

Ensuring Safety in Fire Evacuation by Facilitating Way-Finding in Complex Buildings

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Abstract : The issue of way-finding earmarks a wide range of literature in architecture and despite the 50 year background of way-finding studies, it still lacks a comprehensive theory for indoor settings. Way-finding has a notable role in emergency evacuation as well. People in the panic situation of a fire emergency need to find the safe egress route correctly and in as minimum time as possible. In this regard the parameters of an appropriate way-finding are mentioned in the evacuation related researches albeit scattered. This study reviews the fire safety related literature to extract a way-finding related framework for architectural purposes of the design of a safe evacuation route. In this regard a research trend review in addition with applied methodological approaches review is conducted. Then by analyzing eight original researches related to way-finding parameters in fire evacuation, main parameters that affect way-finding in emergency situation of a fire incident are extracted and a framework was developed based on them. Results show that the issues related to exit route and emergency evacuation can be chased in task oriented studies of way-finding. This research trend aims to access a high-level framework and in the best condition a theory that has an explanatory capability to define differences in way-finding in indoor/outdoor settings, complex/simple buildings and different building types or transitional spaces. The methodological advances demonstrate the evacuation way-finding researches in line with three approaches that the latter one is the most up-to-date and precise method to research this subject: real actors and hypothetical stimuli as in evacuation experiments, hypothetical actors and stimuli as in agent-based simulations and real actors and semi-real stimuli as in virtual reality environment by adding multi-sensory simulation. Findings on data-mining of 8 sample of original researches in way-finding in evacuation indicate that emergency way-finding design of a building should consider two level of space cognition problems in the time of emergency and performance consequences of them in the built environment. So four major classes of problems in way-finding which are visual information deficiency, confusing layout configuration, improper navigating signage and demographic issues had been defined and discussed as the main parameters that should be provided with solutions in design and interior of a building. In the design phase of complex buildings, which face more reported problem in way-finding, it is important to consider the interior components regarding to the building type of occupancy and behavior of its occupants and determine components that tend to become landmarks and set the architectural features of egress route in line with the directions that they navigate people. Research on topological cognition of environmental and its effect on way-finding task in emergency evacuation is proposed for future.

Keywords : architectural design, egress route, way-finding, fire safety, evacuation

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