

**A COMPENDIUM OF URBAN AND
REGIONAL PLANNING STUDIES
IN THE BUILT ENVIRONMENT
OF MALAYSIA**

MARIANA MOHAMED OSMAN
SYAHRIAH BACHOK
MOHAMMAD ABDUL MOHIT
MANSOR IBRAHIM



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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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CHAPTER 10

A REVIEW ON SIMULATION MODEL OF CROWD MOVEMENT DURING INGRESS AND EGRESS OF STADIUM.

Syahriah Bachok and Zulfadly Azizi Bohari

INTRODUCTION

This research focuses on the crowd movement and its characteristics, such as ingress and egress of the stadium. It basically deals with the planning of the events, events characteristic, spatial characteristics (layout and design) and factors influencing the crowd movement.

Events are part of a booming industry that continue to grow both domestically and internationally. This increase in their popularity has led to larger and more diverse attendees, making crowd management and crowd control a necessary and integral part of the planning process for any event. The mushrooming of events industry attracted the attendees to come and resulted in major challenges in dealing with the crowd movement on the part of the crowd manager. Therefore, the crowd managers need to ensure the convenience and safety level of the attendees are well secured.

In the modern era, simulation models are kind of tools which assist the event or crowd manager in dealing with thousands of crowds during events. The models of pedestrian simulation are not only applicable for ingress and egress of venue, but also fit into the mass movement for in the case of emergency situation and pilgrimage. Schmid (2010) added that pedestrian simulation model is extremely needed in order to identify planned or existing flaws regarding pedestrian comfort in buildings. This is also supported by Okazaki and Matsushita (undated) who argued for pedestrian simulation model being a tool for the architects or designers in identifying the relationship between space and human behaviour. Okazaki and Matsushita (undated) also added that complicated architectural design effected the pedestrian movement especially in emergency cases of movement into and out of the building. Thus, this proves that complicated design of building could lead to uneven flow movement of pedestrian during evacuation situation. Klupfel (undated) demonstrated that the V-shape design of Dortmund Stadium encouraged the faster movement from the lower seating rows.

Further, this is also supported by Zeitz et al (2009) who explained that the design element should be emphasized to limit the broader of crowd engagement perimeter by conducting pre-