UNIVERSITI TEKNOLOGI MARA

THE INFLUENCES OF EXIT SIGNAGE ON HUMANS DURING FIRE EMERGENCY EGRESS: A REVIEW

NUR IZZANI BINTI NASIR

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ABSTRACT

Emergency exit signage is an essential tool under fire safety which acts as a guidance for occupants when experiencing unexpected emergency such as fires. Requirement of exit signage installation and its specific features had been mandated under By-Law 172 of Uniform Building By-Laws (UBBL) 1984 which depicts its importance, hence designation of an effective exit signage is necessary in order to effectively deliver the messages of directional and exit pathway to the occupants. In this study, a total of 29 articles had been selected for qualitative review which were collected from online databases by using a deductive approach based on the research questions. Hence, the result emphasizes on three themes which are types of exit signage, design of exit signage and the placement of exit signage. In term of type of exit signs, the application of dynamic exit signage showed better performance as occupants were found to have lower evacuation periods, higher compliance rates, shorter traveled distances, and fewer breaks taken throughout the egress phase compared to static exit signs. Whereas for exit signage design, green signage expressed stronger guiding and evacuation effects either in individual or group egress and it is suggested to include both pictograms: arrow and running man on exit signs to prevent misinterpretation and increase its detection rate. In addition, a design of multidimensional arrow instead of 2D arrow also was proven to be more effective to convey the evacuation direction. Apart from that, the placement of signage is also being analyzed in terms of its height where it is found out that floor level signage provides better visibility during egress but showed limitation with presence of disturbers. Degree of installation of exit signage is best to take the suitable distance and interaction angle into consideration which increase the signage coverage area. Based on the analysis and comparison made in this study shows that implementation of exit signage should be considered from its initial designation process including its equipped features until the way of an exit sign being installed in building in order to ensure that the exit signs are placed within the visibility coverage area of occupants. Therefore, this study can be used as a reference in improving the effectiveness of emergency exit signage in aiding occupants toward a safe egress.

Keywords: *Emergency exit sign, Fire occurrence, Building egress, Wayfinding, Design of exit signs, Sign Placement*

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Year over year, decades after decades, the world has seen a series of natural disasters such as fires, floods, volcanic eruptions, landslides, and earthquakes. These calamities have executed thousands of lives and caused significant damage to properties and the victim's physical and psychological state. Fire incidents that happened either intentionally or unintentionally become one of the major threats to the implementation of safe operation in buildings because of their unexpected occurrence. According to the International Association of Fire and Rescue Service data, more than 1.1 million people were injured or killed as a result of 104 million fires in the surveyed countries between 1993 and 2020 (CTIF, 2022). The most recent data in 2020 revealed that four million fires were registered, resulting in a total of 20,755 fatalities and 71,410 injuries (Brushlinsky et al., 2022). These numbers are predominantly high and at a worrying state.

In addition, the needs of building occupants in terms of accessibility and safety have expanded dramatically since the building layout itself has grown larger and more complex. Buildings nowadays are currently equipped with combined functionalities under one facility such as shopping malls, airports, apartments, and workplaces. Despite that, emergencies and wayfinding are generally not become the primary focus for developing such facilities (Yenumula et al., 2015), and conflicting situations between the architecture's layout and the available signage system may appear during an emergency either during the formation of intervention measures in buildings, renovations, and even changes in building purposes. Above all, the possibility of