



Spotifire®

**Presentation - Client Fire Safety Assessment - 15 March 2014
Group 3.3**



Pawel Krupa



Joakim Sandström



Oskar Lind



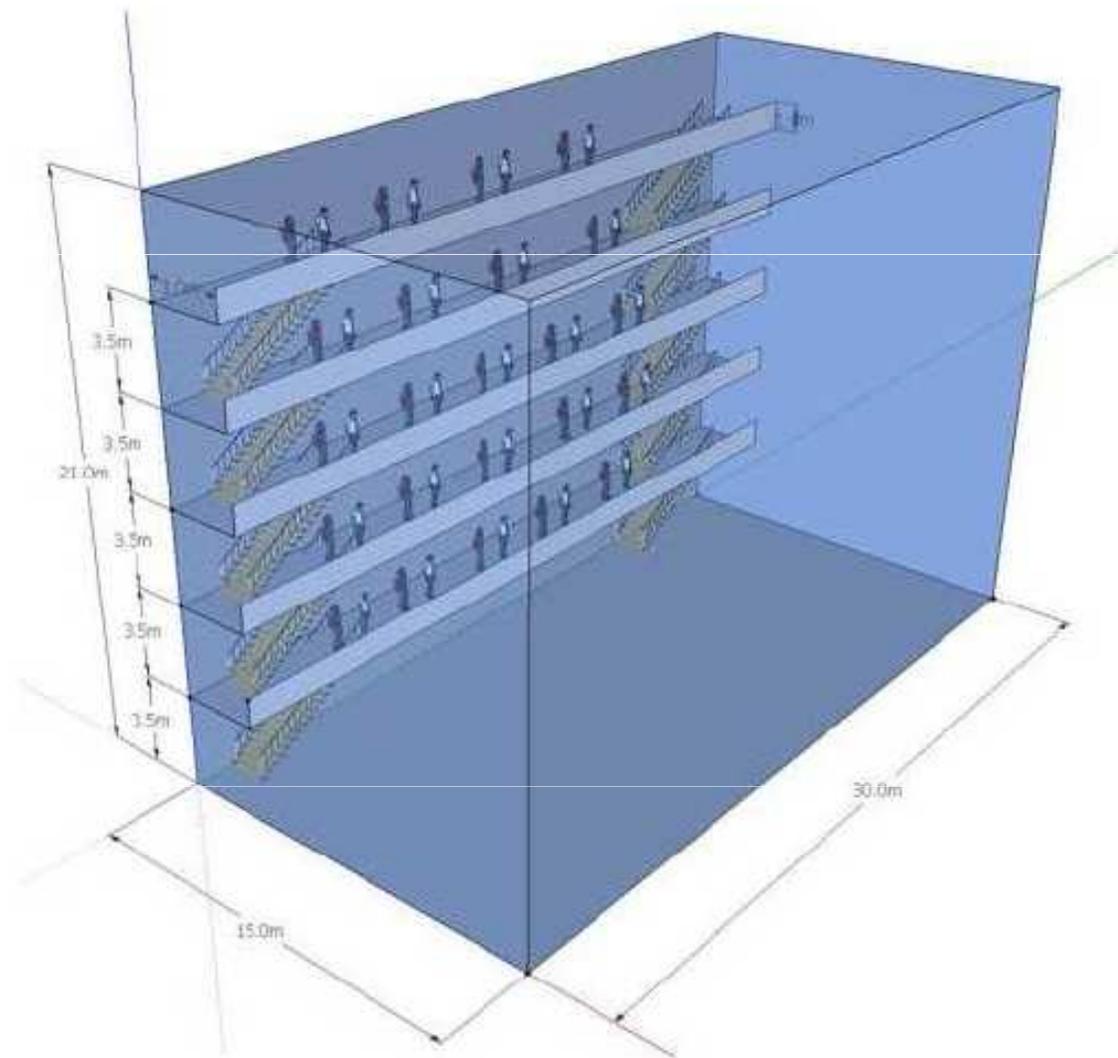
Ross Johnston



CONTENTS

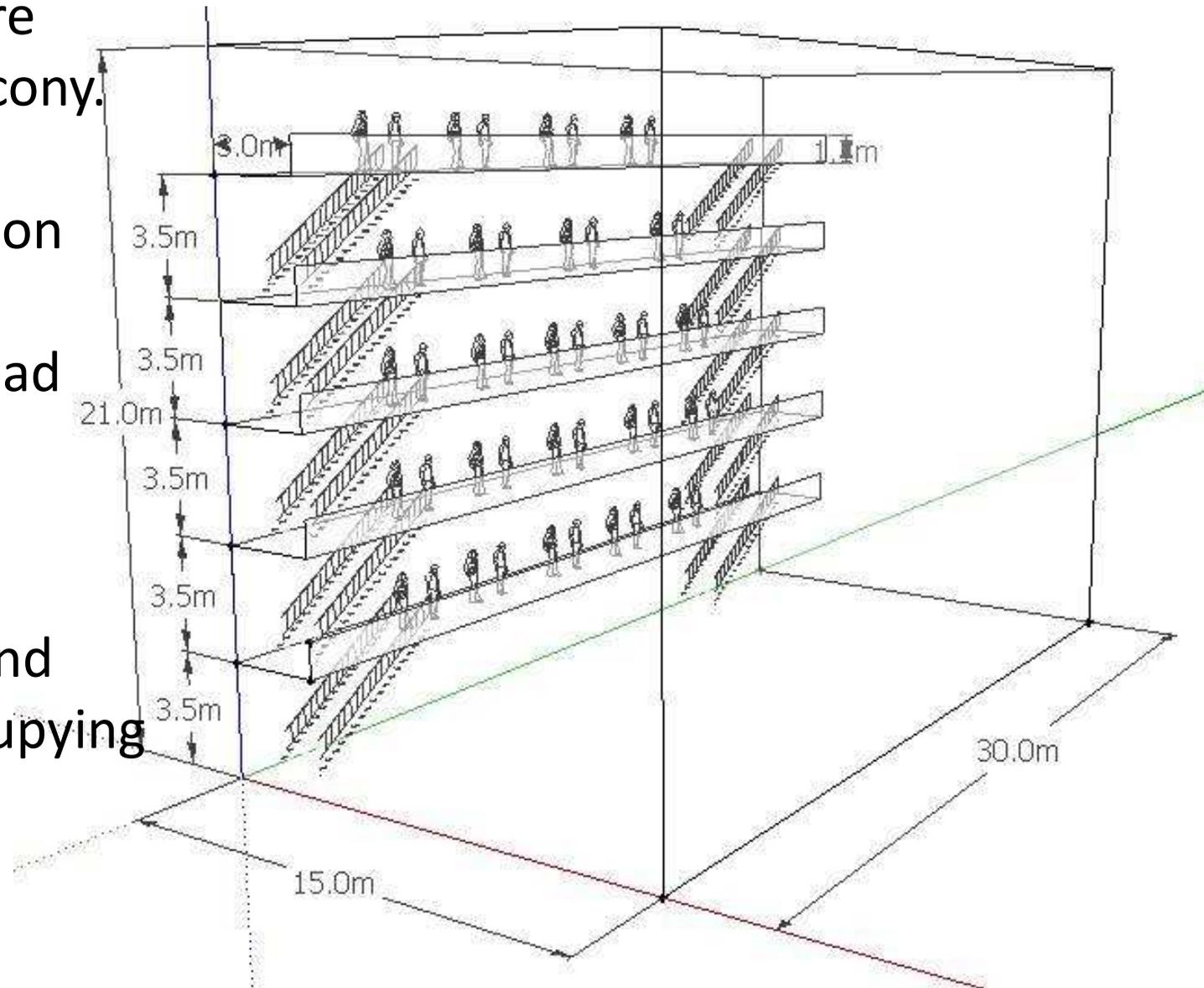
Brief

- Assessment Methodology
 - People Movement
 - Smoke Management
 - Structural Response
- Design Recommendations

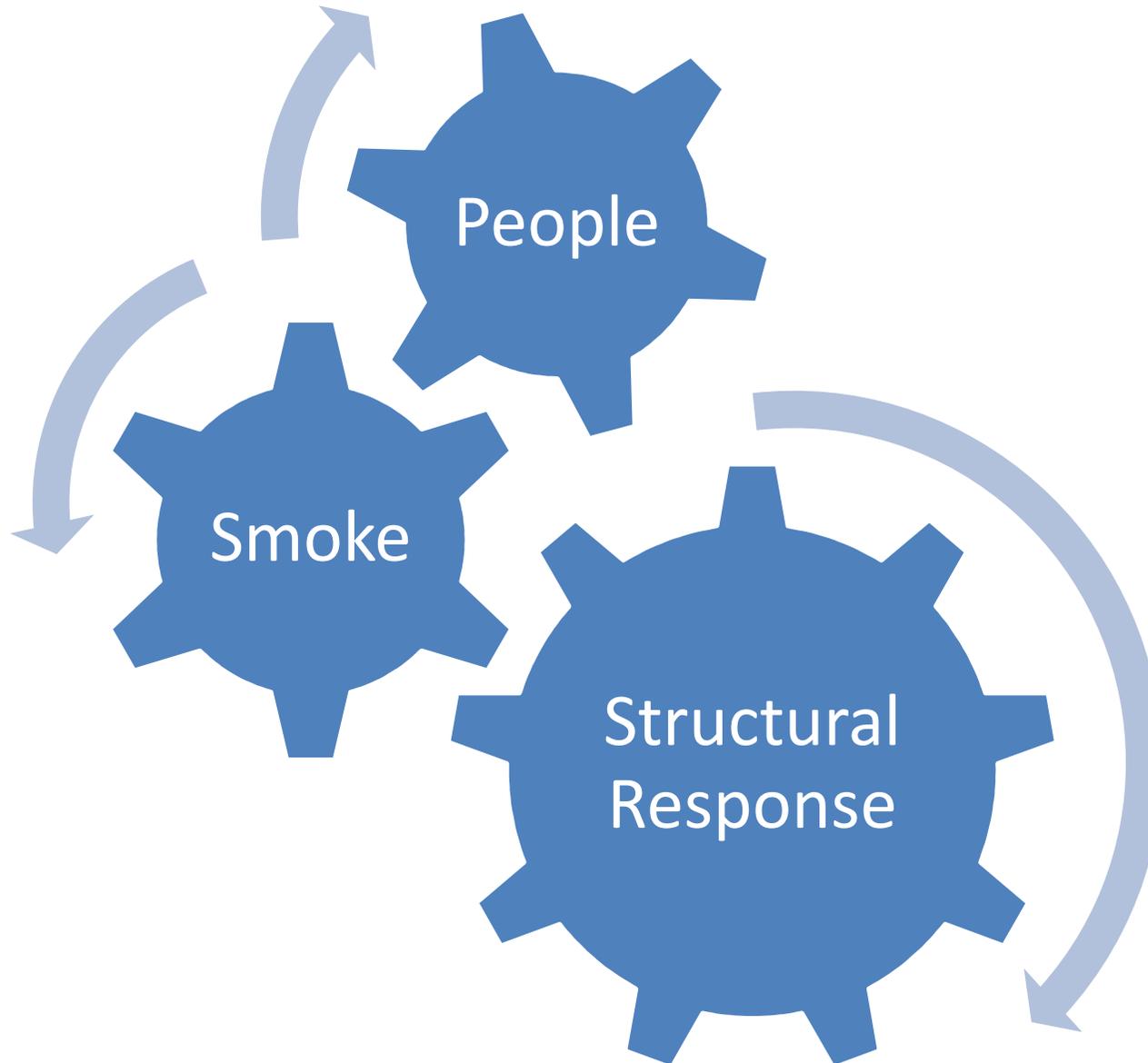


Scenario Brief

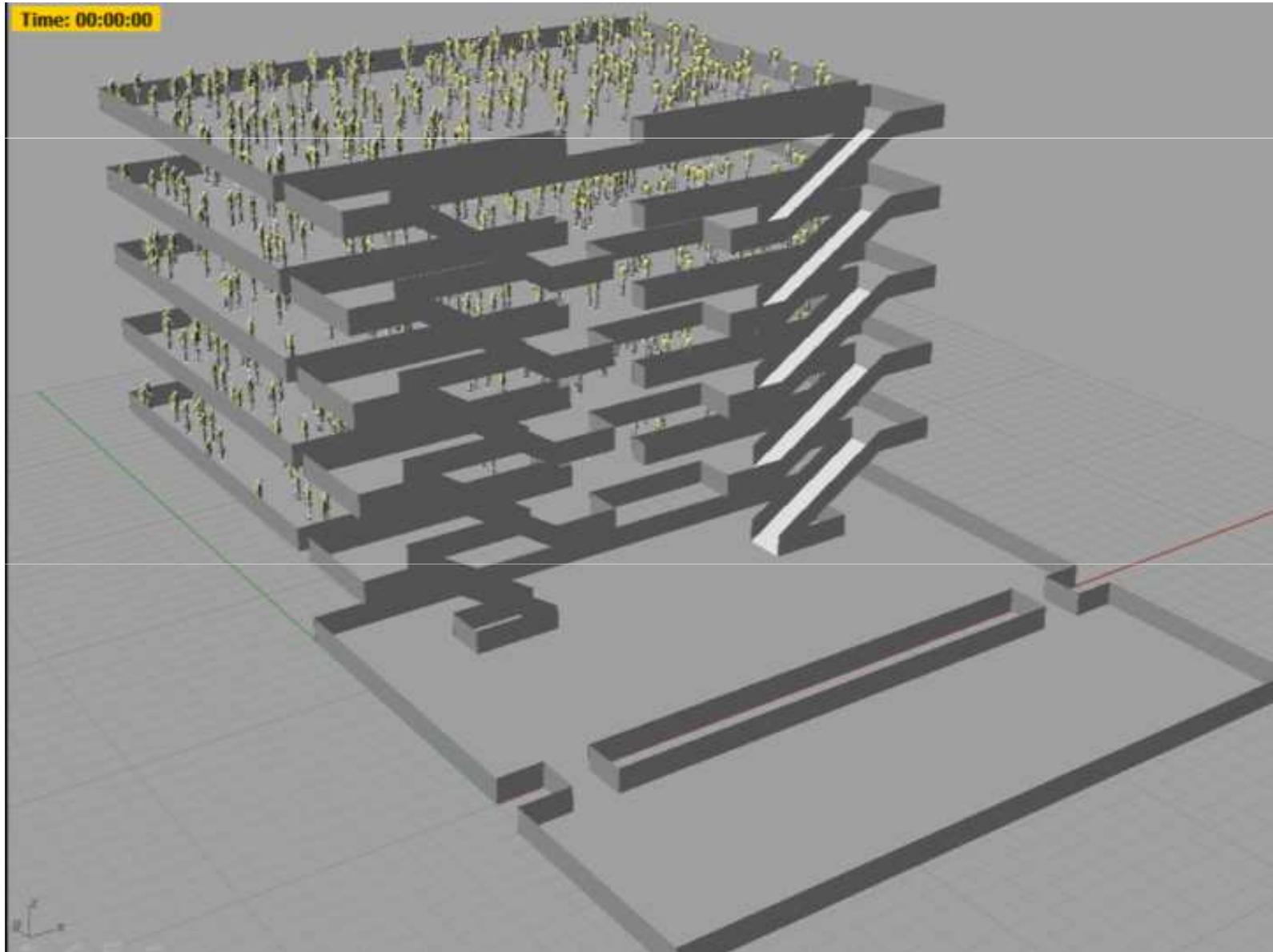
- Fire heating structure from underneath balcony.
- Mechanical ventilation
- 100% of structural load
- Fire type – ISO 834
- 5 Levels above ground floor. 200 people occupying each level



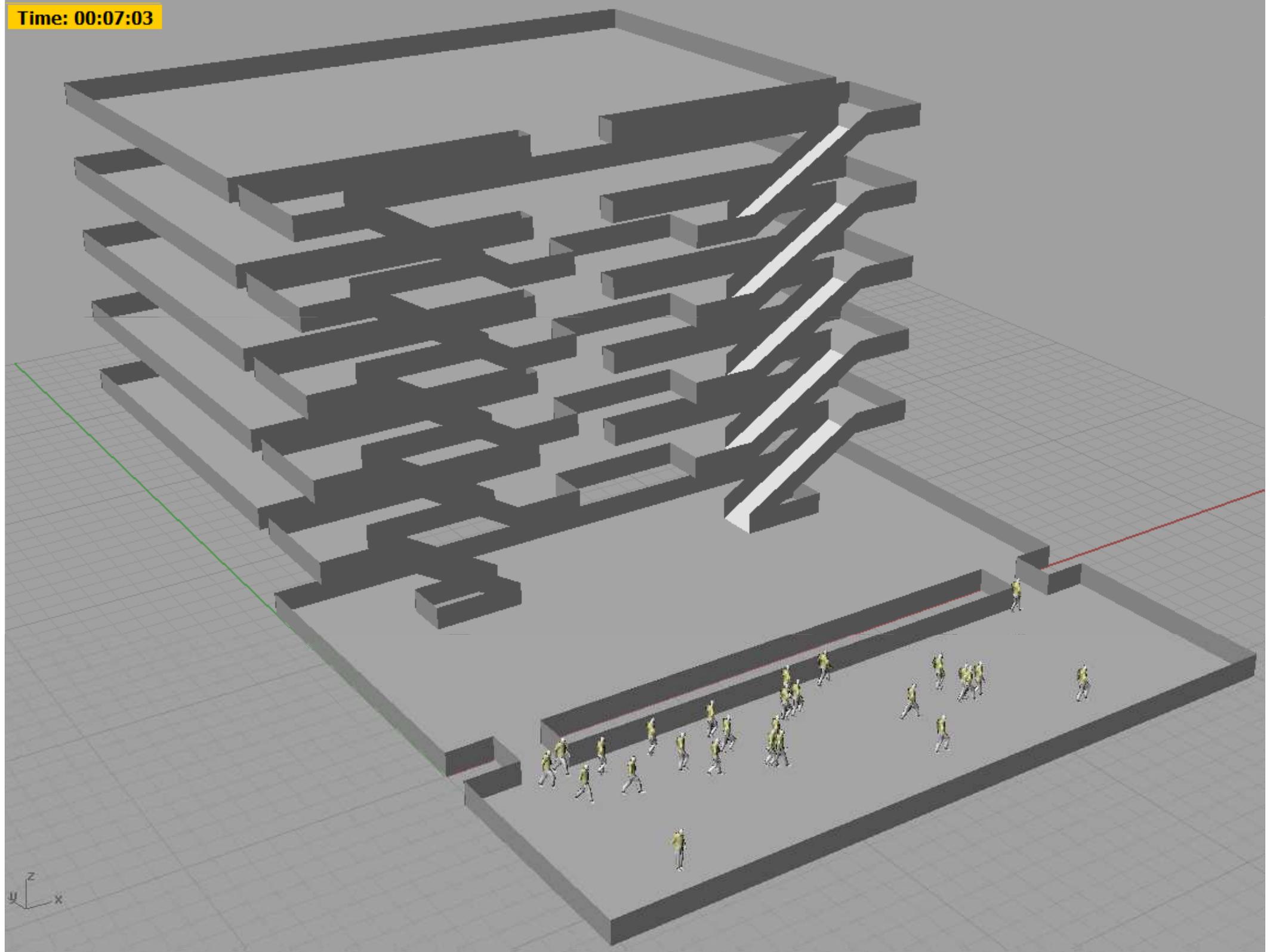
HOLISTIC DESIGN APPROACH



ADVANCED CALCULATION – PEOPLE MOVE



Time: 00:07:03



ADVANCED CALCULATION – PEOPLE MOVE

Evacuation Time (minutes : seconds)

– based on 200 people per floor. Escape rate 60p/min. Also considered no escape rate, not as onerous.

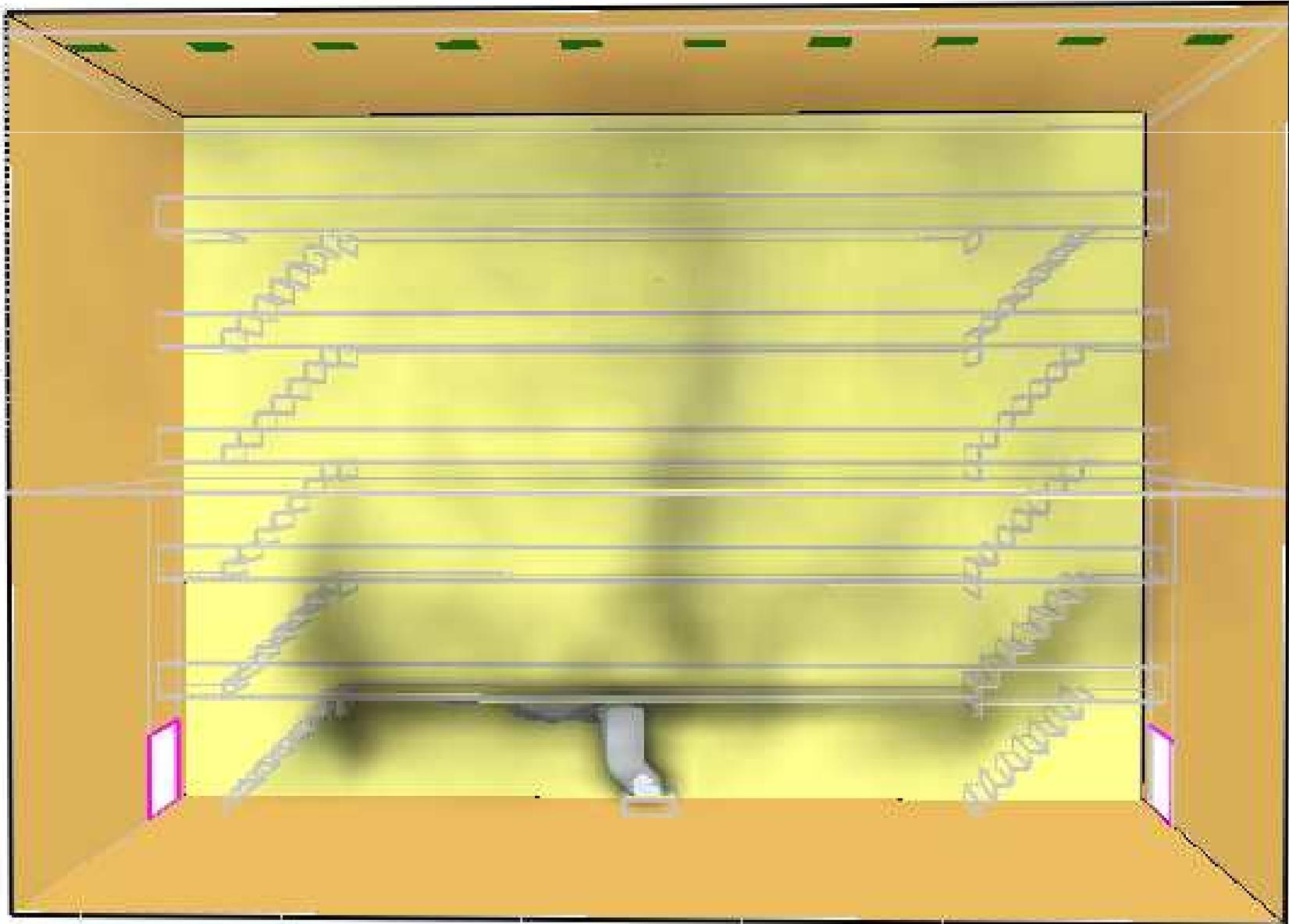
Level 5:	3:57
Level 4:	4:16
Level 3:	4:46
Level 2:	4:57
Level 1:	5:21

Ground Floor: 7:03

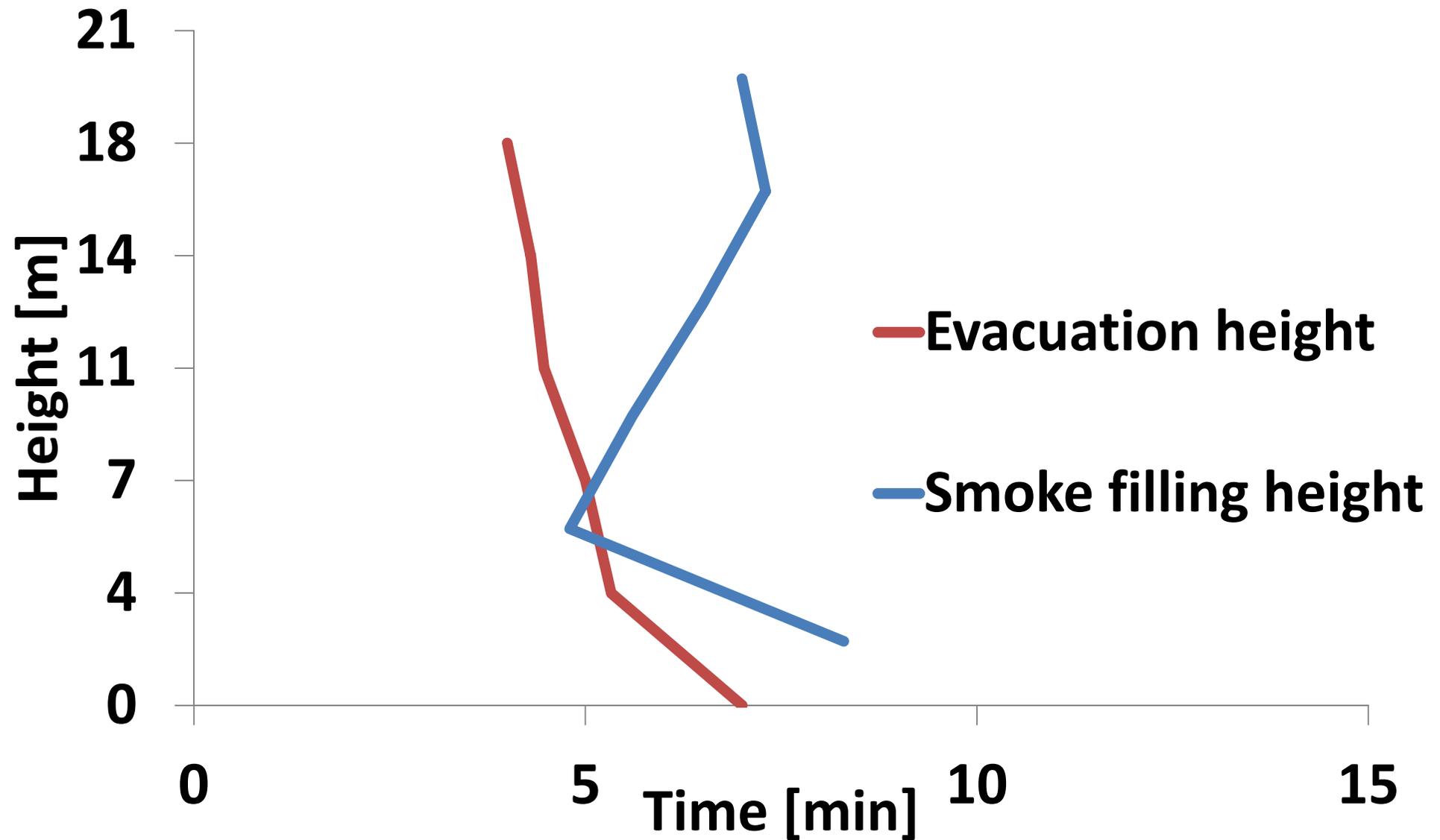


Bottle neck at ground floor, need additional exits

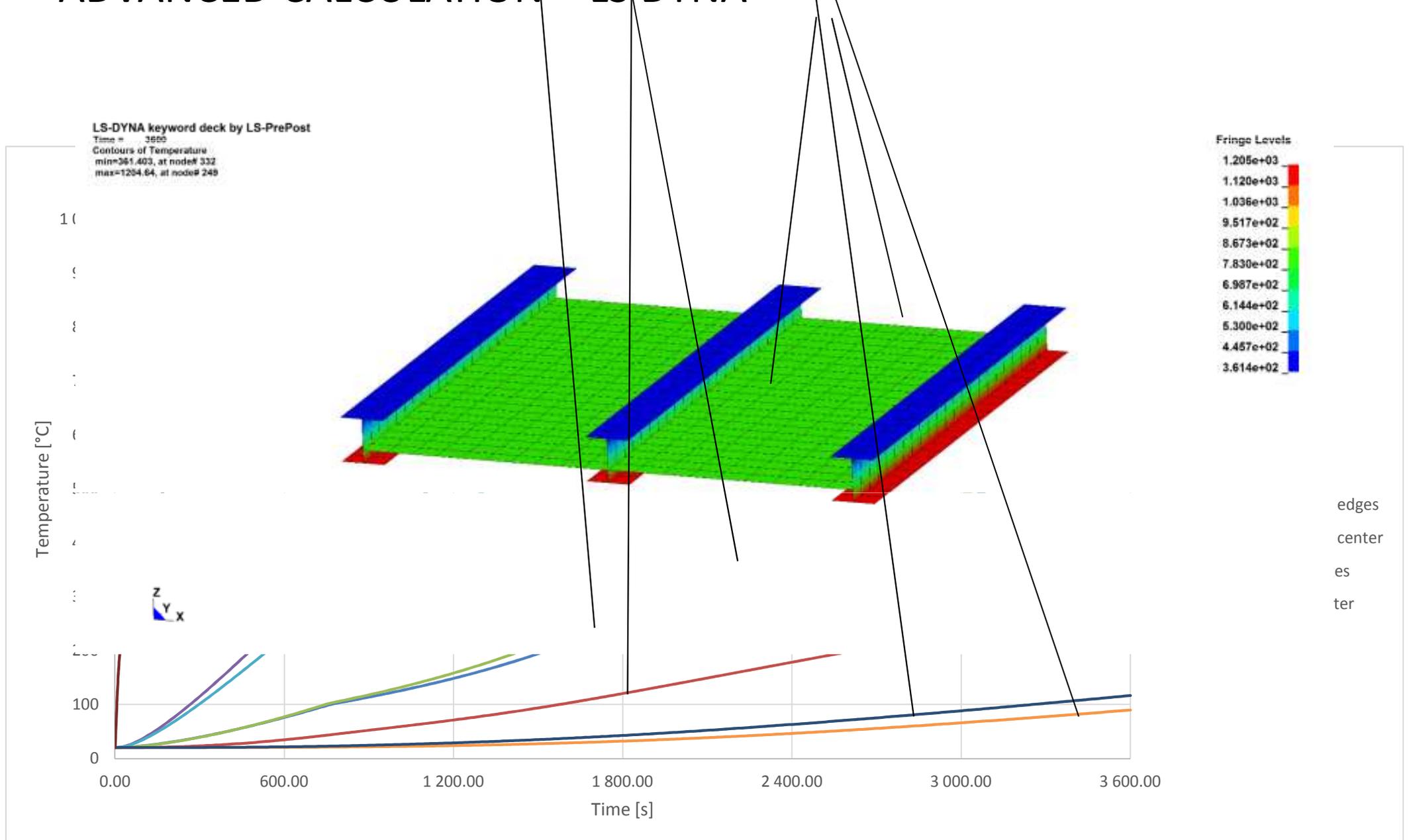
ADVANCED CALCULATION - FDS

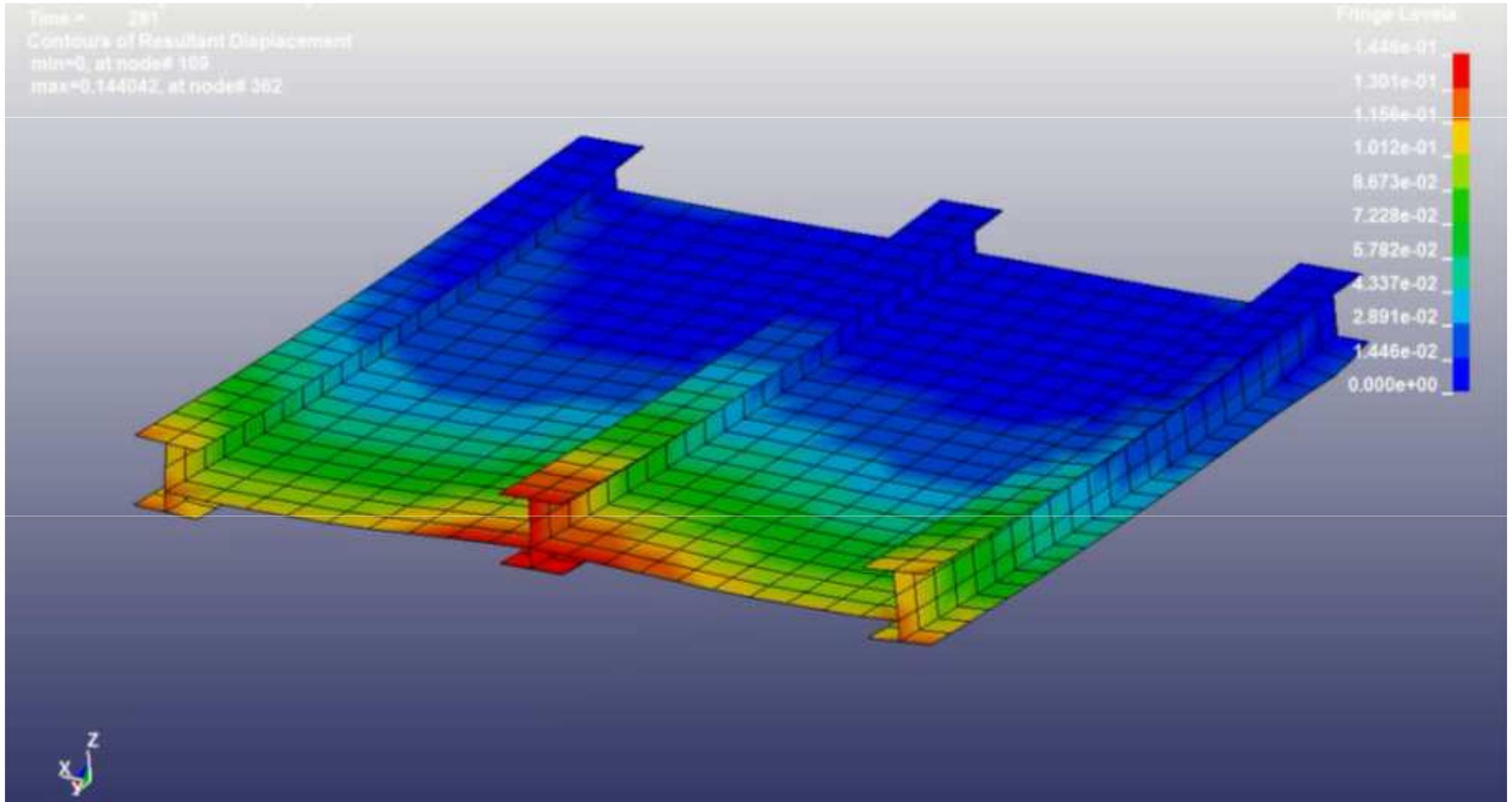


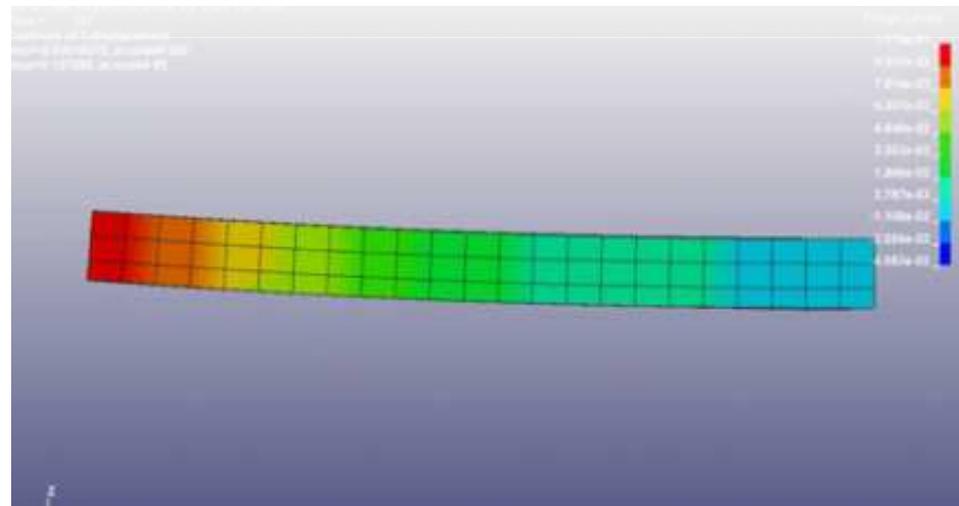
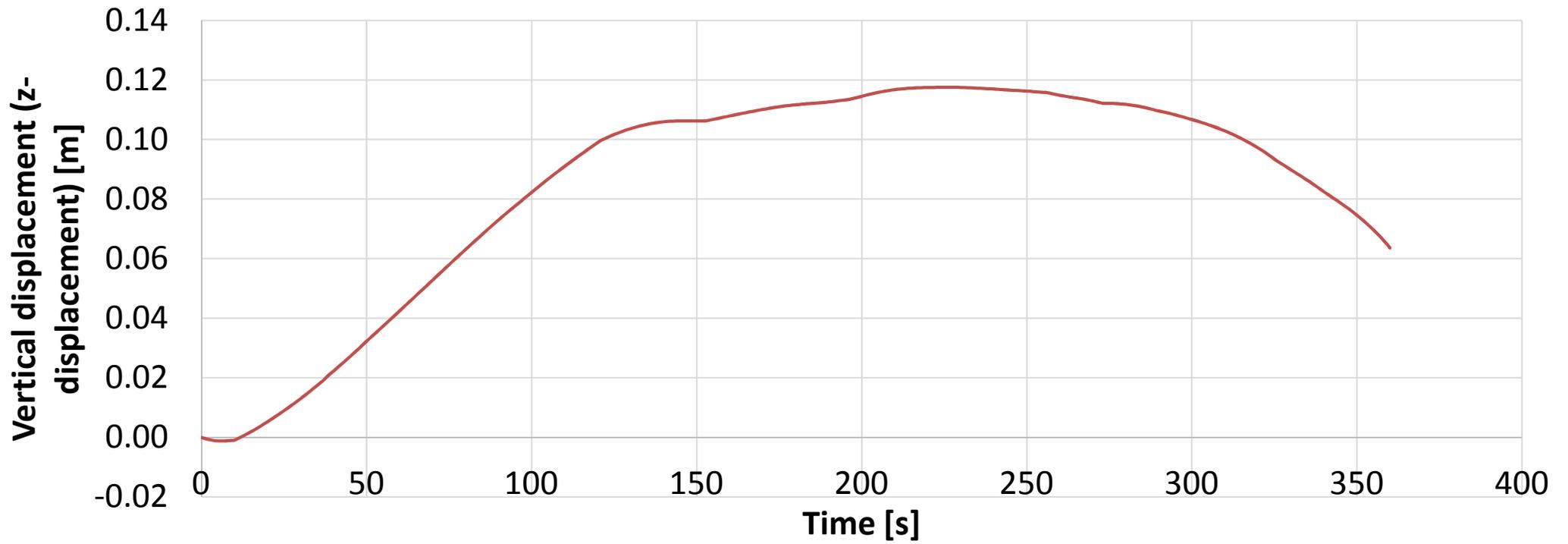
RSET - ASET

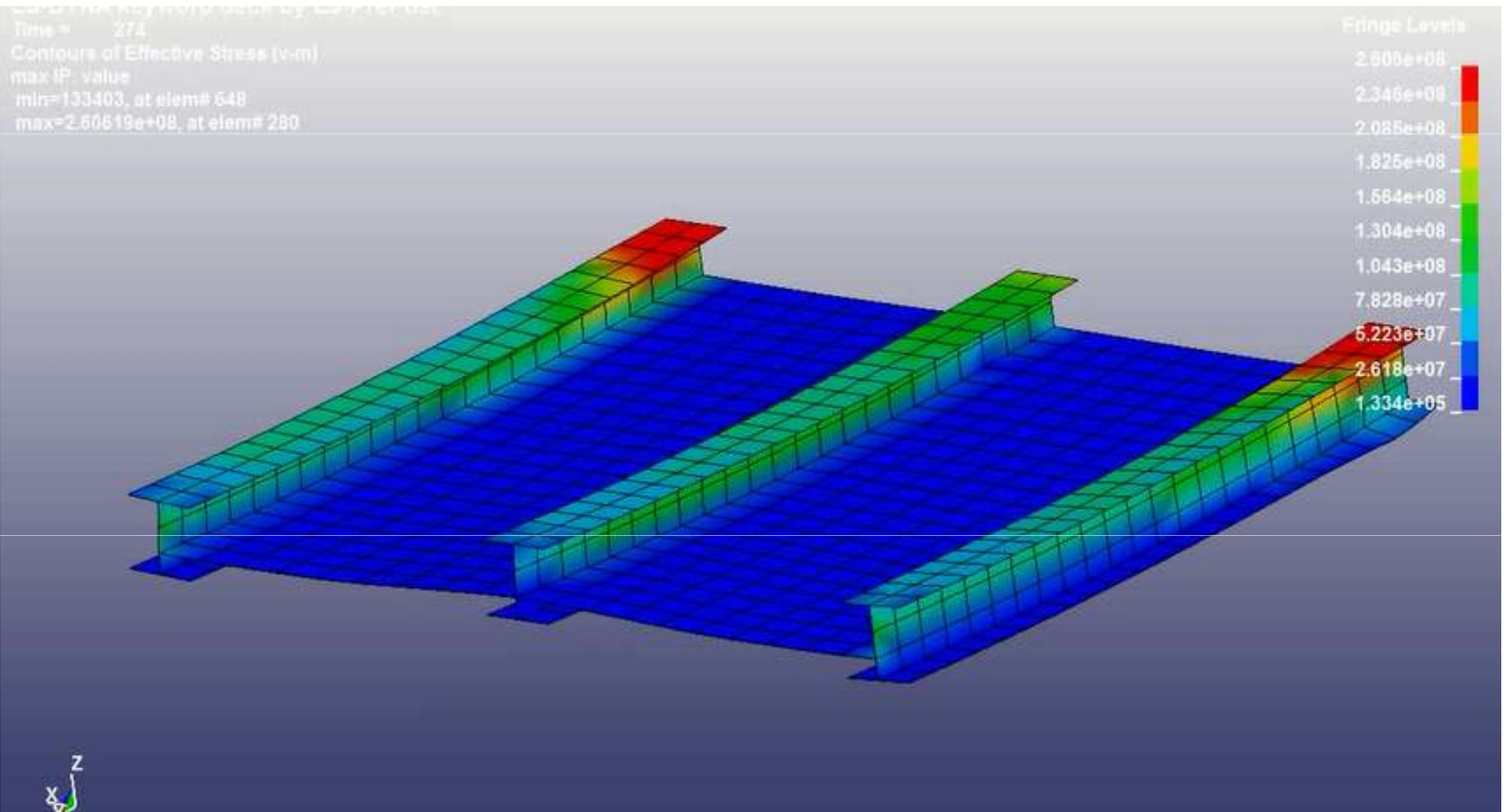


ADVANCED CALCULATION – LS DYNA









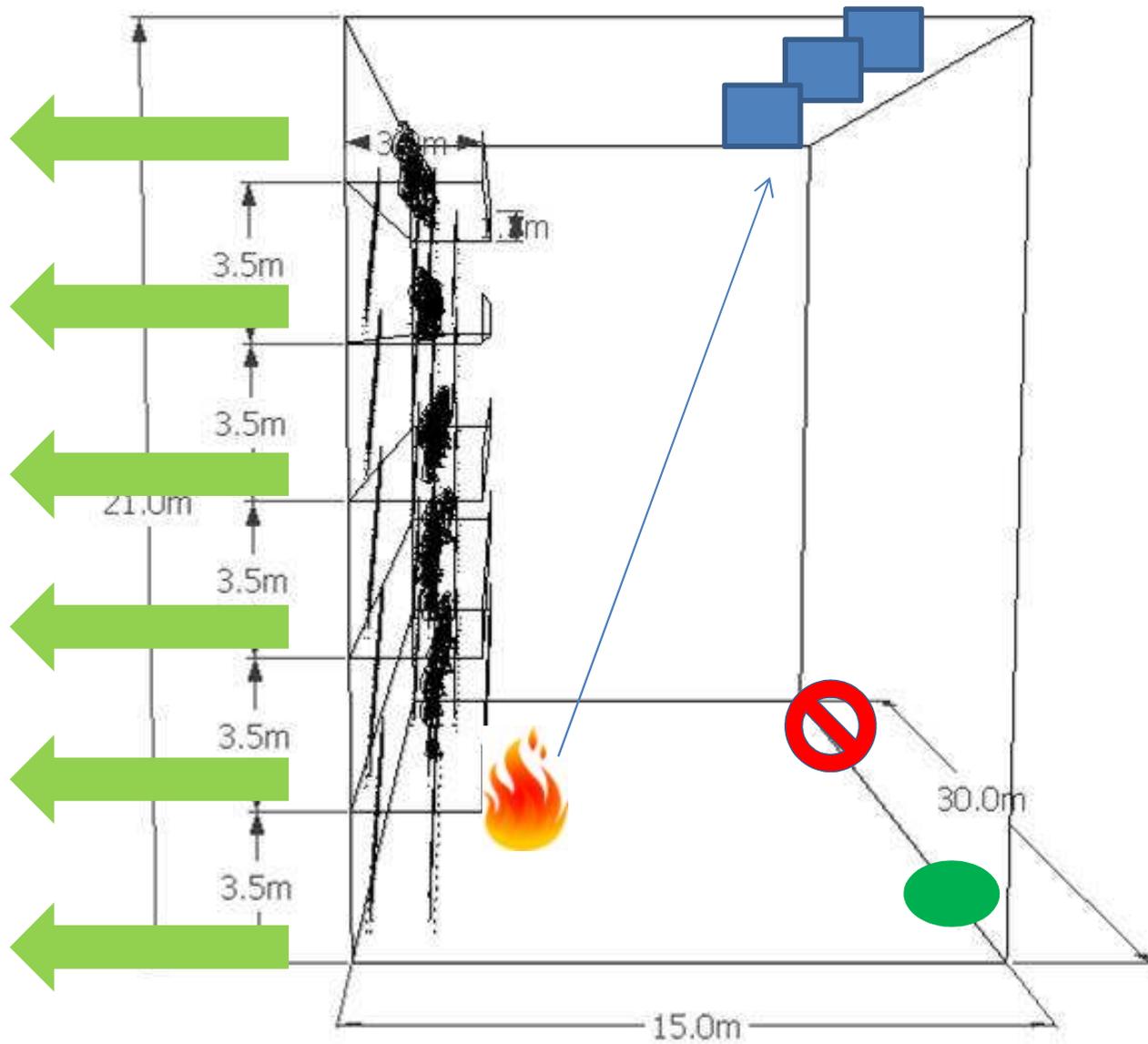
COMPARISON

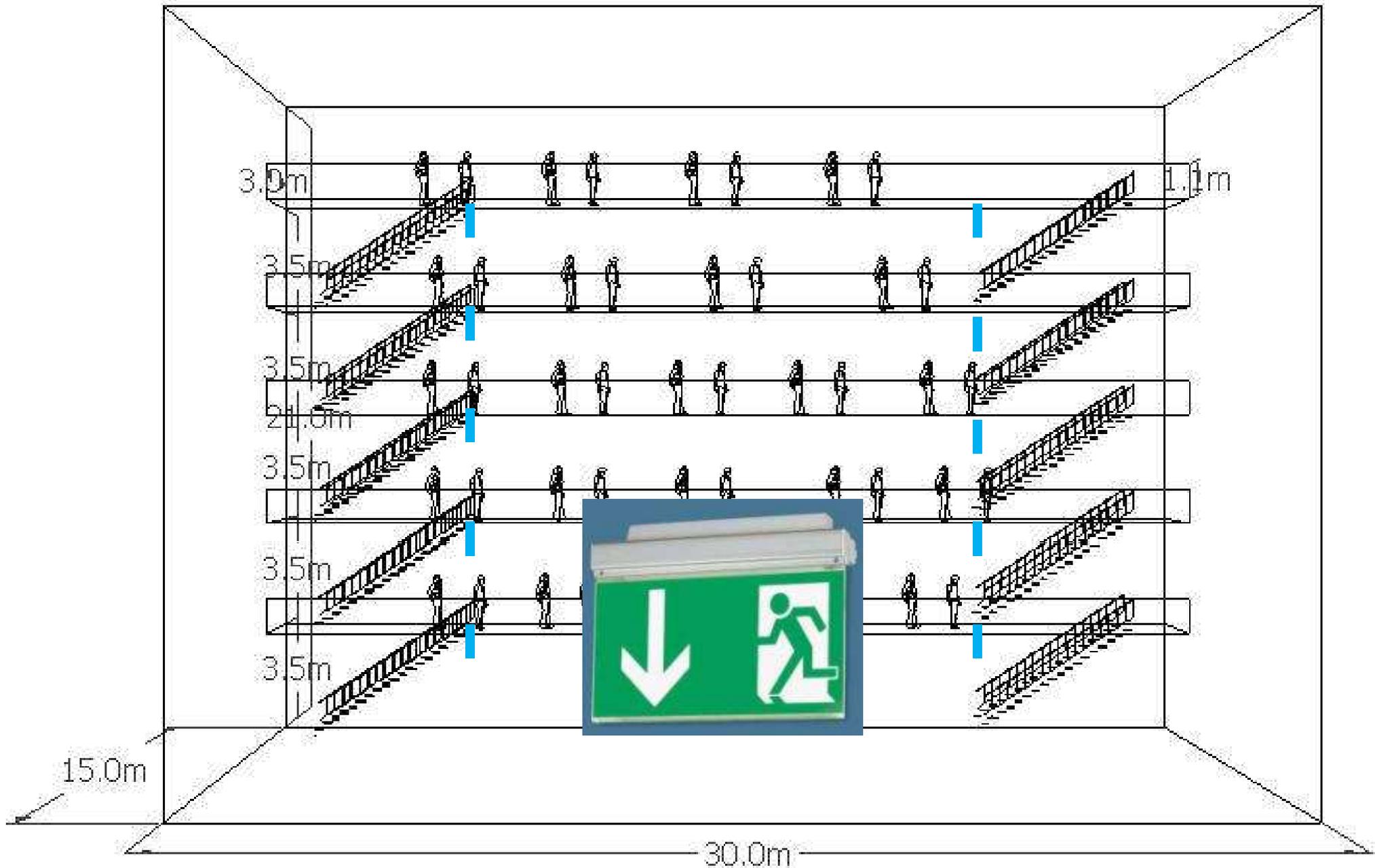
Advanced model comprised part of overall continuous structure. For accurate design, required application of additional loading.

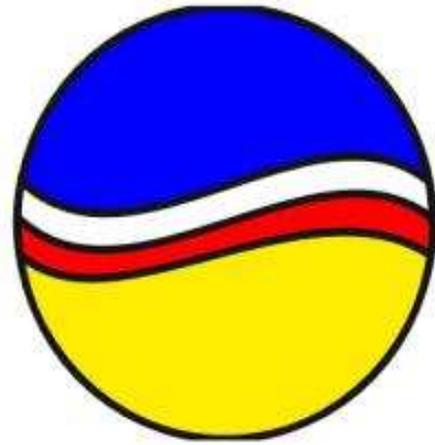
Simplified design approach allowed for check. With advanced analysis, important to sum up forces within model, and compare with applied permanent + variable.

Design Recommendations:

1. Ensure appropriate cover to concrete and thickness of steel flange. Small increase in section design leads to reduced need for applied fire protection. Also need to ensure protection of fire fighters inside building.
2. Introduce additional exits at rear of each level and at ground floor to prevent 'bottleneck' on ground floor.
3. Move mechanical ventilation away from balcony, forcing smoke flow diagonally away from where persons will be descending staircases
4. Provide reservoir glazing under balcony parapet at stairs.
5. Include sufficient illuminated escape signage with emergency lighting to guide persons to safety during escape.







Spotifire®

Thank you, Questions?



Integrated Fire Engineering and Response

COST action network number TU0904 in domain Transport and Urban Development

Training School on 12-15 March 2013

Advanced Fire Engineering in Practice - Software Tools

