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**Integrating Fire Evacuation into the Building Information Modelling Workflow**

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**Abstract**

Building Information Modelling (BIM) is arising gradually as a useful methodology in the AEC field. One of the many benefits of BIM is coordination between stakeholders from multiple disciplines. However, the field of Fire Safety Engineering (FSE) is relatively lagging by its lack of integration into this digital workflow (Chevin, 2020). This lack of integration increases the efforts needed to evaluate the designs and hinders possible collaboration of parties undertaking projects. It also causes a fragmentation of the design and review processes which may result in data loss, inconsistent documentation and ambiguity in roles and responsibilities, and ultimately lead to life safety issues and property damage.

In order to address these gaps, this thesis proposes to develop a framework for smoothly integrating FSE into BIM-authoring tools, with a specific focus on evacuation. Through this framework, the potential for exchange and collaboration is leveraged by embedding prescriptive requirements and evacuation simulation data into a shared BIM model. This will enable professionals and authorities to review building design models coupled with analysis results and perform more efficient and comprehensive assessments.

Ultimately, this will result in the creation of a full data loop linking BIM platforms and evacuation assessment tools and the implementation of a digital record, referred to as the “golden thread of information”.

In this report, a number of developments by the author are discussed, which include establishing a technical framework and associated data exchange formats from an FSE perspective. Additionally, the benefits of two-way data flow between BIM and fire evacuation assessment tools are demonstrated by implementing a prototype system for coupling Revit, a popular BIM platform, and Pathfinder, a widely used evacuation simulator.

The work presented in this paper provides a practical demonstration for the integration of fire evacuation into BIM and will contribute to the ongoing efforts of the community in support for FSE and occupant movement data exchange.