

The Role of Simulation in Developing Evacuation Codes

PROBLEM

Building codes provide principles, requirements, constraints and jurisdictions for architectural design and construction industries around the world. Evacuation codes, in particular, ensure occupant safety during tragic events like fire. Over the last century, evacuation codes were mainly based on the prescriptive approach, which defines minimum constraints, and which has proven itself to be poorly adapted to large contemporary buildings.

Performance-based codes have been introduced in some countries since the 1990s, as international trends in regulatory reform followed the development and wide use of pedestrian simulation tools. However, the quantification of performance evaluations and safety levels has proven difficult, which has resulted in sluggish development and implementation difficulties. Certain frameworks have been developed to simplify the implementation process of performance-based building codes, but most of them focus on rough performance goals and basic steps, without giving consideration to the specific roles simulation can play.

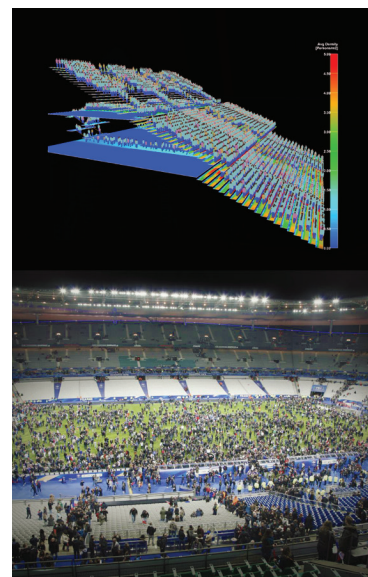


Figure 1. Quantifying & evaluating evacuation safety and performance through simulation.

GUIDING QUESTIONS

This project asks how simulation technologies and tools can promote the development of building evacuation codes, and explores the opportunities and challenges involved in standardizing evaluation processes, input parameters and computing methods using evacuation simulation.

What are the performance requirements for building evacuation?

How do simulation tools work for assessing evacuation performance?

PROJECT DESCRIPTION

This project aims to develop a methodology for evaluating building evacuation performance by pedestrian simulation, considering the standardization of the simulation process, the accepted calculations, inputs and simulation tools. The goal is to advance the development and broader implementation of performance-based buildings codes, and explore the potential of pedestrian simulation in promoting egress provisions within performance-based building codes and regulations.

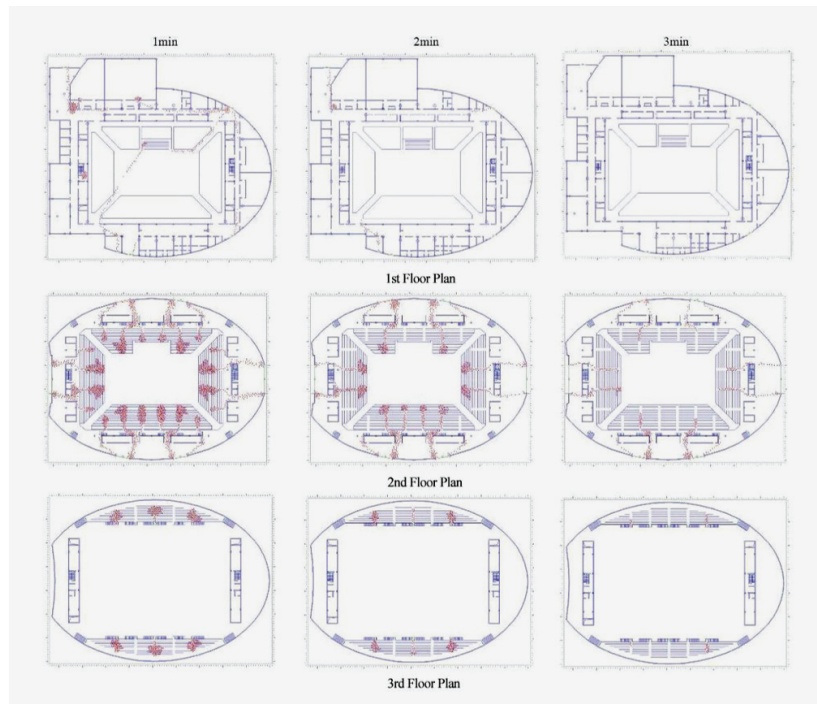


Figure 2. Harnessing pedestrian simulation in the development of performance-based building codes.

IMPACT

This work can improve the enforceability of performance-based evacuation codes by refining provisions and standardizing the evaluation process. It can also promote pedestrian simulation models by addressing growing demands for accuracy and building integration.

Provide a methodology for the normalization of evacuation simulation.

Improve the implementation of performance-based codes.

Promote the development of pedestrian simulation models.



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