Computer－Based Rapid Tooling System in Mold Design

賴致廷、劉大銘

E-mail: 9707295@mail.dyu.edu.tw

ABSTRACT

Facing with the competition in global manufacturing, it is critical to shorten product life cycle and to reduce the manufacturing cost in industry. In response to this demand , the practical concern is the close integration of computer-aided Rapid tooling technique with the design-knowledge supported system , and also is one of necessary and efficient way to improve the moulding process. It becomes the topicof this research. This main aims in this research is to buildup the computer-aided moulding system for rapid tooling via the integration of several API (Win 32 and Solidwork) and the knowledge-management system under VB-platform. There are two main modules, the moulded product and the molding modules. The Moulded product modules deals with the setup of solid model of product by using parametric design notation, The Molding modules concerns with the functional design-automation of parting surface and or line with respective to the moulded product and then constructs the two-pieces or multi-pieces mold with Boolean operation. Finally the system outputs the 2D engineering drawing for its manufacturing.

Keywords : Rapid Tooling ; Parting Surface ; Boolean operation ; Knowledge Management System

Table of Contents

REFERENCES

[1] 冬陽(民92)，3D遊戲程式設計/基礎篇，宸宇出版社，台北。
[2] 何宗陽(民95)，凹陷特徵塑膠製品之模具設計，大葉大學機械工程研究所碩士論文。
[3] 施宣光、簡聖芬(民93)，2004電腦輔助繪圖，台灣科技大學建築系。 http://140.118.29.4/AD1402301/spring2004/mass/index.htm [4] 徐明輝(民96)，業務型顯示器產品展示系統之研究，大葉大學機械工程研究所碩士論文。
[5] 張豪智(民95)，機械製品虛擬原型設計，大葉大學機械工程研究所碩士論文。
[6] 雷永剛、彭穎紅、阮雪輸(民89)，機械產品概念分析, 武漢大學學報，1 (1)，頁11~16。
[7] 蕭立奇(民95)，射出模模座設計管理系統，大葉大學機械工程研究所碩士論文。
[8] Chen, L. L., S. Y. Chou and T. C. Woo (1993) ACM Transact- ions on Graphics. Separating and intersecting spherical polygons: computing machinability on three four and five-axis numerically controlled machines, 12(4), 305-326.
[9] Chen, L. L., S. Y. Chou and T. C. Woo (1993) Computer-Aided Design. Parting directions for mould and die design, 2(5), 763-767.
[10] Fu, M. W., J. Y. H. Fuh and A. Y. C. Nee (1999) COMPUTER AIDED DESIGN, Computer-Aided Design. Undercut feature recognition in an injection mould design system, v31, 777 – 790.
[11] Hui, K. C. and S. T. Tan (1992) Computer Aided Design. Mould Design with Sweep Operations a Heuristic Search Approach, 24(2), 81-91.
[12] Kong, L., J. Y. H. Fuh, K. S. Lee, X. L. Liu, L. S. Ling and Y. F. Zhang (2003) Journal of Materials Processing Technology. A Windows-native 3D plastic injection mold design system, v139, 81 – 89.
[13] Krishnan S. (1997) Design for Manufacture: An Integrated System for Injection Molding and Milling, PhD Paper, Mechanical Engineering, University of Maryland, College Park.
[14] Mok, C. K., K. S. Chin and J. K. L. Ho (2001) Int. J. Adv. Manuf. Technol. An interactive knowledge-based CAD system for mould design in injection moulding processes, 17(1), 27 – 38.
[15] Moulding Manual (2008) Moulding Considerations, DuPont Delrin? acetal resin. http://www.distrupol.com/en/downloads.asp?id=129 [16] Ravi, B. and M. N. Srinivasan (1990) Computer Aided Design. Decision Criteria for Computer Aided Parting Surface Design, 22(1), 11-17.
[17] Rosochowski A. and A. Matuszak (2000) Journal of Materials Processing Technology. Rapid tooling: the state of the art, 10(6), 191~198.
[18] Savinder D., K. S. Gupta1, J. Huang and M. Kumar (2000) A Feature Based Approach to Automated Design of Multi-Piece Sacrificial Molds, University of Maryland College Park.
[19] Weinstein M. and S. Manoochehri (1996) Journal of Mechani- cal Design. Geometric Influence of a Molded Part on the Draw Direction Range and Parting Line Locations, v118, 29-39.
[20] Weinstein M. and S. Manoochehri (1997) Journal of Manu- facturing Systems. Optimum Parting Line Design of Molded and Cast Parts for Manufacturability, v161, 193-204.
[21] MSDN Library (2008) Win32 and COM Development, Microsoft Developer Network. http://msdn.microsoft.com/