HSFires
Human Structure
Fire Safety
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Human Structure
Fire Safety

SMOKE FILLING ANALYSIS

Fire Dynamic Simulator

- m_{ent} = 5,33 kg/s
- V_{ent} = 14,1 m^3/s

Hand calculation

- m_{ent} = 5,33 kg/s
- V_{ent} = 14,1 m^3/s

Graph

HSFires

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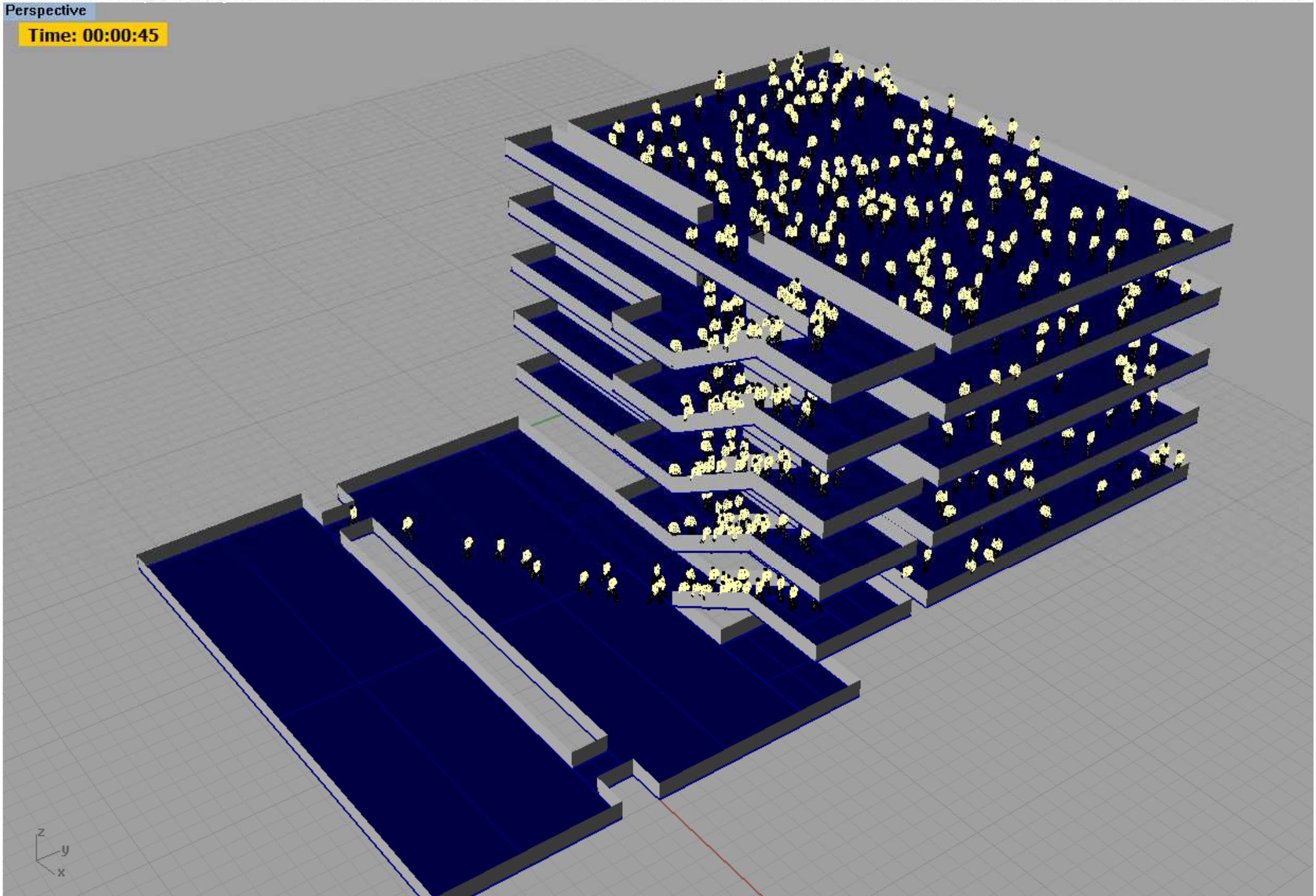
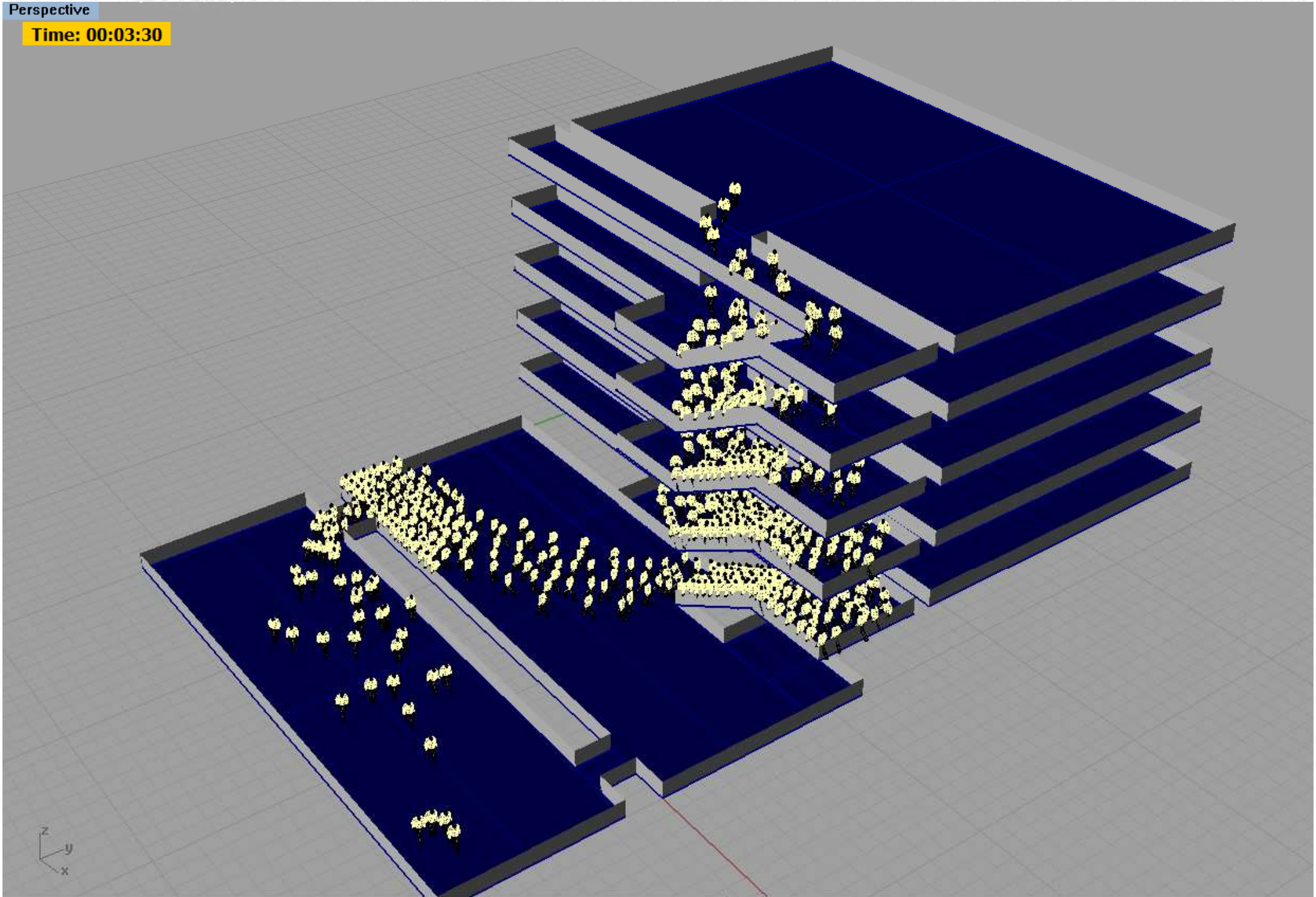
EVACUATION OF THE PEOPLE

SMART Move

- Total time of evacuation → 7 min 15 sec
- Last person leaving
  - → 5th floor – 3 min 30 sec
  - → 4th floor – 4 min
- First person leaving the building 45 sec
- Max people on the 2nd floor balcony at the time
  - → 3 min 30 sec
- People stuck at the entrance – 5 min (270 people at the entrance floor)

Evacuation


Perspective
Time: 00:00:45
z
y
x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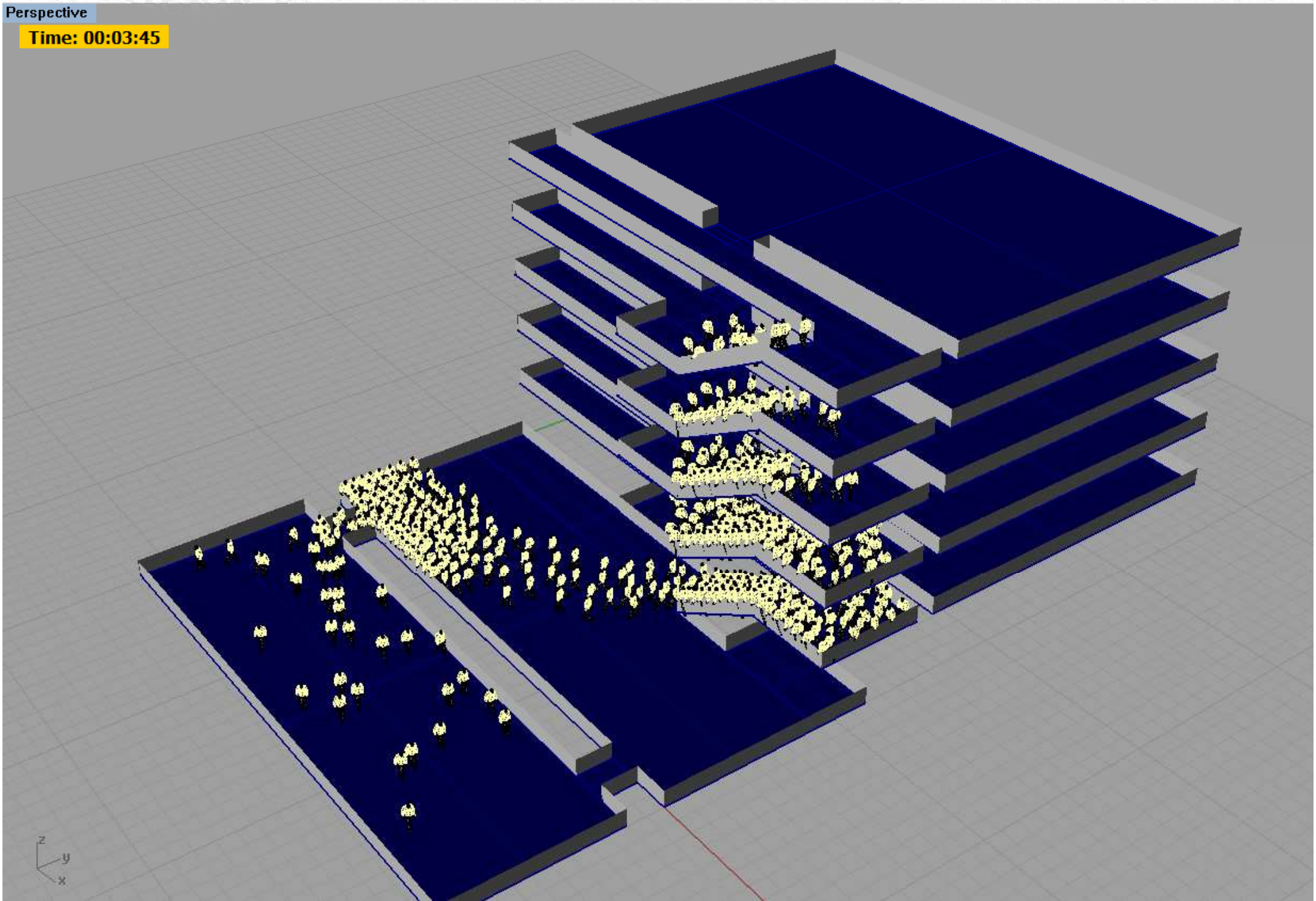
y
x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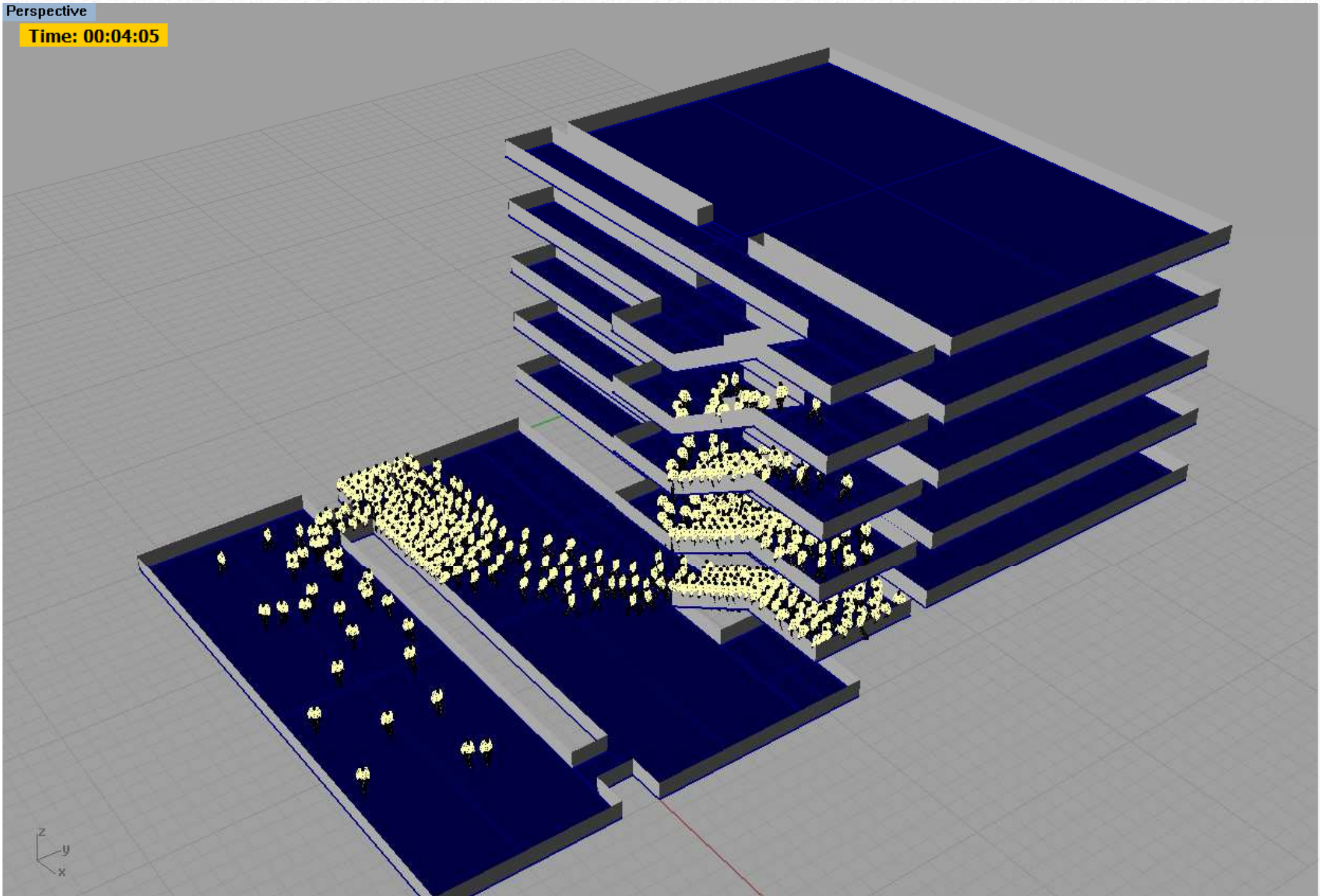
z
y
x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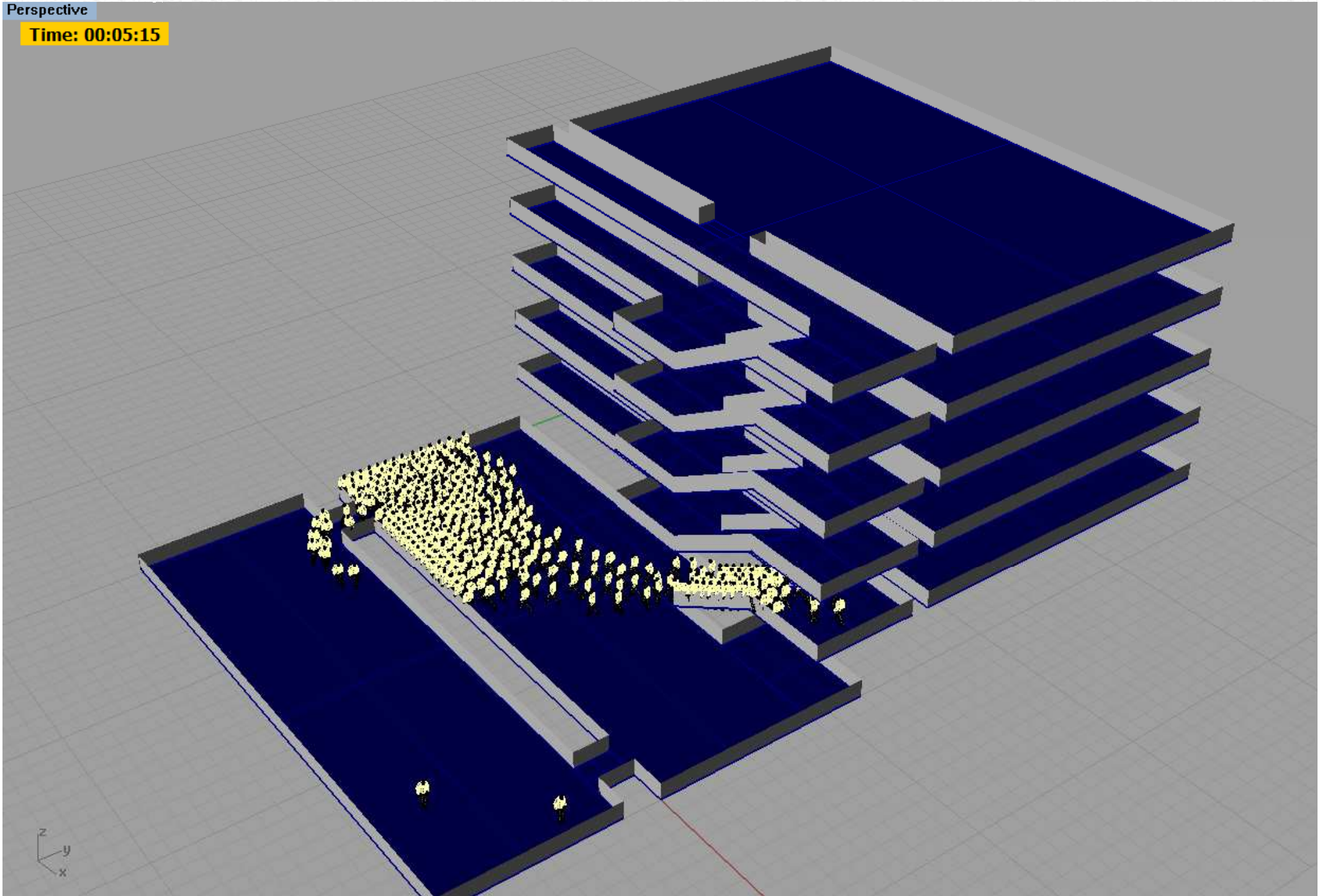
y
x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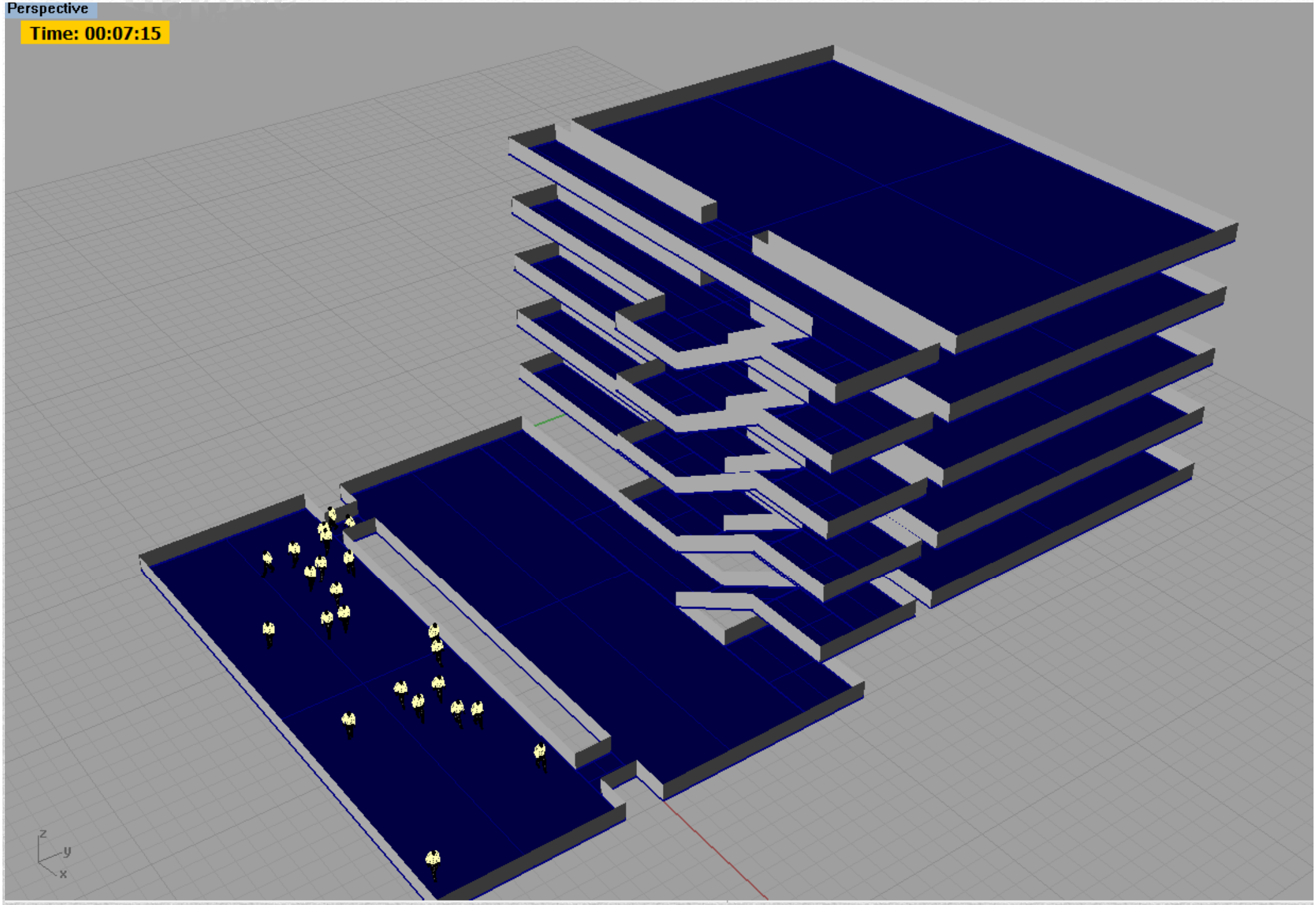
z
y
x


Perspective
Time: 00:07:15
z
y
x

- Total pass length of a single person
  - 160 m – the maximum length (middle pass)
  - Avagare speed (singel person) – 1.2 m/s
  - Total: 190 sec (3 min)
- Door /entrance capacity
  - 2 m wide
  - At maximum 4 people passing at the time
  - 1000/4 =250 people
  - Assumed speed of the pasiing at average 0.5 m/s
  - 1*250/0.5= 500 (6.5 min)
- Stair passing flow
  - 3 m wide
  - Speed (at perfect case) 0.9 m/s
  - Capacity – around 4 people at the time per 1m
  - Around the corner – 2 person
  - Avagare speed (singel person) – 1.2 m/s
  - Total: 190 sec (3 min)

Hand calculation

- Re-design/ re-plan the building for safety evacuation
- Sprinkle system, fire detectors – larm to people, roof openings to remove the smoke
- Not overload the capacity of the building (less then 1000 people)
- Problem/Weakest area
  - Entrance gate
  - Stair-flow

Engineering solution

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Fire Safety

STRUCTURAL ANALYSIS

LS-Dyna

- Temperatures
- Behaviour

Engineering solution