

Uso e prospettive della FSE nell'ambito di musei e biblioteche: esempi applicativi

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- *Attività soggetta a Controllo n. 72 del Dpr 151/11 (Edifici sottoposti a tutela ai sensi del D. Lgs. 22 gennaio 2004, n. 42 destinati a contenere biblioteche, archivi, musei, gallerie, esposizioni e mostre, nonché qualsiasi altra attività contenuta nell'allegato)*



Regole Tecniche “*Dedicate*”

- *DM 20-05-1992 n. 569 “Regolamento contenente norme di sicurezza antincendio per gli edifici storici e artistici destinati a musei, gallerie, esposizioni e mostre”*

D.P.R. n. 418 del 30 giugno 1995 “Regolamento concernente norme di sicurezza antincendio per gli edifici di interesse storico-artistico destinati a biblioteche ed archivi”.



MINISTERO DELL'INTERNO
DIPARTIMENTO DEI VIGILI DEL FUOCO
DEL SOCCORSO PUBBLICO E DELLA DIFESA CIVILE

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Problemi comuni

- *Strutture REI*
- *Vie di esodo*
- *Ventilazione*

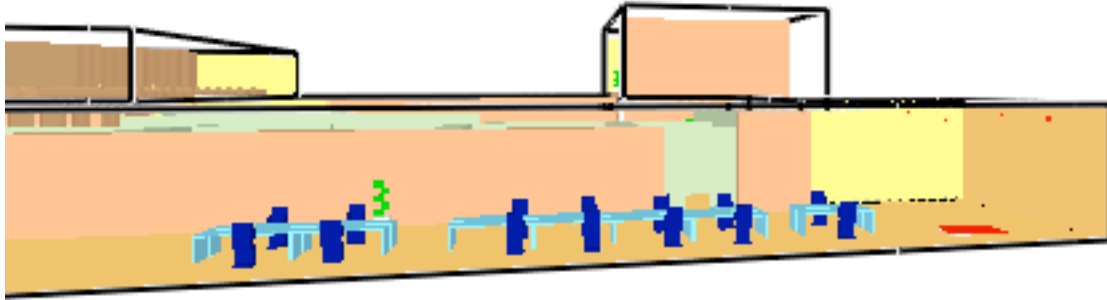
..... *Deroghe.... FSE*



MINISTERO DELL'INTERNO
DIPARTIMENTO DEI VIGILI DEL FUOCO
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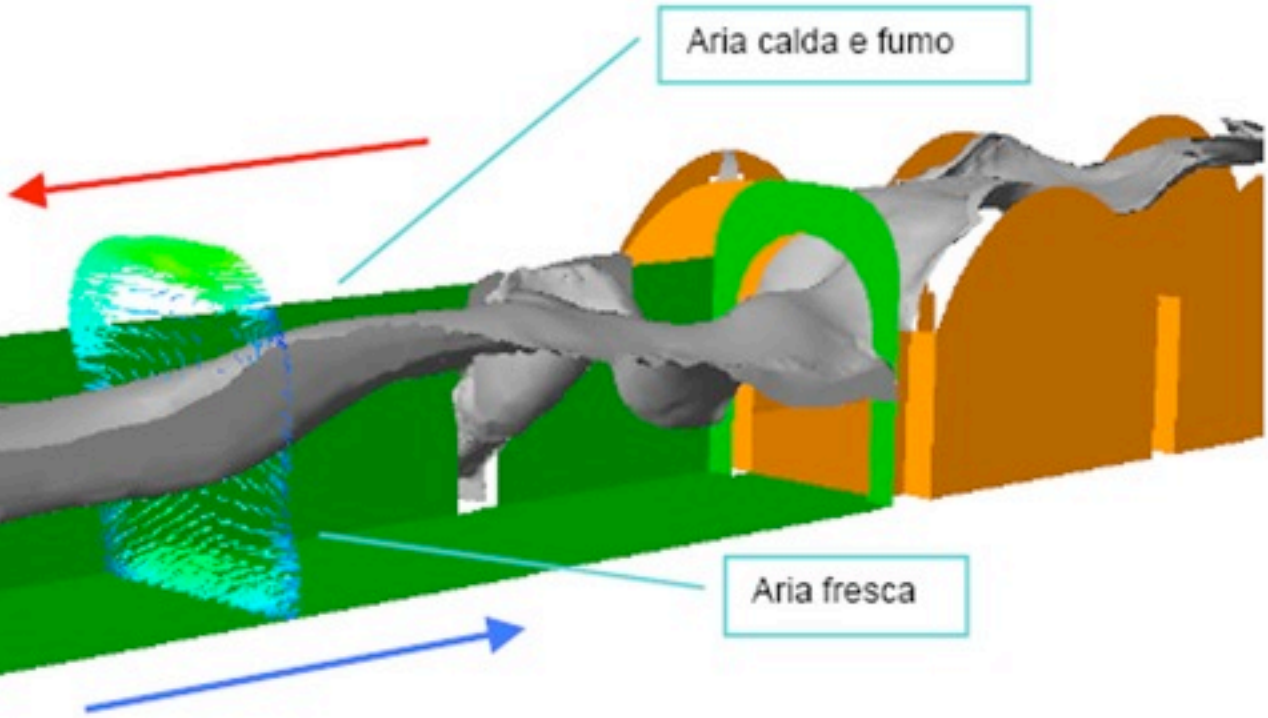
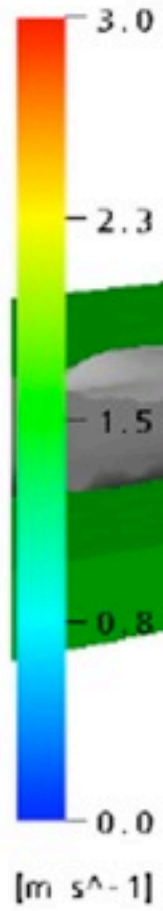
ArupFire



Time: 0.0

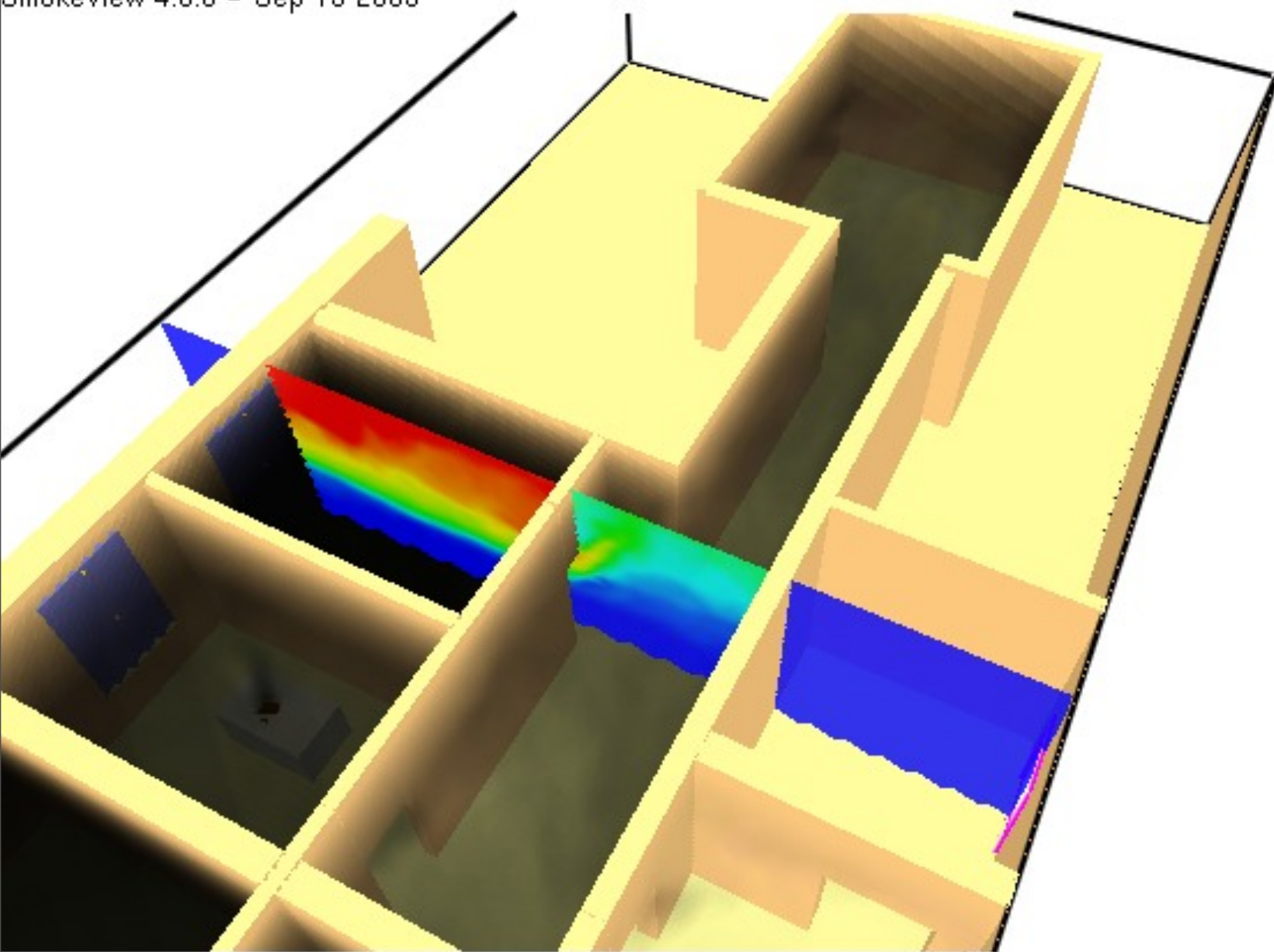


Velocity
(Vector 1)



Aria calda e fumo

Aria fresca



Slice temp C



Frame: 525

Time: 139.4



FILE: o
 NODES: 6849
 BEAMS: 0
 TRUSSES: 0
 SHELLS: 6663
 SOILS: 0

SHELLS PLOT

- t22.tsh
- t25bp.tsh
- t16p1.tsh
- t12.tsh
- t16.tsh
- t40.tsh
- t18.tsh
- t8.tsh
- t14p2.tsh
- t8p3.tsh
- t8v5.tsh
- t55.tsh
- t10.tsh
- t10p2.tsh
- t10p1.tsh
- t28.tsh
- t10ic.tsh
- t8ic.tsh
- t10i.tsh
- t6i.tsh
- t30.tsh
- t8p3.tsh
- t14.tsh
- t25.tsh
- t12if.tsh
- t8v1.tsh
- t14v1.tsh
- t9h.tsh
- t6h.tsh
- t55le.tsh
- t18le.tsh
- t16le.tsh
- t16ld.tsh
- t40lb.tsh
- t10a.tsh

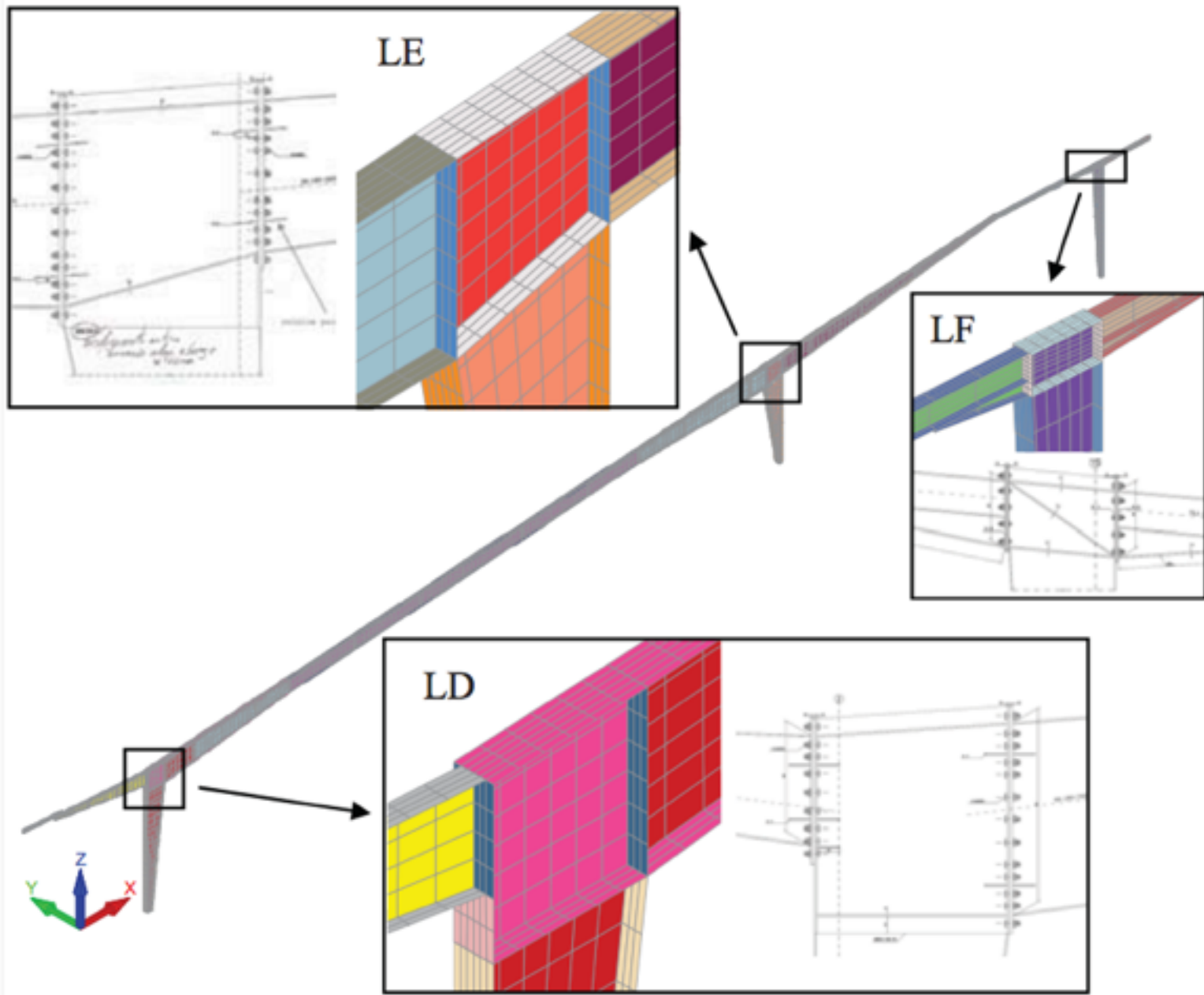
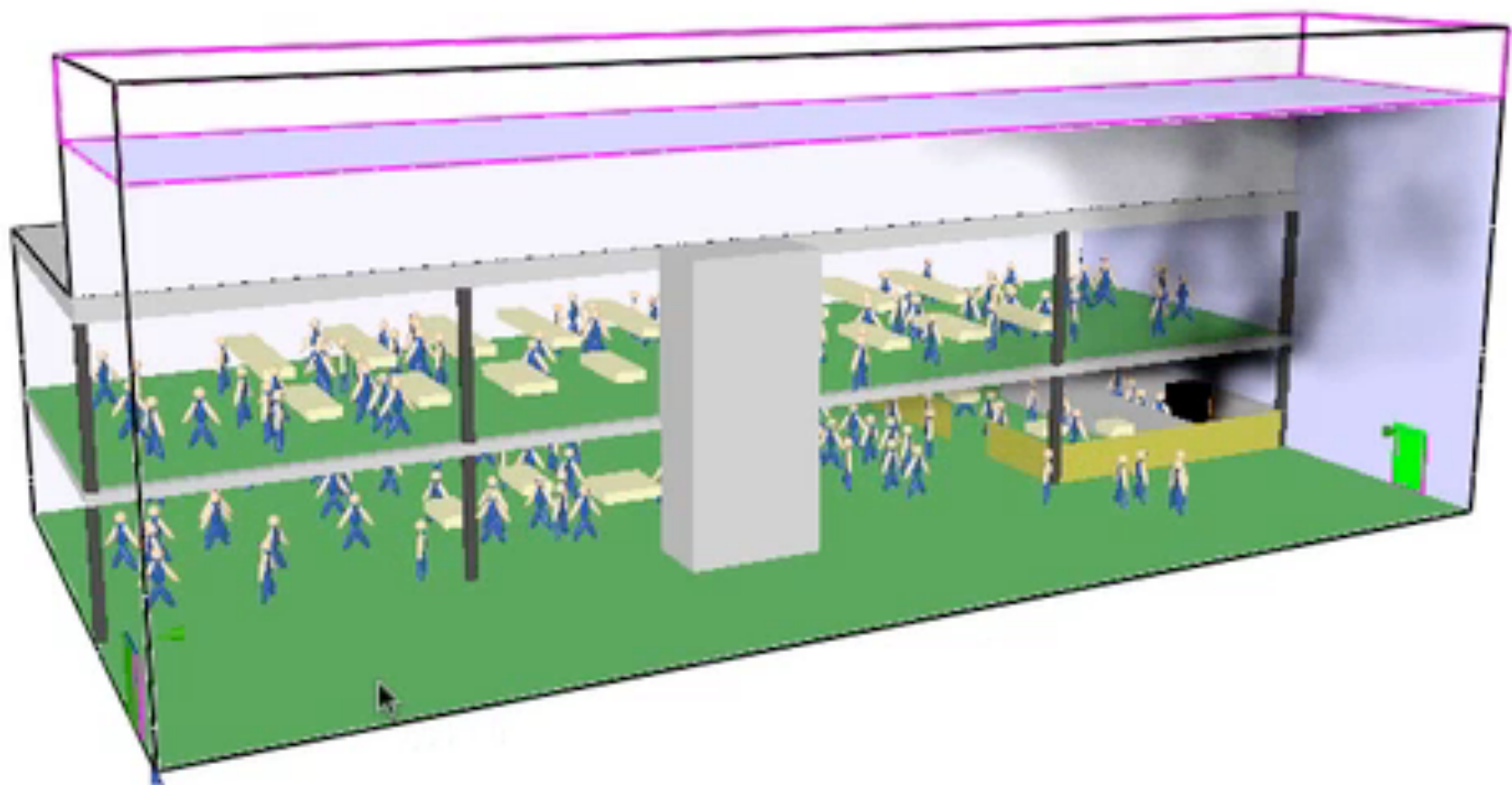


Fig. 14.7 Structural model and beam to column connection details



mesh: 1

Frame: 756

Time: 70.85



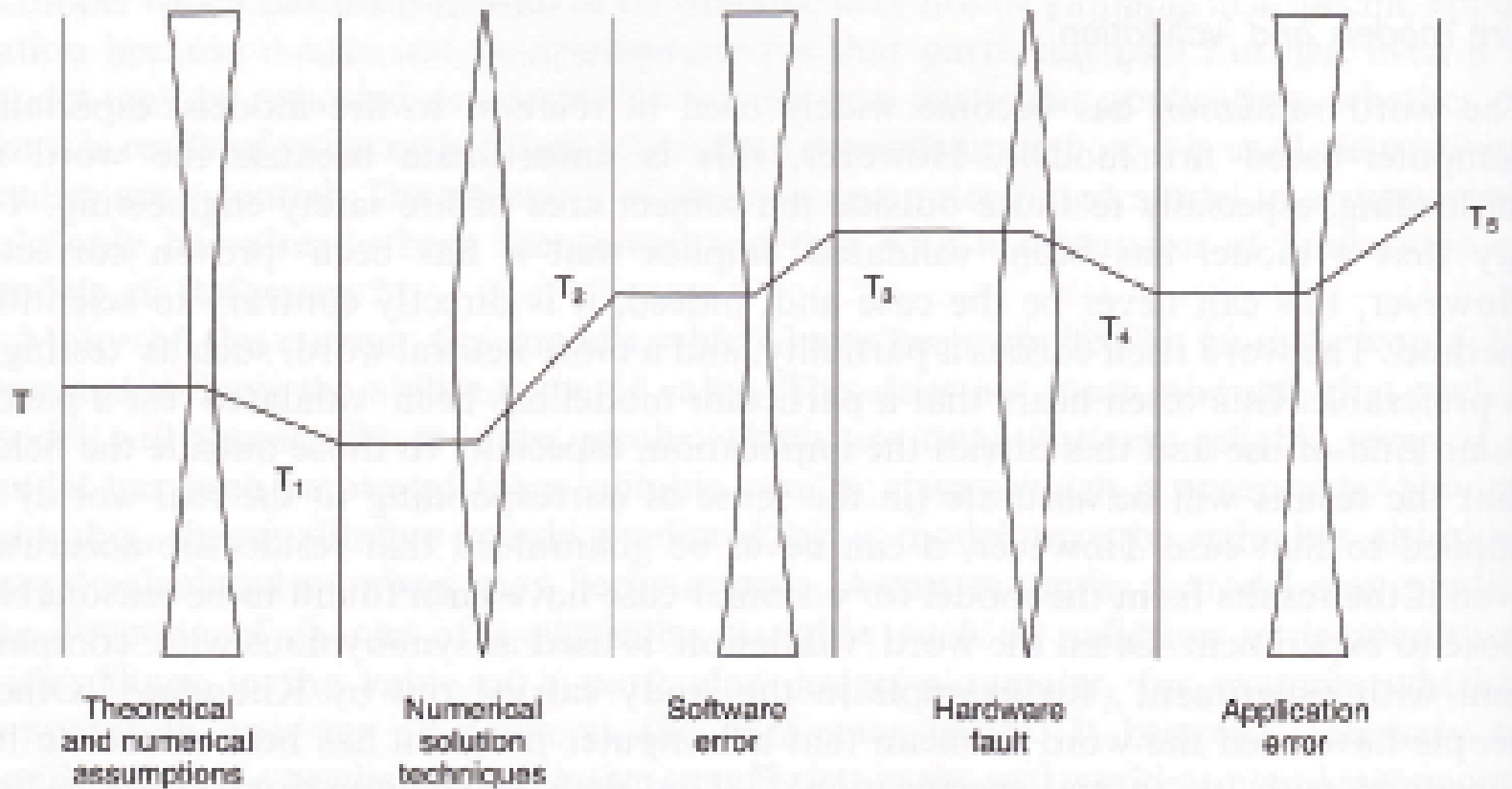
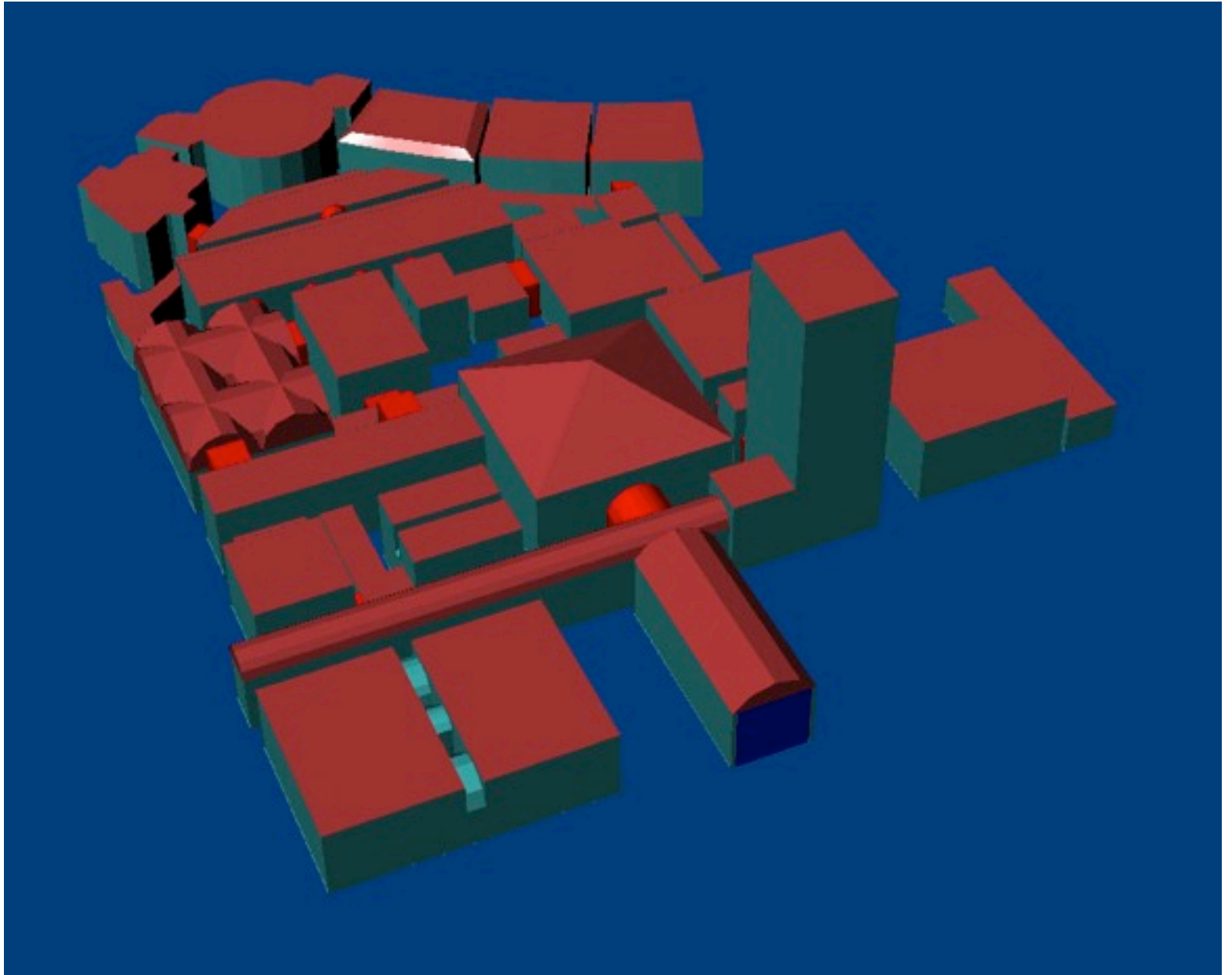


Figure 14.4. Categories of error (represented via a lens analogy)

Kaiserlicher Nachweis:



Darstellung Modell EG



Ground Floor: Escape routes and emergency exits

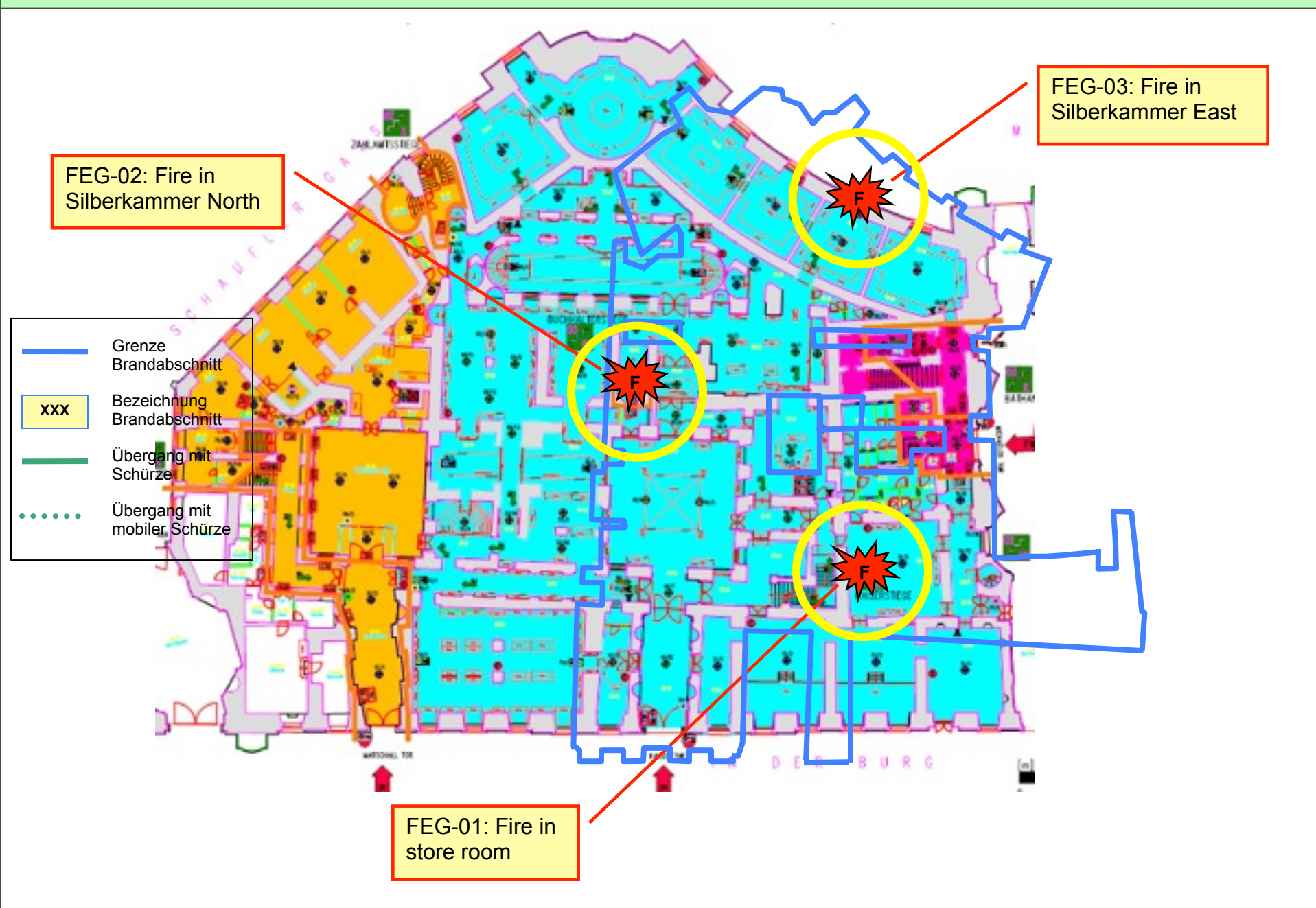
NA Emergency exit



Fluchtweg
Notausgang
Feuerlöscher



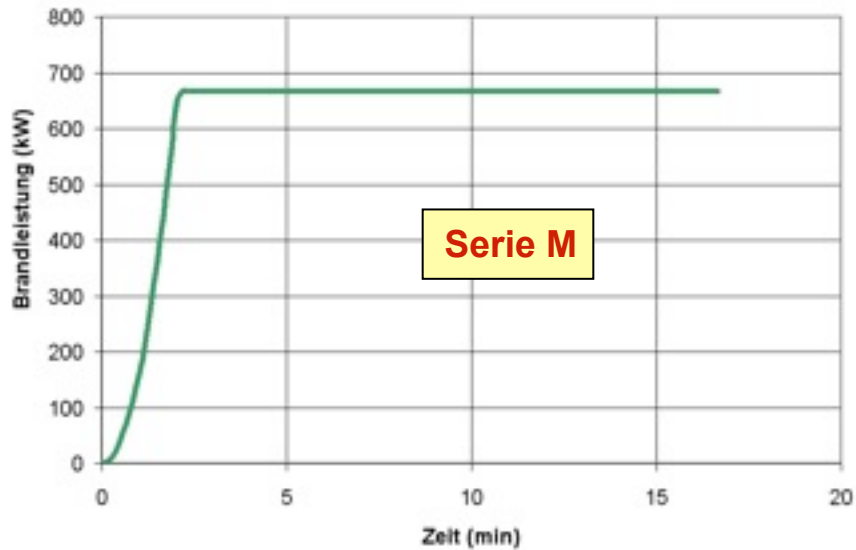
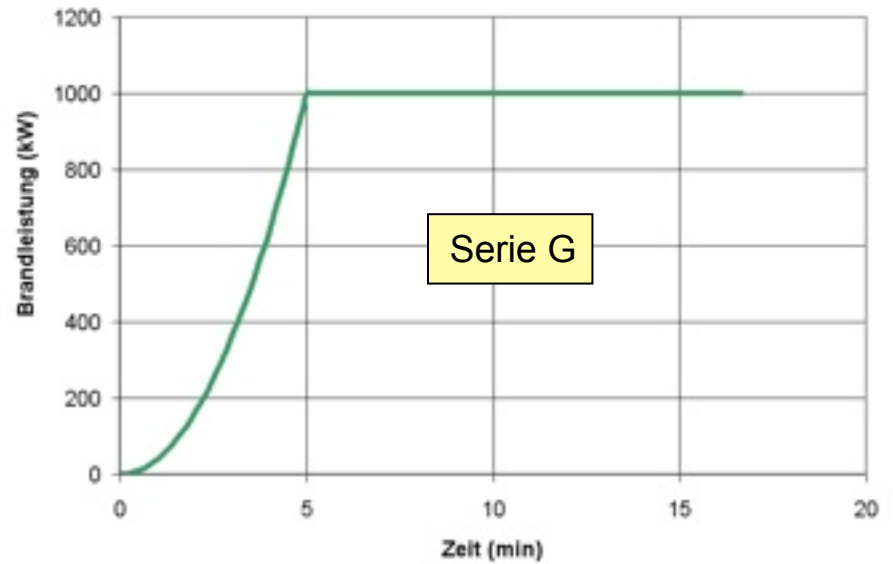
Fire locations, Zone „Silberkammer“ (Ground floor)



Fire Scenarios

Fire Location	Name	Material	Heat Output	Propagation speed	Series
Silberkammer (EG)	FEG-02, FEG-03	Wenig brennbares Material, Elektrische Leitungen	700 kW	Schnell	M
Storage room	FEG-01, FOG-02	Viel brennbares Material	2'500 kW	Mittel bis schnell	V
Ausstellungsraum im OG1	FOG-01, FOG-03, FOG-04, FOG-05	Elektrische Leitungen, Wohnungseinrichtungen	1'000 kW	Mittel	G

Brandkurven

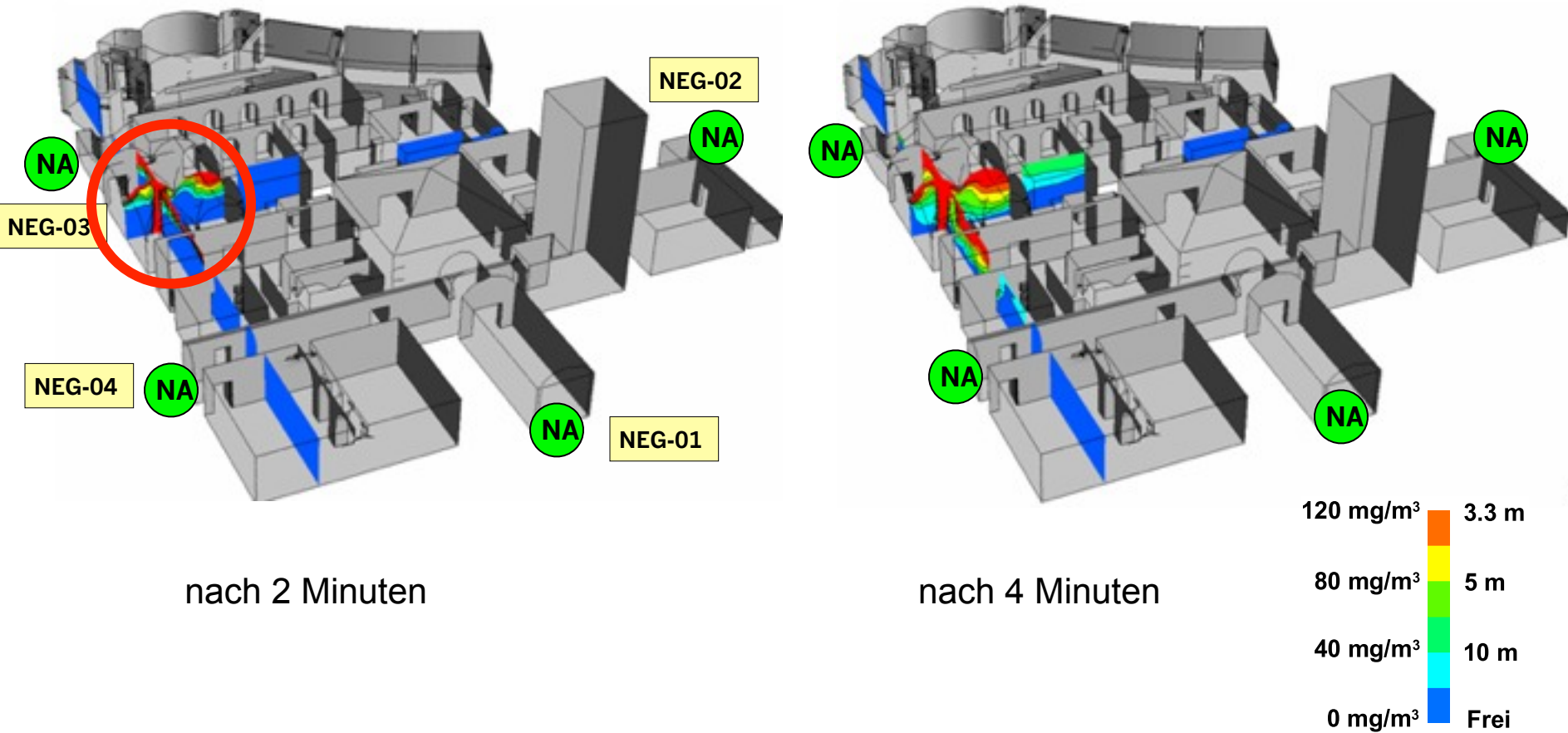


Zusammenhang Leistung, Russ / Rauch und Sichtweite

- Heizwert: 25 kJ/g
- Rauchproduktion: 4% (d.h. 4 g Russ / 100 g verbranntes Material)
- 40 mg/m³ Russ ergibt 10 m Sichtweite für unbeleuchtete Zeichen, **25m für hinterleuchtete Zeichen**

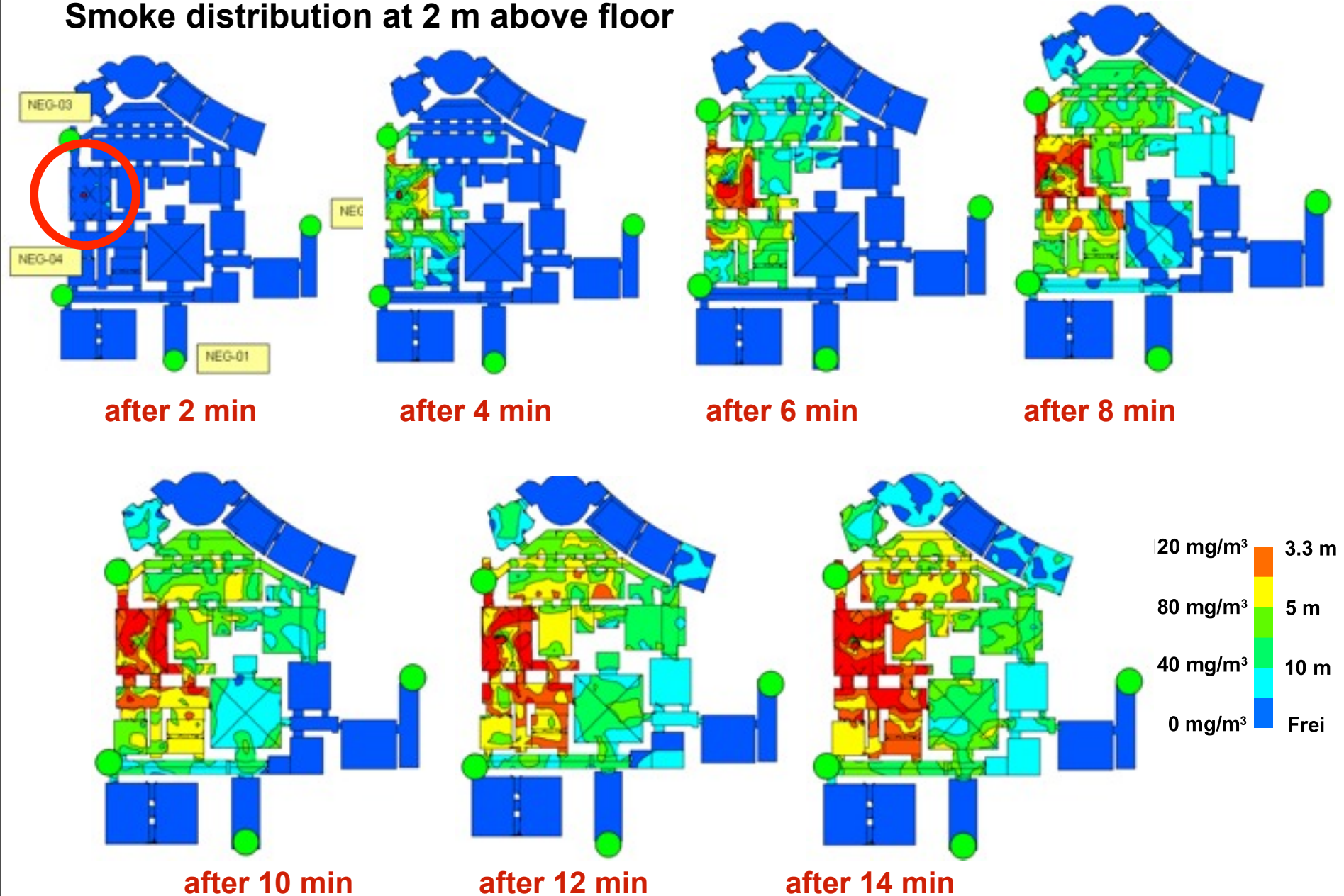
Brand FEG-02 (EG Silberkammer Nord), Variante M01

Smoke distribution (vertical section)



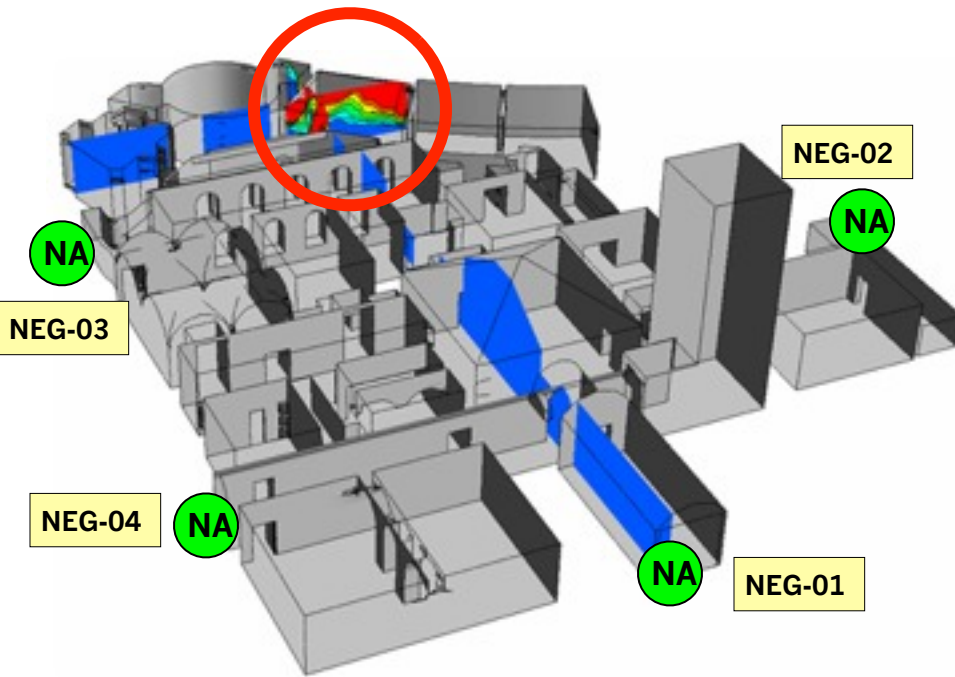
Brand FEG-02 (EG Silberkammer Nord), Variante M01

Smoke distribution at 2 m above floor

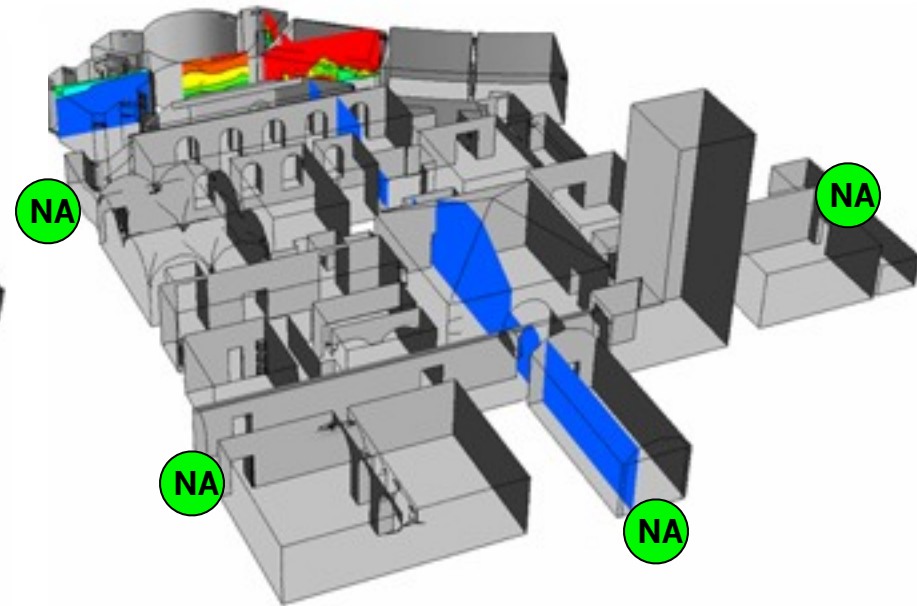


Brand FEG-03 (EG Silberkammer Ost), Variante M02

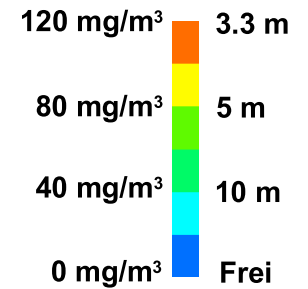
Rauchverteilung (Vertikale Ebenen)



nach 2 Minuten

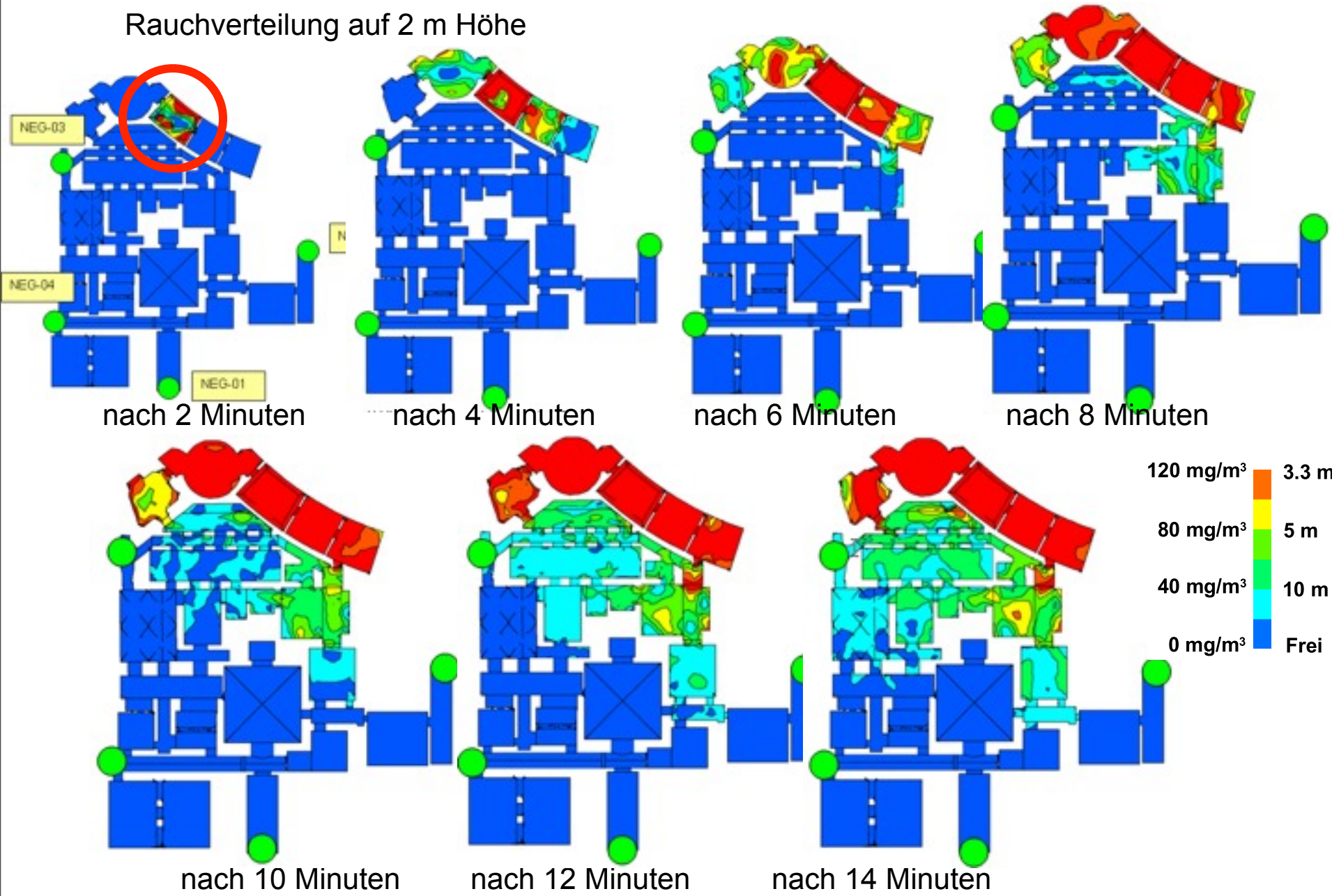


nach 4 Minuten



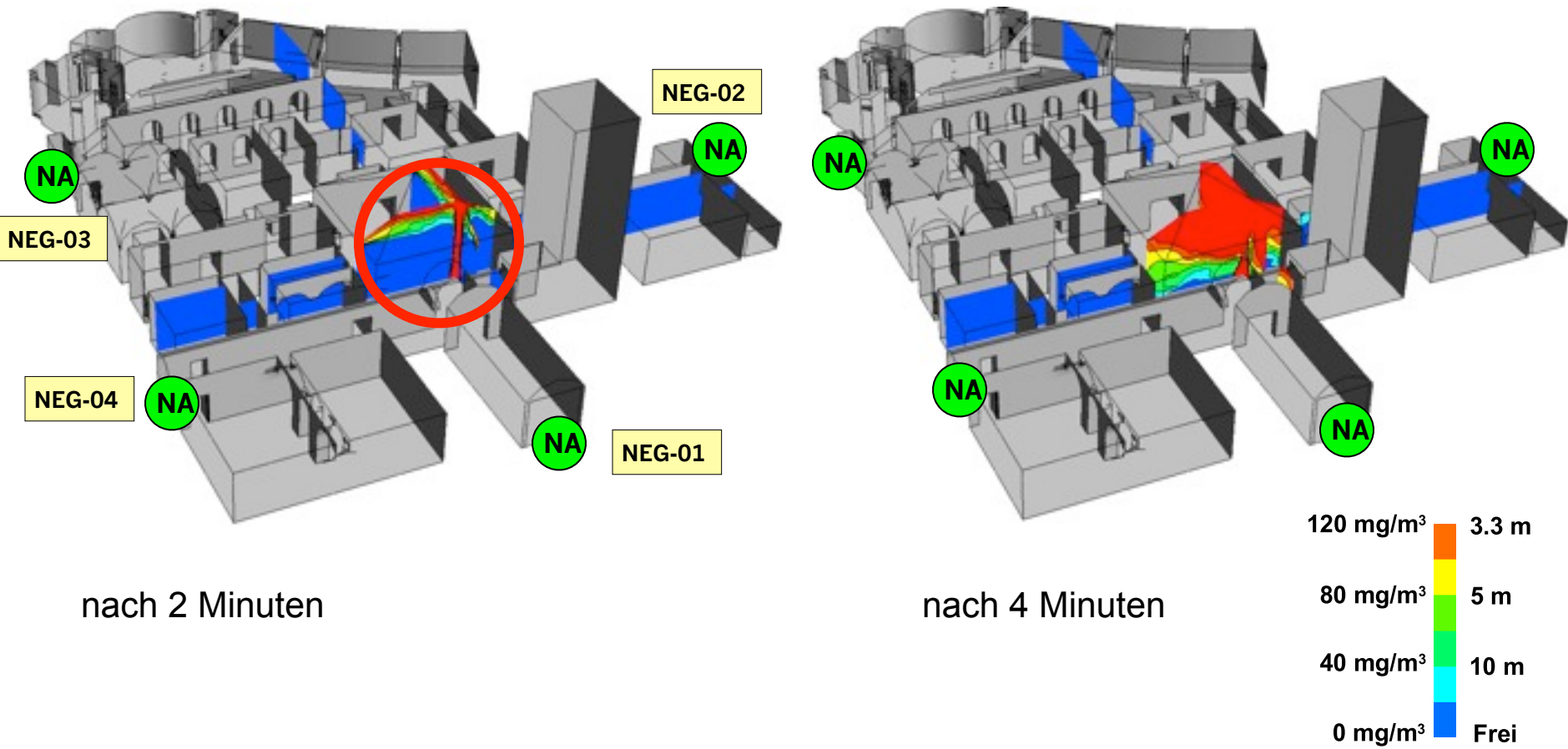
Brand FEG-03 (EG Silberkammer Ost), Variante M02

Rauchverteilung auf 2 m Höhe



Brand FEG-01 (Shop EG), Variante V02

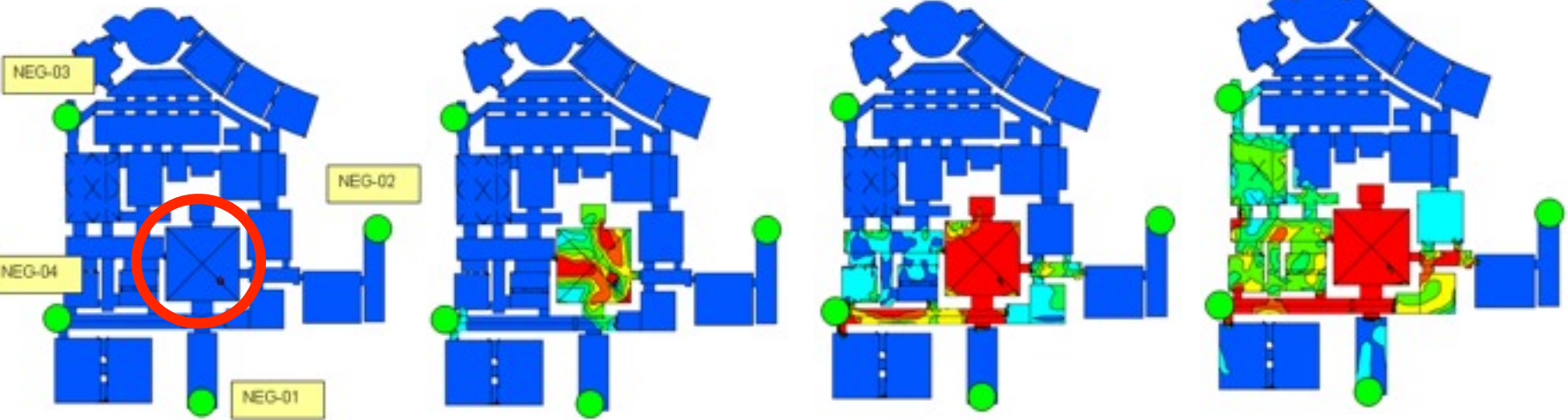
Rauchverteilung (Vertikale Ebenen)



Brand FEG-01 (Shop EG), Variante V02

● Emergency exit

Rauchverteilung auf 2 m Höhe

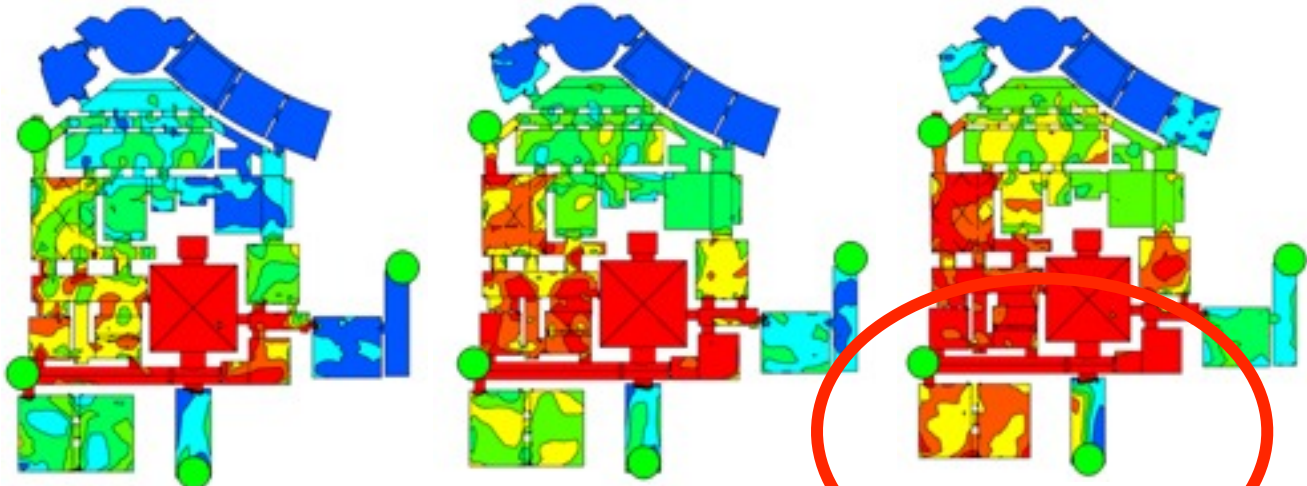


after 2 min

after 4 min

after 6 min

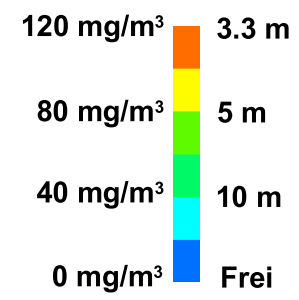
after 8 min



after 10 min

after 12 min

after 14 min



Critical spot!

Resultats of Simulation GF (overview)

Variat	nt	Fire location	Smoke-free exits			
			NEG-01	NEG-02	NEG-03	NEG-04
V02		Storage GF, FEG-01	0 – 10 min	0 - 14 min	0 – 8 min	0 – 4 min
M01		GF Silberkammer North, FEG-02	>15 min	>15 min	0 – 4 min	0 – 8 min
M02		GF Silberkammer East, FEG-03	>15 min	>15 min	0 – 12 min	>15 min

Critical
!

Music Academy / Accademia Chigiana

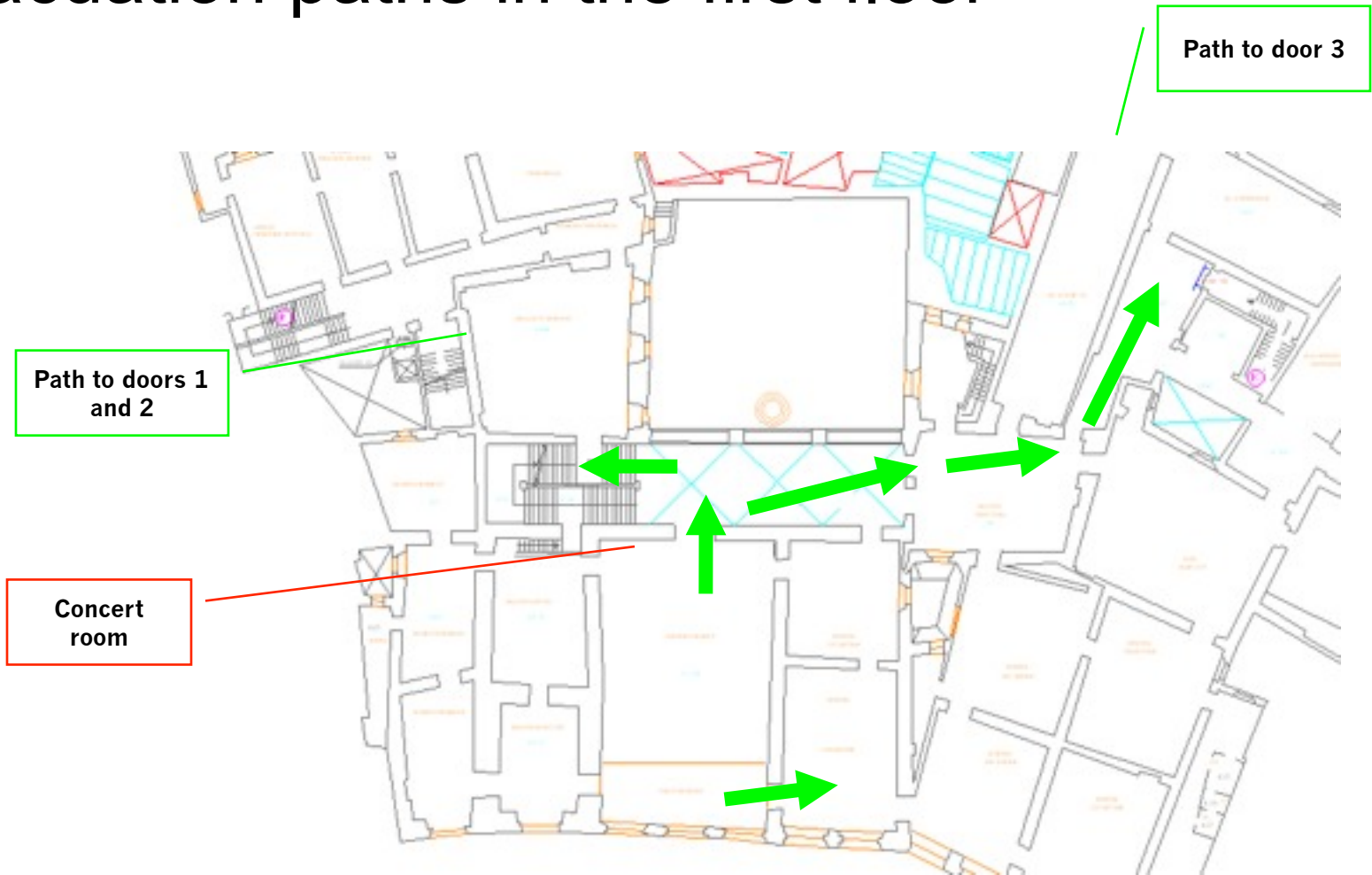


- Concert room

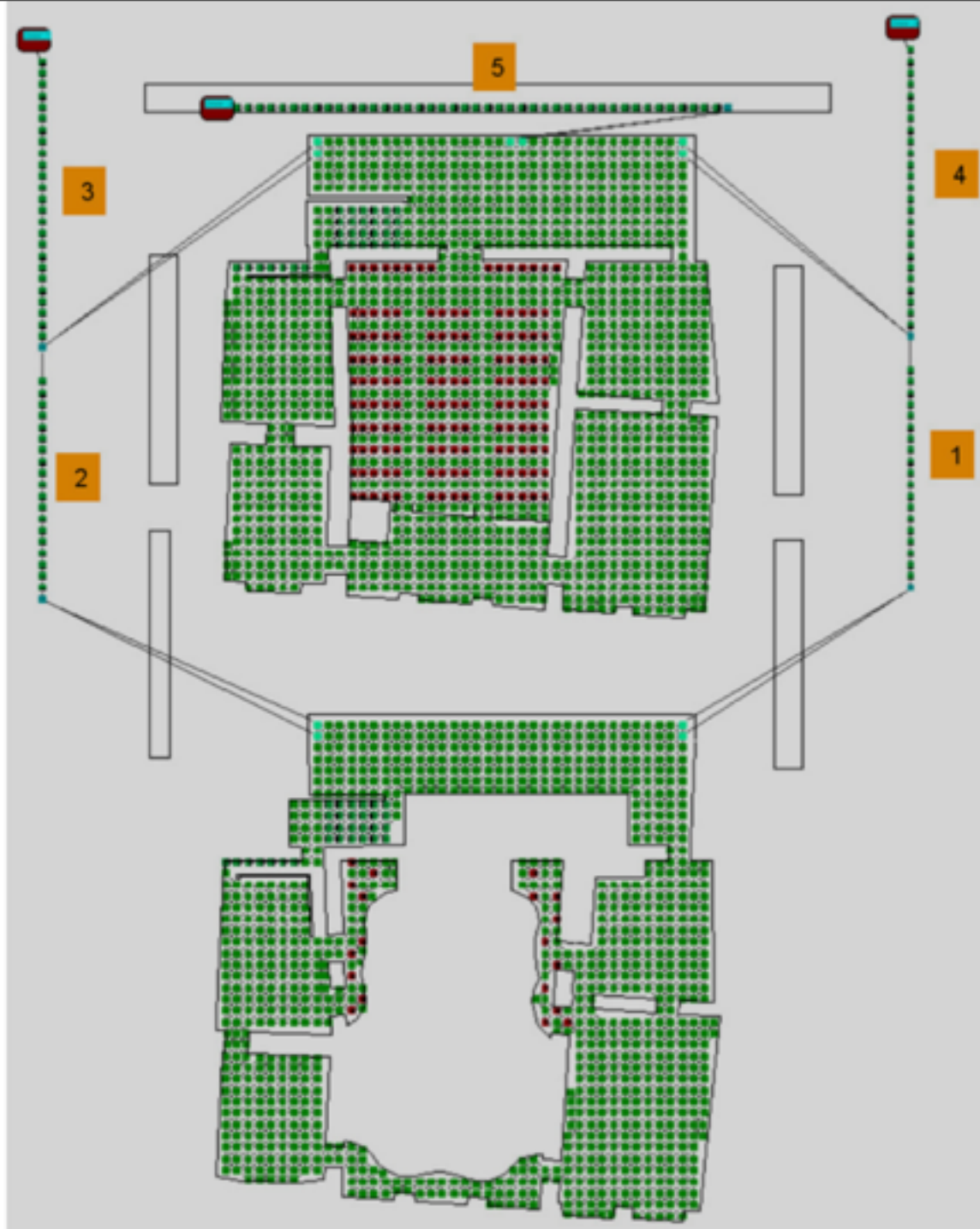
• **Building mainly restored in 1507**

Accademia Chigiana: Geometry

- Evacuation paths in the first floor



165 people in the first floor



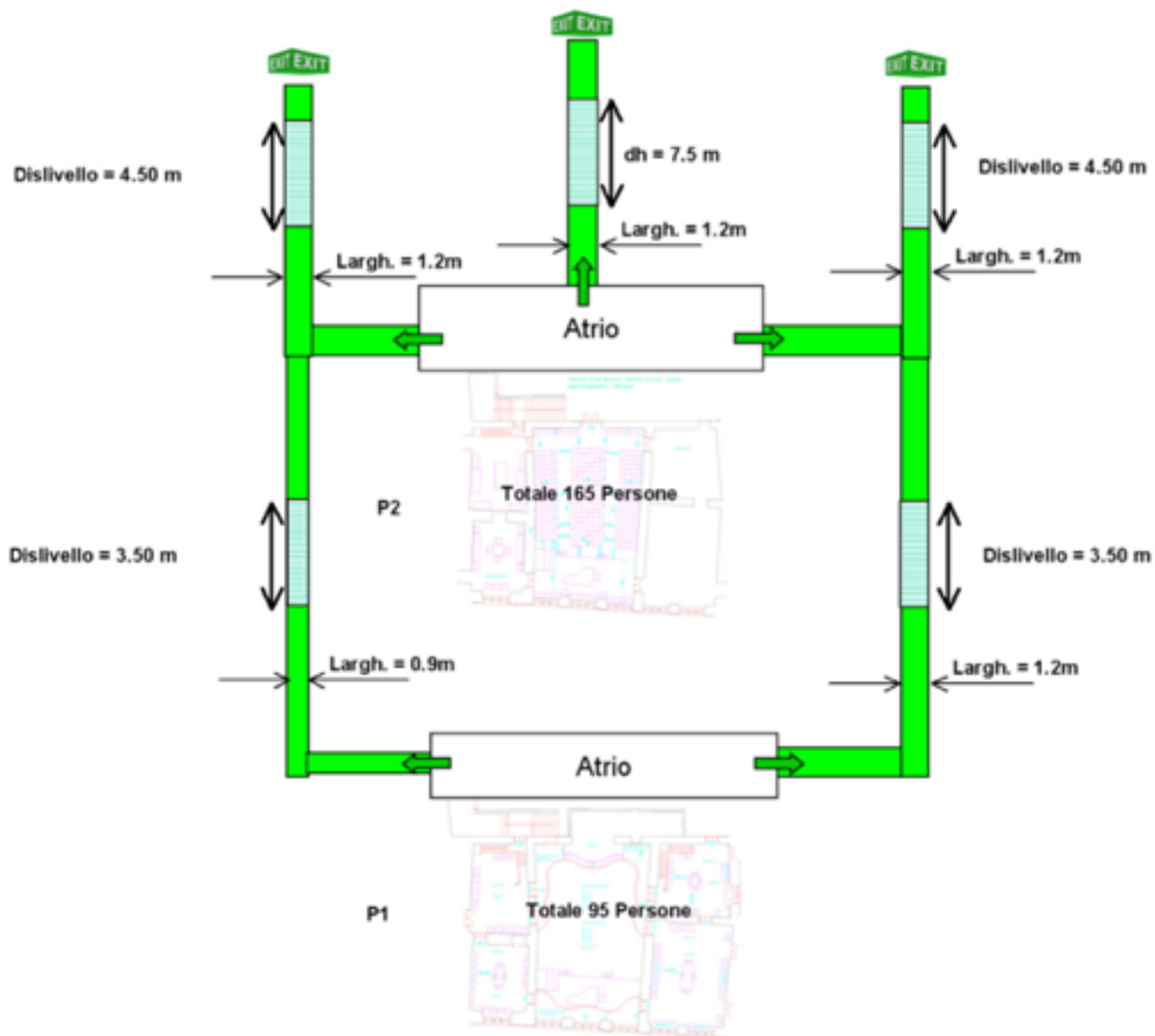
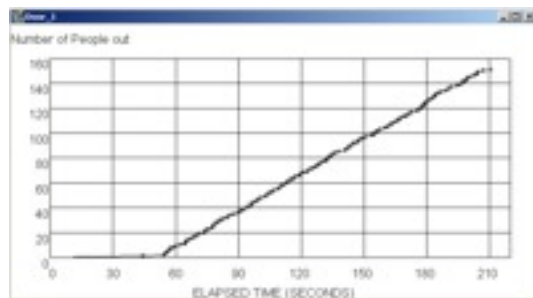
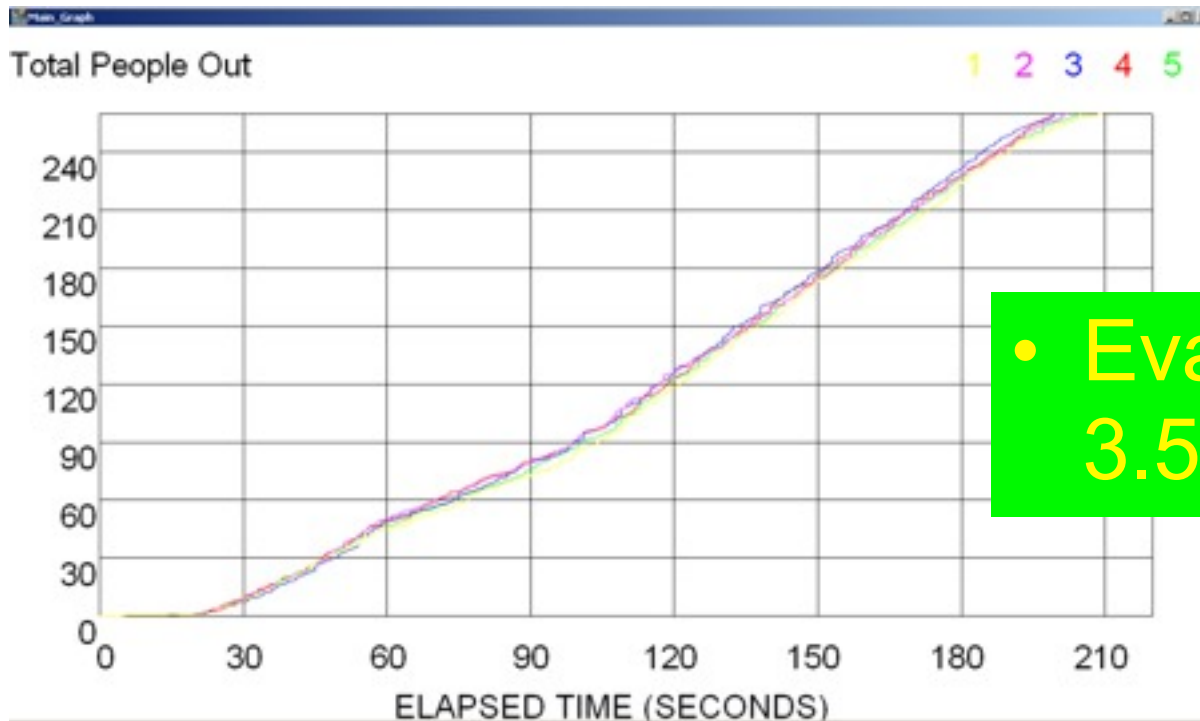


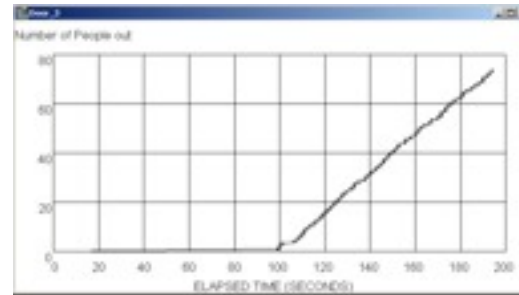
Figura 3: Schema dello scenario di evacuazione secondo normativa.

La figura seguente mostra la geometria delle 2 sale e le porte verso l'esterno. La larghezza delle porte verso l'esterno è pari a 1.20m.

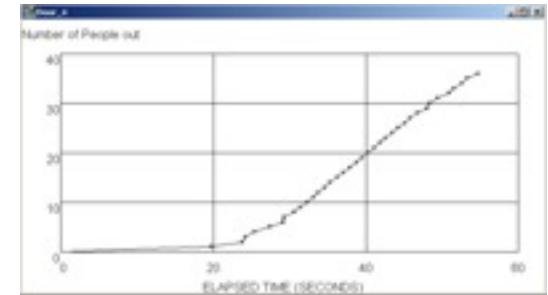
Accademia Chigiana: Results



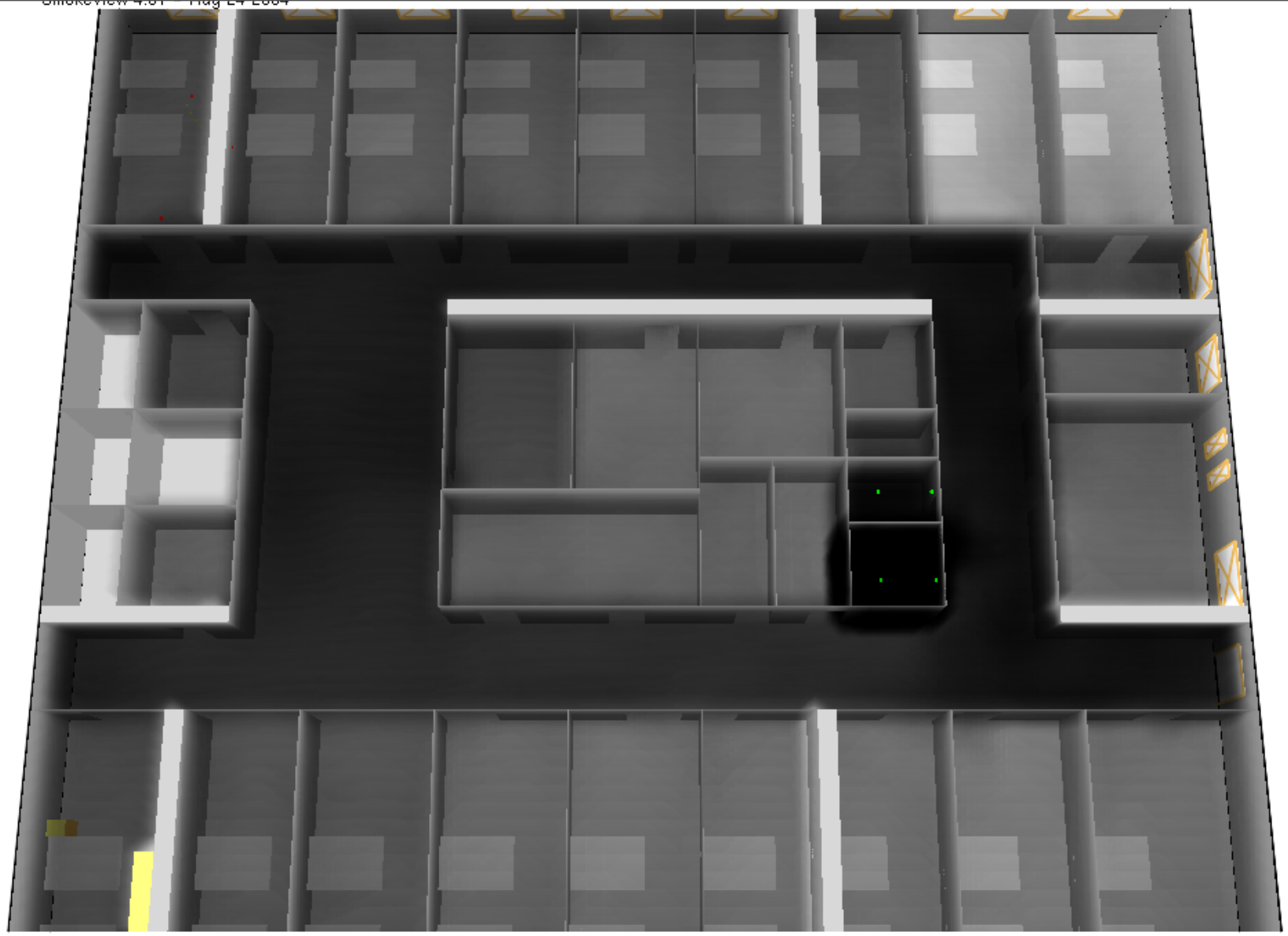
Door 1



Door 3



Terrace



Frame: 1000

Time: 900.0



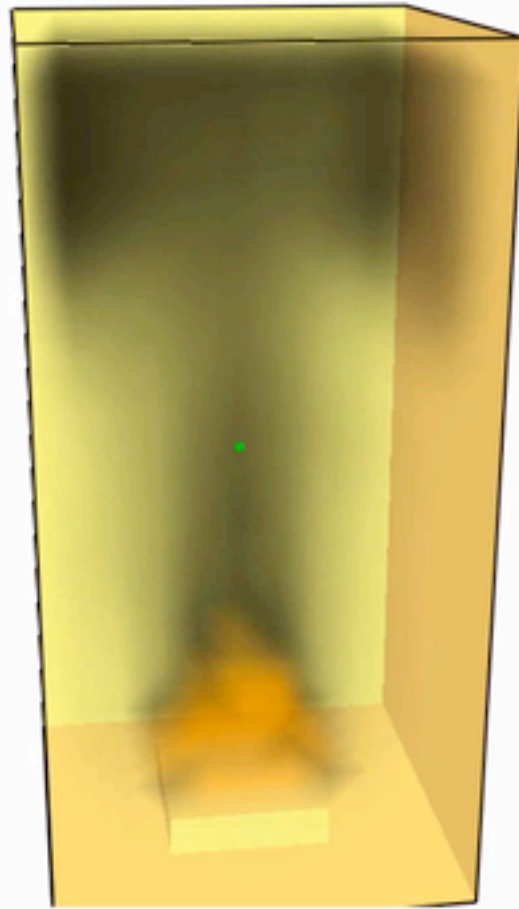


Fig. 1. Huntington Art Gallery—Smoke and heat damage to ceiling in hallway immediately outside elevator shaft.



Fire damaged painting, before and after restoration



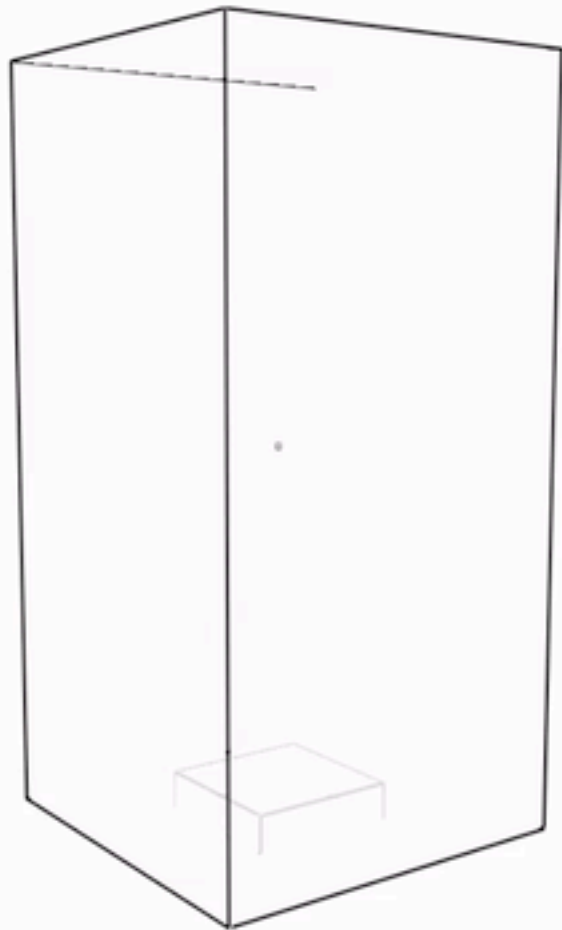


■ >200 (kW/m3)

Frame: 237

Time: 2.37

mesh 1



Endry
depo_soot
kghm2
*10⁻⁶

1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00



Frame: 93
Time: 1.86

mesh: 1



Grazie per l'attenzione.

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