Synthesis of the web-based CAD viewer for interference verification of injection moulds

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This paper describes the development of a web-based interference examination system in mould design processes. Although several commercial computer-aided design (CAD) systems offer interference inspection functions, those systems are very expensive and inadequate to perform collaborative works over the Internet. In this paper an efficient and precise hybrid interference examination algorithm applicable to multilevel assemblies is studied for injection mould design processes. In order to design a collaborative system over the distributed environment, lightweight CAD files produced from the optimally transformed CAD data through ACIS kernel and InterOp are applied to develop a web-based interference verification system. Collaborators related to the development of a new product can verify the interference over the Internet without commercial CAD systems. The system reduces production cost, errors and lead-time to the market. The validity of the developed system is confirmed through case studies.

Keywords: e-Manufacturing; Injection mould; Interference verification; Internet; Lightweight computer-aided design (CAD) file

1. Introduction

Injection-moulded products are widely used and their significance is increasing. The life cycle of plastic products is becoming shorter and shorter. Injection mould companies reduce lead-time by using three-dimensional (3D) computer-aided design (CAD) systems. However, various problems occur in the design and manufacturing processes of injection moulds. For example, as the 3D CAD systems are expensive and difficult to use, they are mainly used by design experts of the mould industry. Technicians in the manufacturing department use two-dimensional (2D) CAD drawings for drilling, milling and assembly jobs. This requires transformation of 3D CAD data to 2D CAD drawings by the design department of mould-makers. It delays the lead-time of the mould design. The 2D drawings also degrade the quality of precision jobs in the mould fabrication. In addition, losses are generated not only from the lack of a collaboration tool between several offices in the mould-maker, but also from the difficulty of communication among the injection, customer