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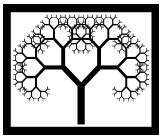

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An Industrial Knowledge Collaborative CAD System for Scaffolding Structures

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Abstract

Modelling and design of scaffolding and temporary work embodies significant levels of complexity, which make it very inconvenient and, sometimes not possible to utilise general structural finite element packages. Moreover, industrial expertise plays an important role in the modelling and design process which makes it unlikely that a single engineer can work alone on a complex problem. Knowledge-intensive collaboration has emerged as a promising discipline for dealing with the modelling and decision-making processes in distributed design system.

In this paper we first review the previous and current research on the development of scaffolding CAD system. Then, we develop an industrial knowledge collaborative CAD system based on Autodesk ObjectARX platform for collaborative design modelling and decision support. A comprehensive component database is developed incorporated with the industrial expertise and acting as the knowledge servers.

Based on component-based modelling/design approach, a full software package has been developed including, pre-processor, analysis engine, post-processor, design module, report and drawing generator. Finally, as an illustration, a practical project is modelled using the CAD system developed. The analysis and design results are demonstrated.

Keywords: CAD system, scaffolding design, knowledge servers, Autodesk ObjectARX, integrated design and analysis, collaborative design.

1 Introduction

Scaffolds are a form of temporary structure widely used throughout the construction industry for various purposes. Some common uses are to provide access, for storage of materials or as temporary support. The design of such structures is governed by