

Abstract

Osama S. Tolba

BIM Semantics for Digital Fabrication: A Knowledge-Based Approach

This research investigates how a Knowledge-Based approach to developing BIM objects of Engineered-To-Order (ETO) components could facilitate the workflow between designers and fabricators. The work reported in this paper represents the findings of a 16 month action research project undertaken with an ETO woodwork component fabrication company with both conventional and Computer Numerically Controlled (CNC) machining capabilities. The goal of this paper is to demonstrate a way for how BIM objects could first be embedded with fabrication semantics, and then used to support the workflow between designers and fabricators, specifically where CNC machines are used. To demonstrate the idea, the methodology is outlined in the context of a developed BIM object for a base cabinet from the domain of custom cabinetry. The BIM object was validated by fabricating the actual component via a simulated workflow between design and fabrication disciplines in a real setting. The main contribution is that the research clarifies some of the ambiguity relating to BIM and CNC technologies working in tandem. The discussed results explain the benefits and challenges observed through the use of this method as well as provide avenues for further investigation.