UNIVERSITI TEKNOLOGI MARA

AN INTERCHANGEABLE TURNING SPRUE BUSHING (ITSB) SYSTEM IN A FAMILY MOULD

SAIFUL BAHRI MOHD YASIN

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of the requirement for the degree of
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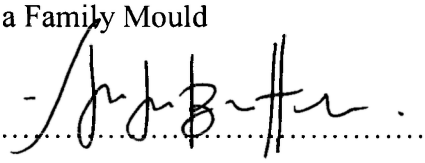
AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation was carried out in accordance with the regulation of Universiti Teknologi Mara. It is original and is the result of my own work, unless otherwise indicated or acknowledged as a reference work. This thesis has not submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulation for Post Graduate, Universiti Teknologi Mara, regulating the conduct of my study and research.

Name of Student	: Saiful Bahri bin Mohd Yasin
Student I.D. No	: 2010156313
Program	: Master of Science (AS780)
Faculty	: Faculty of Applied Science
Thesis	: An Interchangeable Turning Sprue Bushing (ITSB) System in a Family Mould
Signature of Student:	
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ABSTRACT

A family mould consists of different shape of cavities used, while a multi cavity mould contains same shape of cavities to create injection products. The combinations of these features create a new family mould which is beneficial for the manufacturing cost and time reduction in injection moulding process. However, the main problem of the conventional family mould is the different cavity volume, led to an imbalance of melt filling behaviour. There are many successful family mould modifications which enabled a balance of melt filling such as an artificial balance runner system, runner shut-off system and variable runner system. Nevertheless, the inconsistencies of the melt filling behaviour in these family moulds are yet to be resolved especially when they are utilized in high mass production. Hence, the idea of an interchangeable turning sprue bushing (ITSB) insert was proposed in this study in order to overcome the imbalance of melt filling behaviour. The key for rotating ITSB insert was designed in three stages prior to a final ITSB design. The two chosen product geometry utilized were tensile and flexural test pieces, which were designed with the support of CAE analysis to obtain a favourable feeding system. With the incorporation of ITSB insert at the layout centre, the melt was able to shift in accordance to ITSB insert rotation. This allows filling of the tensile and flexural cavities during moulding at different times and different processing conditions, which resulted in melt filling balance behaviour. The optimization of the injection moulding process such as packing pressure, injection speed and holding time were successfully conducted through Scientific moulding analysis. The efficiency of the ITSB design and its consistency during production were successfully measured from the mass and wall thicknesses data during pilot production. In conclusion, ITSB insert was found to be a favourable optional design that can be considered for injection mould industry in order to produce multi design products.

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