Proceedings of the International Conference on Industrial Engineering and Operations Management

Publisher: IEOM Society International, USA DOI: 10.46254/AF07.20260379
Published: May 13, 2026

Enhancing Construction Safety through the Early Integration of Construction Health and Safety Agents (CHSAs)

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Abstract

The construction industry remains one of the most hazardous sectors globally, with fatalities, injuries, and occupational illnesses continuing to occur despite regulatory and technological advancements. A considerable proportion of construction accidents can be attributed to decisions made during the design stage. Design for Safety (DfS) is recognised as a proactive approach to improving health and safety (H&S) performance; however, its effectiveness is often limited by the fragmented nature of the industry and the late inclusion of Construction Health and Safety Agents (CHSAs) in the project lifecycle. This study examines the factors affecting CHSA integration during the design stage and proposes a framework to enhance collaboration between CHSAs and designers in order to improve H&S performance. A quantitative, positivist research approach was adopted. Data were collected through a structured online questionnaire distributed to construction professionals in South Africa, including CHSAs, project managers, engineers, and architects. A total of 86 respondents participated in the study. Descriptive and inferential statistical analyses were conducted using the Kruskal - Wallis H test and Spearman's rank-order correlation to test three key hypotheses related to CHSA integration, collaboration, and technological enablers. The findings revealed strong agreement among respondents on the importance of early CHSA integration, interdisciplinary collaboration, and the adoption of digital tools such as the Common Data Environment (CDE). The results confirmed statistically significant positive relationships between (H1) CHSA integration and H&S performance, (H2) collaboration and H&S performance, and (H3) CDE adoption and collaboration. Key barriers identified included designers' concerns regarding professional liability and limited H&S expertise within design teams. The study concludes that early CHSA involvement, supported by collaborative practices and enabling technologies, can significantly enhance DfS implementation and improve health and safety outcomes on construction projects.

Keywords
Construction Health and Safety Agents; Design for Safety; Collaboration; Health and Safety Performance; Common Data Environment