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BIM4Cult Leveraging BIM and IoT for Enhancing Fire Safety in Historical Buildings

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Abstract : Introduction: Historical buildings are an inte-gral part of the cultural heritage of every place, and beyond the obvious need for protection against risks, they have specific requirements regarding the handling of hazards and disasters such as fire, floods, earthquakes, etc. Ensuring high levels of protection and safety for these buildings is impera-tive for two distinct but interconnected reasons: a) they themselves constitute cultural heritage, and b) they are often used as museums/cultural spaces, necessitating the protection of both human life (vis-itors and workers) and the cultural treasures they house. However, these buildings present serious constraints in implementing the necessary measures to protect them from destruction due to their unique architecture, construction methods, and/or the structural materials used in the past, which have created an existing condition that is sometimes challenging to reshape and operate within the framework of modern regulations and protection measures. One of the most devastating risks that threaten historical buildings is fire. Catastrophic fires demonstrate the need for timely evaluation of fire safety measures in historical buildings. Recog-nizing the criticality of protecting historical build-ings from the risk of fire, the Confederation of Fire Protection Associations in Europe (CFPA E) issued specific guidelines in 2013 (CFPA-E Guideline No 30:2013 F) for the fire protection of historical buildings at the European level. However, until now, few actions have been implemented towards leveraging modern technologies in the field of con-struction and maintenance of buildings, such as Building Information Modeling (BIM) and the Inter-net of Things (IoT), for the protection of historical buildings from risks like fires, floods, etc. The pro-ject BIM4Cult has bee developed in order to fill this gap. It is a tool for timely assessing and monitoring of the fire safety level of historical buildings using BIM and IoT technologies in an integrated manner. The tool serves as a decision support expert system for improving the fire safety of historical buildings by continuously monitoring, controlling and as-sessing critical risk factors for fire.

Keywords : Iot, fire, BIM, expert system
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