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Postgraduate Diploma Thesis

BIM Applications in Construction Claims and Forensic Investigations

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Abstract

Claims management, in construction projects, remains one of the most persistent challenges in the construction industry. Despite the proliferation of standardized contracts and advanced project control systems, evidence of claims often remains fragmented, reactive, and inconsistent. This research examines how building information modeling (BIM), when aligned with the ISO 19650 framework for information management, can redefine claims management in the construction sector and forensic investigation sectors through data-driven, transparent, and verifiable processes.

The study situates the problem within broader context of the construction industry, describing the causes of disputes and the systemic deficiencies that stem from disorganized documentation and the absence of standardized information structures. It then provides a detailed overview of the types of claims identified in academic and professional literature, including claims for delays, interruptions, changes in scope, cost increases, and risk events. This classification serves as a basis for understanding the different contractual and evidentiary requirements that BIM may face.

Established methods of forensic analysis in claims are also examined, exploring how delay analysis, productivity assessments, and evidence documentation are traditionally performed. This information is contrasted with the opportunities offered by digital tools to improve traceability, transparency, and accuracy throughout the project lifecycle. Building on this foundation, the study introduces BIM as a technological and procedural innovation capable of integrating design, scheduling, cost, and communication data into a unified information environment. Emphasis is placed on the role of the Common Data Environment (CDE) and key BIM objects—such as clash detection reports, issue logs, and 4D/5D models—in producing reliable and controlled records.

Within this conceptual framework, particular attention is paid to Exchange Information Requirements (EIRs), which are positioned as the mechanism through which contractual expectations are transformed into structured, verifiable data exchanges. Through a comparative review of the leading standard contract forms — FIDIC, NEC, AIA, and JCT—the research identifies how different contractual systems deal with the submission, notification, and verification of claims, as well as how these processes could be improved through information management using BIM.

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The practical dimension of the research is demonstrated through an application developed in the Plannerly platform. The simulations show how EIRs can define, assign, verify, and archive project information in real time. By linking the definition of requirements, task assignment, and compliance verification, the case study shows how digital workflows can create a traceable connection between contractual provisions and delivered evidence. This approach turns claims management into a proactive mechanism for information governance and accountability.

It is found that integrating BIM with traditional and procedural practices can significantly enhance collaboration, reduce ambiguity, and improve the reliability of evidence; however, there are still challenges, including interoperability between digital ecosystems, uneven legal acceptance of digital evidence, and the need for further professional knowledge at the intersection of the technical and contractual domains.

The study concludes with directions for future research, including the integration of artificial intelligence and blockchain technologies into information management workflows. Artificial intelligence-based analysis can identify potential delays and disruptions earlier in the process by analysing deviations in schedules and communication data while blockchain technology can provide immutable records and increase trust in digital evidence. Together these developments suggest an emerging construction landscape that will require legal, managerial, and technological dimensions to come together to provide a verifiable, collaborative, and digitally enhanced management environment.