Fires in Historic Buildings: Assessment of Evacuation of People by Computational Simulation

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Abstract : Building fires are random phenomena that can be extremely violent, and safe evacuation of people is the most guaranteed tactic in saving lives. The correct evacuation of buildings, and other spaces occupied by people, means leaving the place in a short time and by the appropriate way. It depends on the perception of spaces by the individual, the architectural layout and the presence of appropriate routing systems. As historical buildings were constructed in other times, when, as in general, the current security requirements were not available yet, it is necessary to adapt these spaces to make them safe. Computer models of evacuation simulation are widely used tools for assessing the safety of people in a building or agglomeration sites and these are associated with the analysis of human behaviour, makes the results of emergency evacuation more correct and conclusive. The objective of this research is the performance evaluation of historical interest buildings, regarding the safe evacuation of people, through computer simulation, using PTV Viswalk software. The buildings objects of study are the Colégio Catarinense, centennial building, located in the city of Florianópolis, Santa Catarina / Brazil. The software used uses the variables of human behaviour, such as: avoid collision with other pedestrians and avoid obstacles. Scenarios were run on the three-dimensional models and the contribution to safety in risk situations was verified as an alternative measure, especially in the impossibility of applying those measures foreseen by the current fire safety codes in Brazil. The simulations verified the evacuation time in situations of normality and emergency situations, as well as indicate the bottlenecks and critical points of the studied buildings, to seek solutions to prevent and correct these undesirable events. It is understood that adopting an advanced computational performance-based approach promotes greater knowledge of the building and how people behave in these specific environments, in emergency situations.

Keywords : computer simulation, escape routes, fire safety, historic buildings, human behavior
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