

# Applying Micro simulation to Evacuation planning

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# Case study for signal control with BRT operation in Khon Kean city



# What's the advantage of micro simulation?

- Simulate traffic congestion, data analytics provides solution.
- Understand complicated mechanism of traffic congestion
- Simulate behavior of each vehicle helps you to understand traffic flow better
- Be able to analyze capacity of right turns
- Validate PTPS
- Animation display is appealing

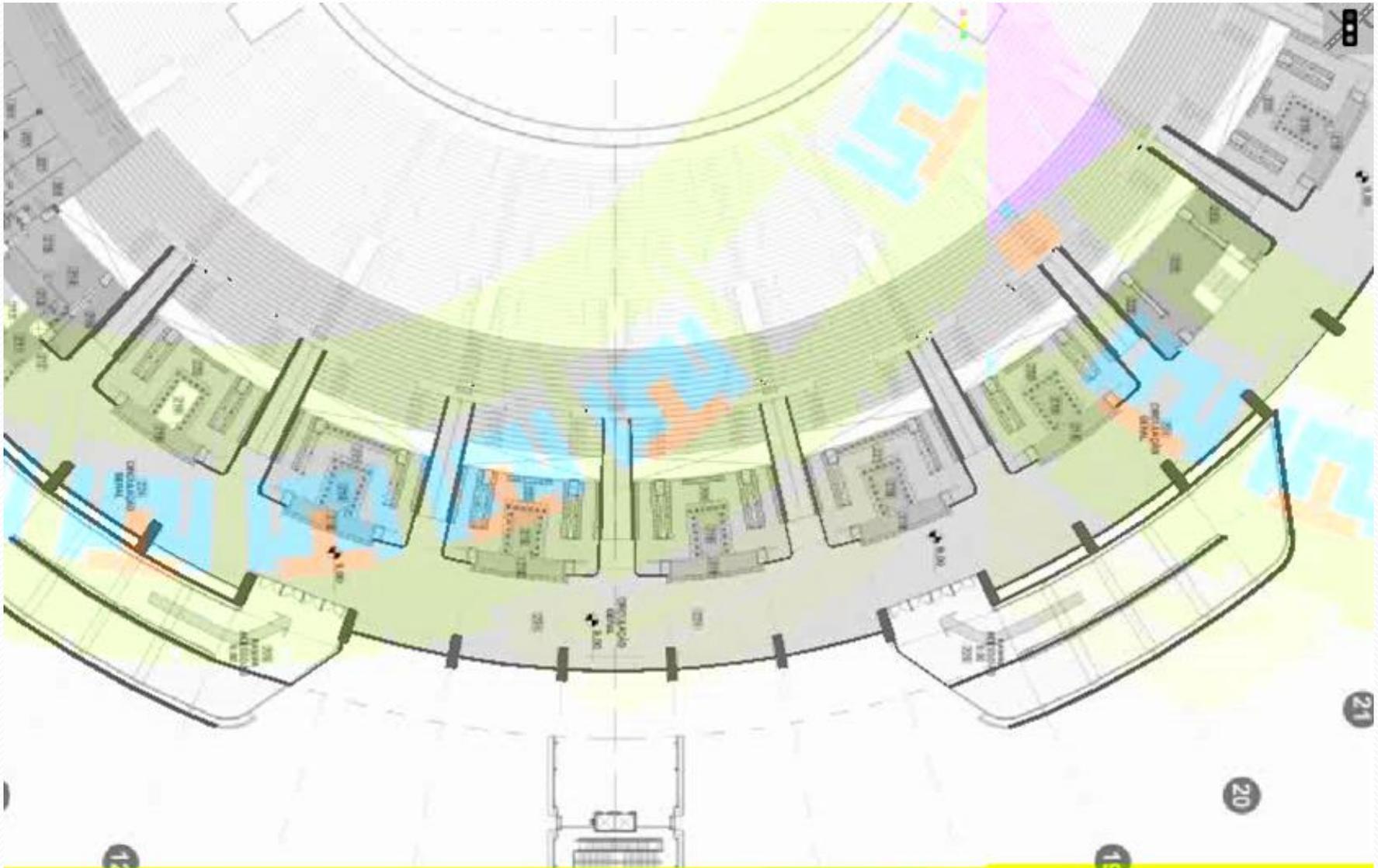
Traffic simulation allows you to ...

- Try any type of situation during planning
- Experiment and determine your planning
- Anticipate problems in planning
- Understand congestion of current intersection
- Save your budget of planning
- Understanding problems in various dimensions

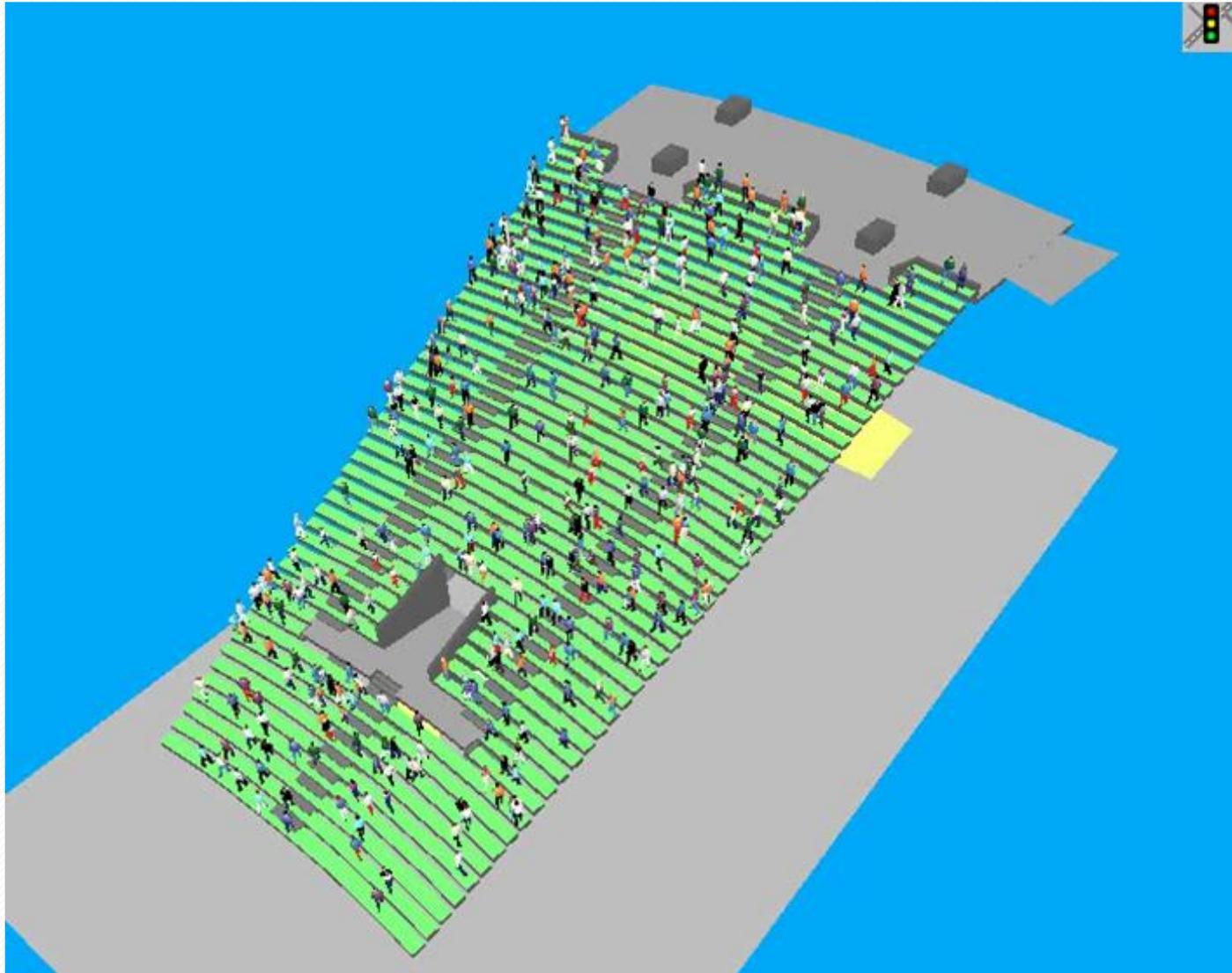
# How to utilize a micro simulation model for evacuation plan

- Evacuation planning for...
  - Building fire
  - Stadium fire
  - Tsunami disaster
  - Earthquake and etc.
- Here I talk about  
Stadium and Building fire evacuations

# Test Simulation of evacuation from stadium 1



# Test Simulation of evacuation from stadium 2



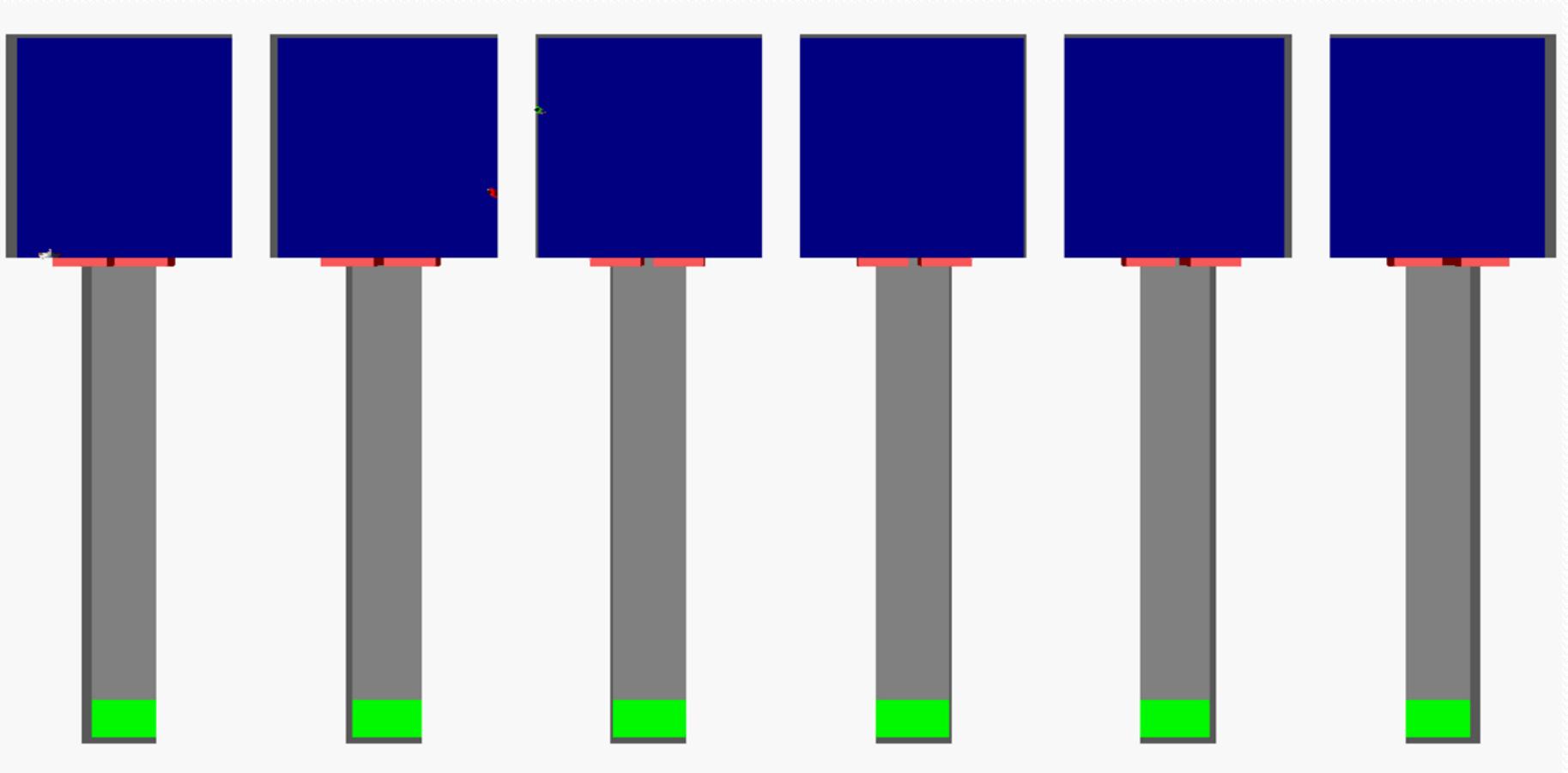
# Test Simulation of evacuation from Building 1



# Out put

- Pedestrian Movement [Out put 1]
- Travel time function
  - Calculate full evacuation time [Out put 2]
- Level Of Service function
  - Evaluate width of corridors or escalators [Out put 3]
  - Check the bottleneck (include stairs) [Out put4]
- Data collection point function
  - Count pedestrians area by area [Out put5]
- Videos recoding function
  - Easy to understand for everybody [Out put6]

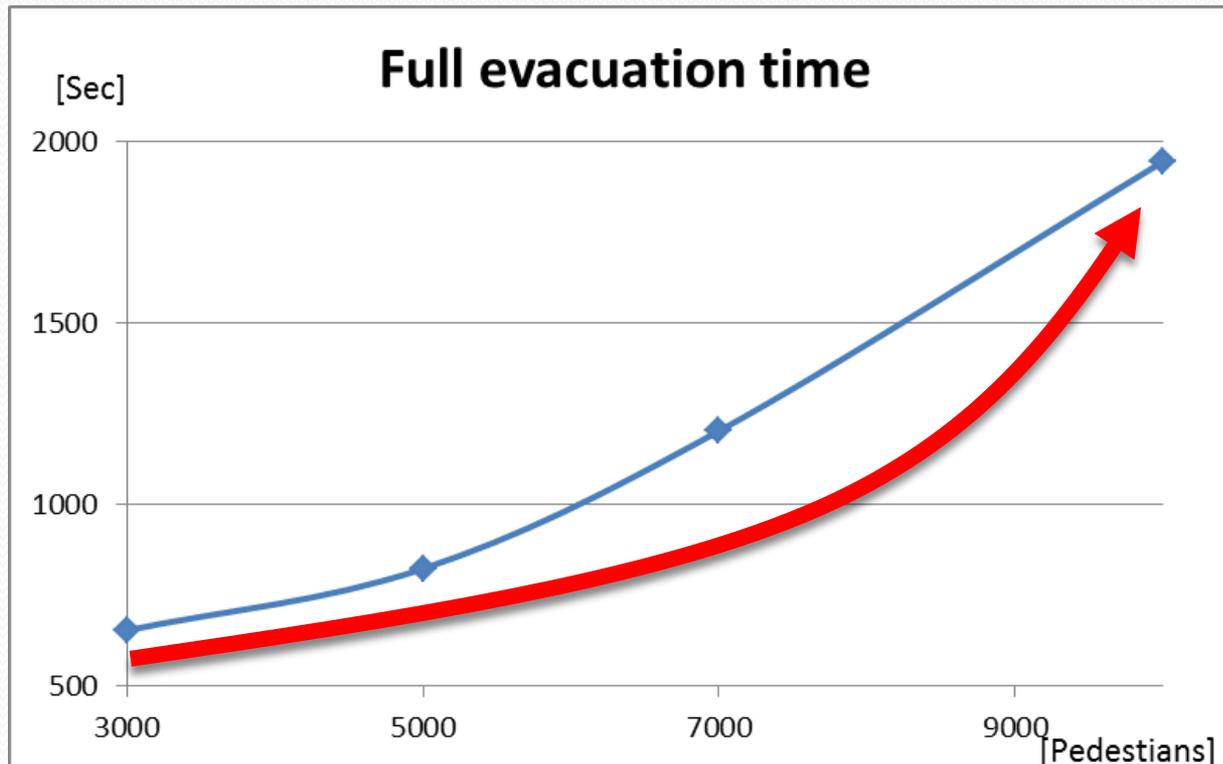
# Out put 1 (Width of gap sample )



## Output 2 (building 2)

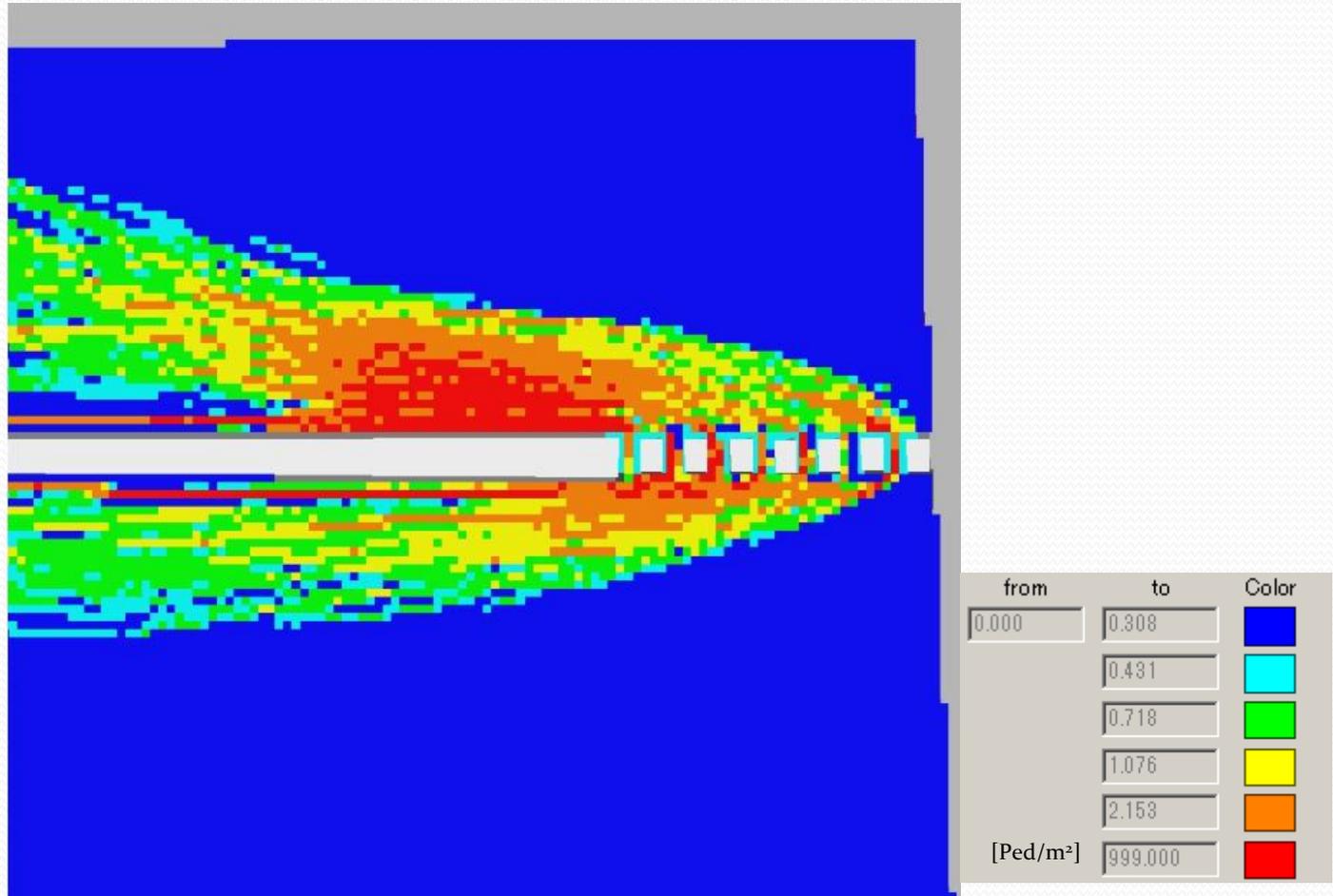
- Travel time function

→ It can use travel time for check Full evacuation time



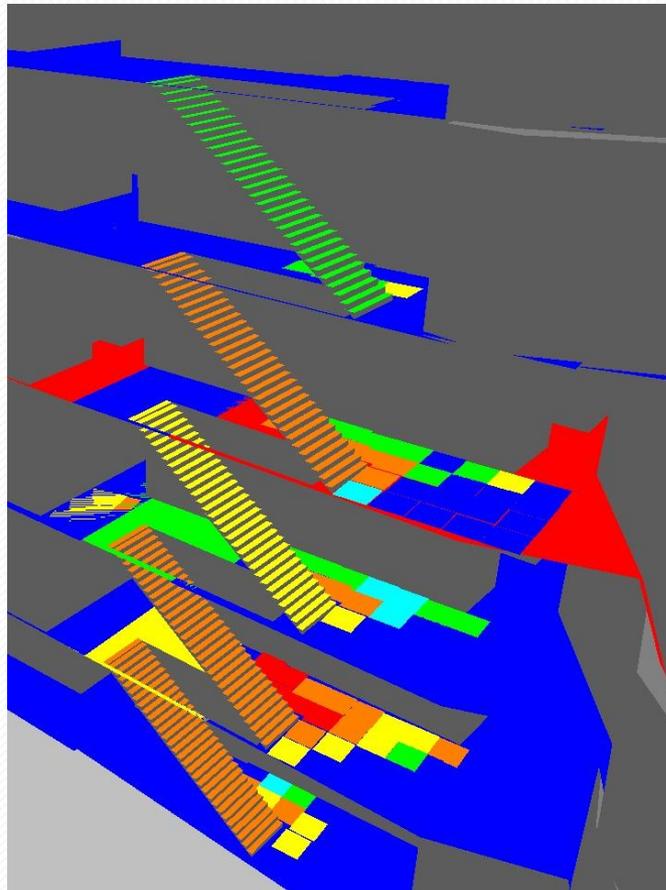
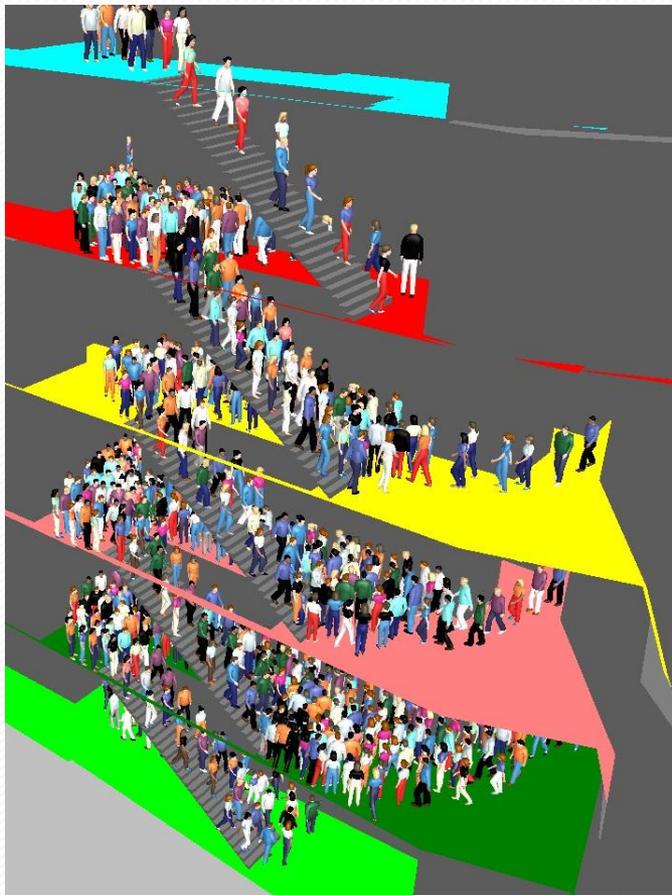
# Output 3 (building 2)

- LOS function  
→ Evaluation width of corridors or escalators



# Out put 4 (building 2)

- LOS function
  - Check the bottleneck (include stairs)

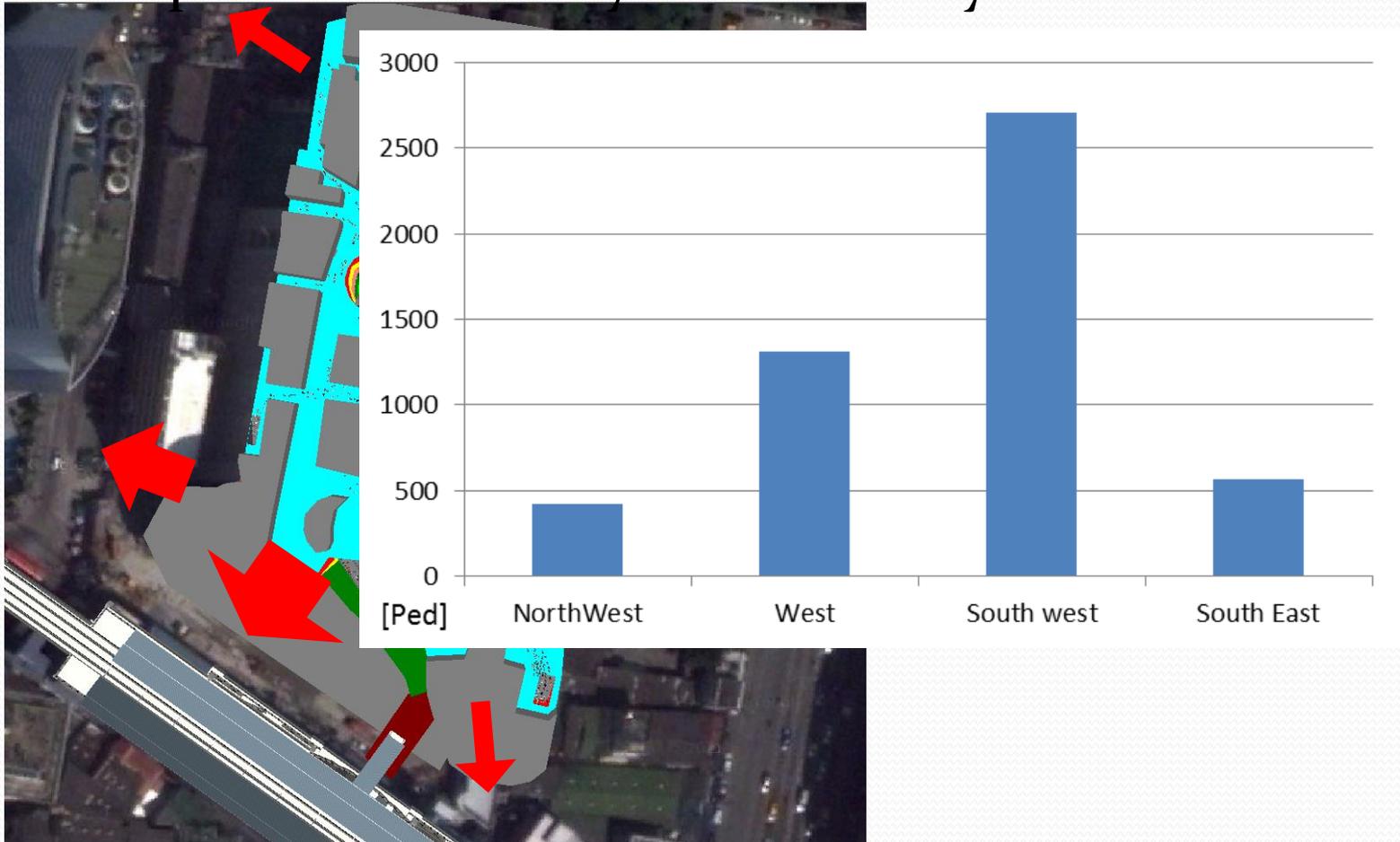


from	to	Color
0.000	0.308	Blue
	0.431	Cyan
	0.718	Green
	1.076	Yellow
	2.153	Orange
[Ped/m <sup>2</sup> ]	999.000	Red

# Out put 5 (building 2)

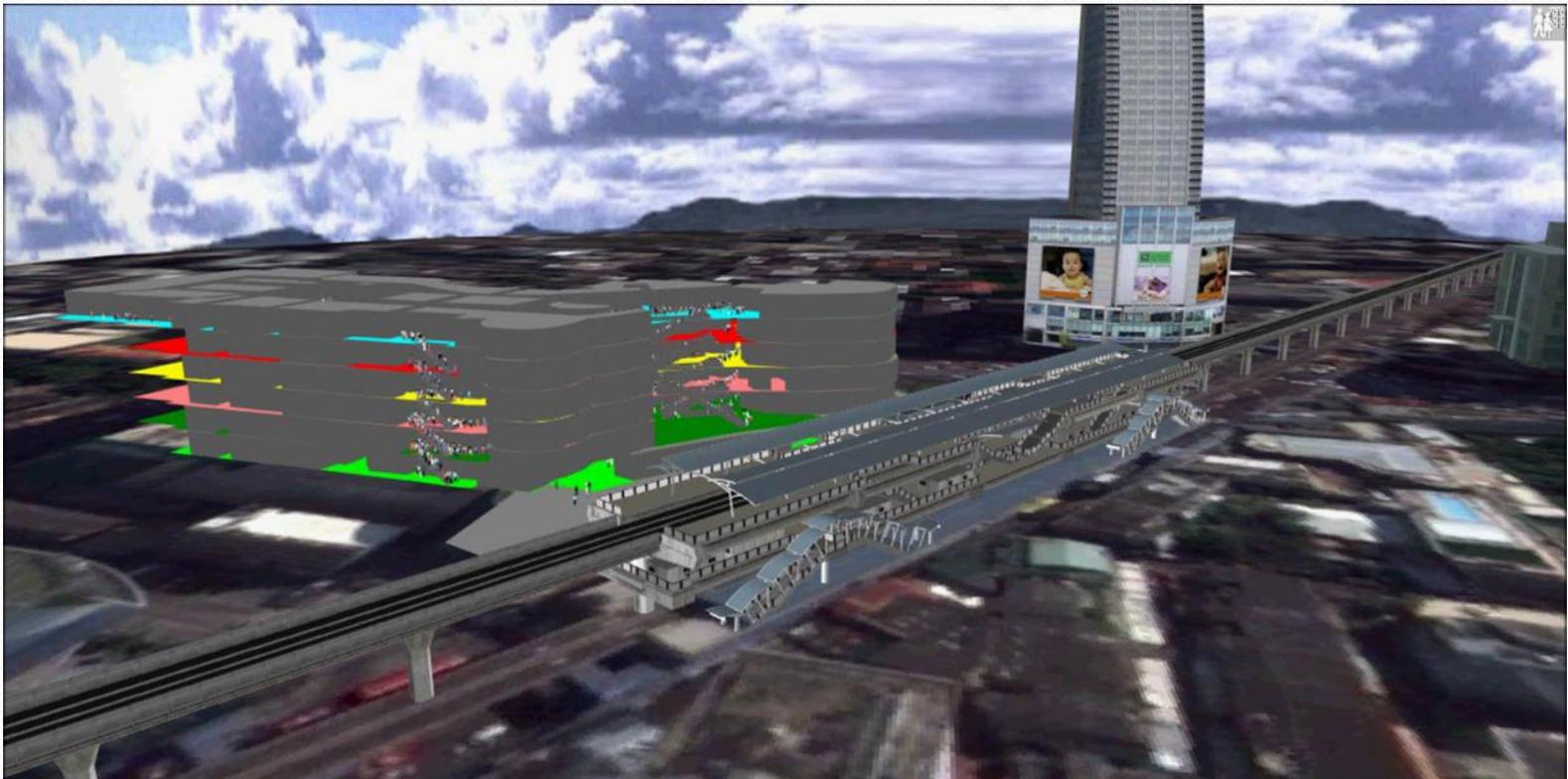
- Data collection point function

→ Count pedestrians exit by exit or area by area



## Output 6 (building 2)

- Videos recoding function
  - Easy to understand for everybody and strong appeal



# Summary and future prospects

- Evacuation planning WITHOUT Simulation
  - Calculate by static data
  - Mostly calculate from experience
- Evacuation planning WITH Simulation
  - Grasp pedestrian movement
  - Calculate with theoretical background
  - Experiment and determine your planning

# Summary and future prospects

- Microsimulation is a valid tool to evacuation planning
- Showed you the value of using simulation
  
- Future possibilities of applying to various planning in other fields
- To improve accuracy of simulation, we can do more field survey.
  - Identify differences in behavior due to age, cultural background, etc.