

Structural design constructability verification using BIM

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1 Abstract

Poor coordination and collaboration between designers and contractors are common within the Architecture, Engineering and Consulting (AEC) industry. The lack of collaboration in projects of building structures often results in impractical designs which could incur unnecessary costs and time on projects. This study considered the design and construction of suspended floor slabs as a topic to investigate how Building Information Modelling (BIM) can be used as a tool to implement a constructability verification process in structural design.

Several factors affect constructability of floor slabs. These factors, identified from a previous case study and from literature, were used to derive questions for interviews with contractors. The information gathered during the interviews was used to identify a range of possible verifications which can form part of a proposed constructability analysis process.

A second round of interviews was conducted with experienced consultants to validate a proposed process and to obtain their preferences in terms of the implementation of the process. The input from the consultants were used to develop guidelines for the implementation of a proposed constructability analysis process.

Keywords: Building Information Modelling (BIM), constructability, design collaboration, constructability verification, concrete structures

2 Introduction

Structural designers often develop drawings and specifications with limited consideration for the eventual construction of the structure. This is particularly the case for building structures, whilst for bridges, more consideration is often given to constructability. Research has shown that substantial cost and time savings are possible when construction processes are identified and planned for during the planning and design phases (Tatum, Vanegas & Williams, 1986; Paulson, 1976).

Building Information Models (BIM) are gaining popularity and the benefits of using BIM in a construction project have been proven to be significant (Mansuri, Chakraborty, Elzarka, Deshpande & Gronseth, 2017). Also, the use of BIM for improving constructability of projects could result in time and cost savings (Young, Jones, Bernstein & Gudgel, 2009).

This paper reports on an investigation which considered an approach for using BIM to address constructability of building structures. This was achieved by considering the construction of