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Three-Dimensional Numerical Analysis of Weld-Line Strength for Injection-Molded Plastic Parts

*Allen Y. Peng (a), Wen-Hsien Yang (a), David C. Hsu (a), Rong-Yeu Chang (b)

(a) *CoreTech System Co., Ltd., Hsinchu, Taiwan*
(b) *National Tsing-Huan University, Hsinchu, Taiwan*

Weld-lines look like micro cracks on the appearance of plastic parts. These visible defects might not be acceptable esthetically in many applications. Moreover, the local mechanical strength in the weld-line area could be significantly reduced. It could be one of the most significant problems for structural applications due to the potential failure in the weld-line areas. Hence, how to prevent the weld lines and guarantee the good quality are the major concerns to part/mold designers. In this paper, a numerical approach is proposed to predict weld lines and weakened mechanical strengths in these areas. Furthermore, through the data link between mold-filling simulation and structure analysis, the effects of weld lines towards part structure are predictable.