your warning lights
Try to move your vehicle to an emergency lane or lay-by or at least to the hard shoulder
Switch off the engine
Leave your vehicle
If necessary and possible, give first aid to injured people
Call for help from an emergency station
What to do in traffic congestion
Switch on your warning lights
Keep your distance, even if you are moving slowly or have stopped
Switch off your engine, if the traffic has come to a halt
Listen to messages on the radio
Follow the instructions given by tunnel officials or obey variable message signs
What to do if your or another vehicle is on fire
If your vehicle is on fire, if possible drive out of the tunnel
If that is not possible, pull over to the side, switch off the engine and leave the vehicle immediately
Call for help from an emergency station
If you can, put out the fire using an extinguisher available in the tunnel
If you can, give first aid to injured people
Go, as soon as possible, to an emergency exit
Remember: Check fuel and turn on radio before entering a tunnel!
Remember: Fire and smoke can kill - save your life, not your car!

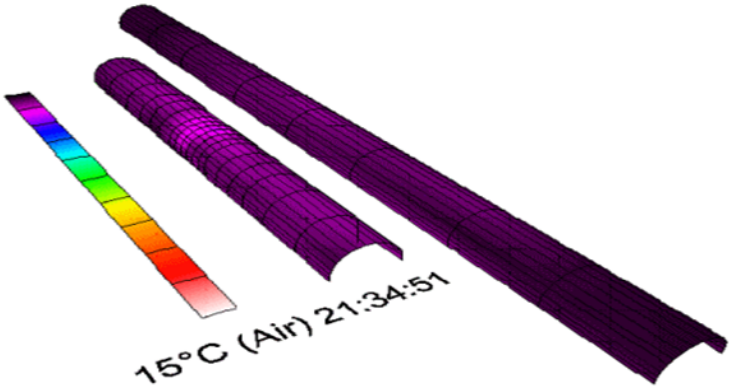

Percentage of truck drivers (%)
25
20
15
10
5
0
21
19
17
17
14
2
5
2
2
Stopped before
Stopped beside
Passed
Collision
Backed up
Drove out and blocked entrance
No info
EU Leaflet


Expected value
0,20
0,15
0,10
0,05
0,00
Tunnel only
25 km detour
50 km detour
Baseline case
1: side exits
2: detection/alarm
2a: side exits and detection/alarm
3: suppression
3a: suppression & side exits
3b: suppression & detection/alarm


IR Technology
Thermo sensible cables
Toxic gases sensors
Hydrants, extinguishers
Sprinklers
Sufficient water supply
Longitudinal, transversal and semi-cro
Smoke suction systems
Smoke stratification maintai
Illumination zones: ada


A.08 Road surface (friction)
E.02 Lighting zones: adaptation, current and safety
E.03-04 Walls coatings and panels
F.12 Variable message panels
B.06 Automatic incident detection
B.10 Infra Red Technology
B.13 Thermo sensible cables
B.15 Toxic gases sensors
E.06 Emergency lighting at curb level
F.01 Acoustic alarms
F.02 Emergency telephones
F.09 Cellular phone signal
F.10 Loudspeakers
G.01 Tunnel authorities emergency plan
G.04 Properly-equipped emergency vehicles
G.05 Audio, visual and tactile channels
G.08 Automatic stopping systems
H.02-04 High temp., fires, expl. re
H.05 Road surface (non por
Legenda
dependent safety features: combination has positive
independent safety features: combination has positive
warning: safety features that might have adverse effe

20 MW fire – Water Mist



D·A·R·T·S

SHORT PRESS RELEASE

Successful symposium points the way forward for improved safety & reliability of tunnels

1st International Symposium
'Safe & Reliable Tunnels - Innovative European Achievements'
4-6 February 2004, Prague, Czech Republic

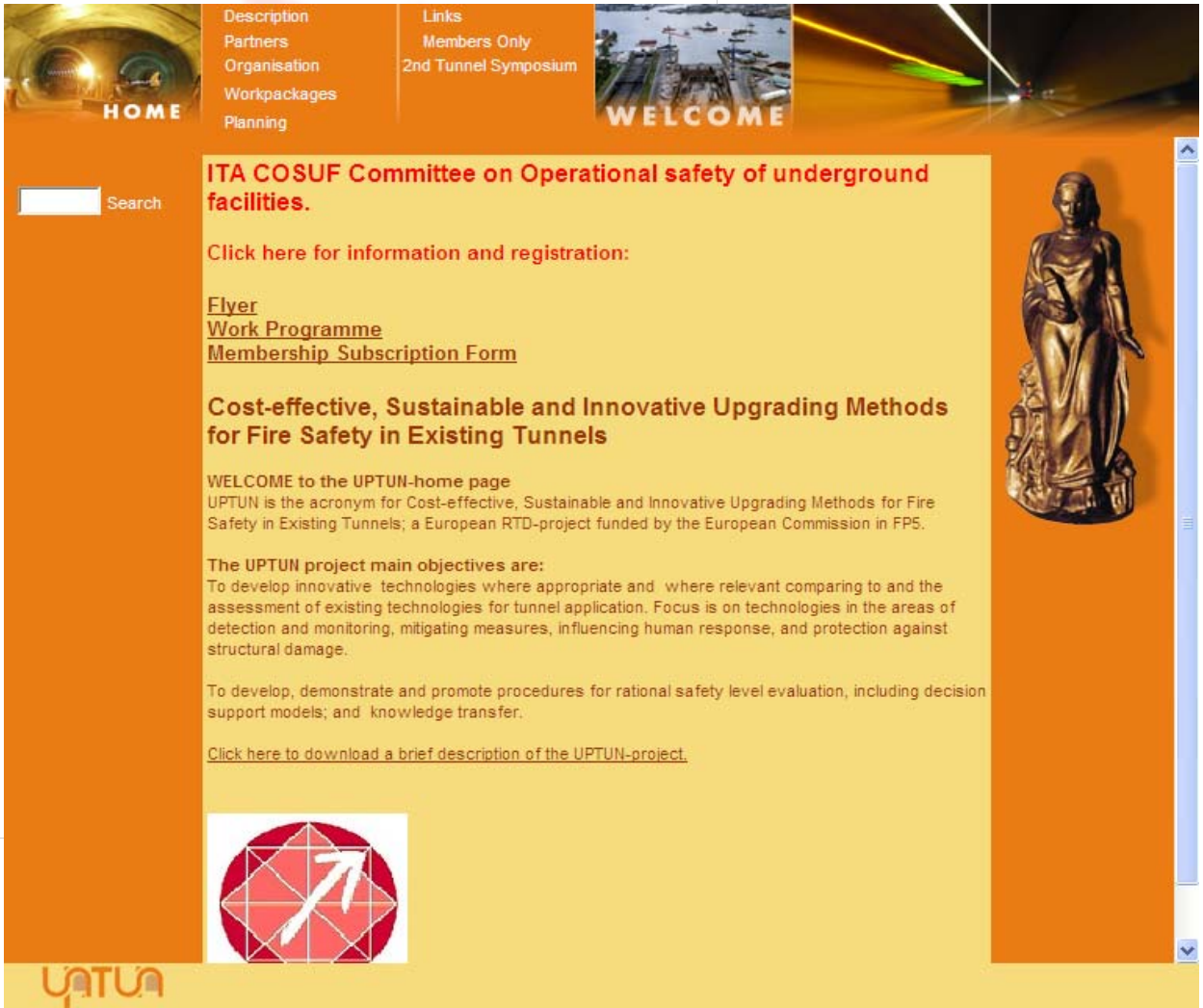
2nd International Symposium
Reliable Tunnels
Innovative European Achievements & ITA - COSUF Inauguration
30-31 May 2006, Lausanne, Switzerland

UPTUN ontology

"Meeting word"	Meaning	Anecdote
Motpakke (N)	Sandwich package	Specially made suit
Mist	Small droplets	Dung, manure
Loop	Circle, ...	Magnifying glass (NL)
Schlummertrunk	Night cap	After the meeting ...

More information?

- WWW.UPTUN.NET



efectis france