Pattern and Feeder Design for the Production of Gray Cast Iron Brackets

Mary Adebola Ajiboye*, Matthew Sunday Abolarin**
and Johnson Adegbenga Ajiboye***

In this paper, the design and production of sand casting for a gray cast iron bracket was carried out. The bracket was divided into different sections called Appendages A, B, C and D, and Ribs E and F. Efficient feeder design is important so as to minimize casting defects such as porosity and incomplete filling to the barest minimum. The feeder or riser is used to feed metal to the casting as it solidifies; therefore they are designed and positioned such as to ensure filling the cavity during solidification. The implication of this is that the riser must be designed to be large enough so that it solidifies only after the casting and it should contain a sufficient volume of metal capable of supplying the shrinkage contraction which occurs on cooling from the casting temperature to the completion of solidification. Based on the feeder design in this work, two bracket castings were produced.

Keywords: CAD, Appendages, Ribs, Modulus

Introduction

Casting is known to have existed for well over 6000 years. The major applications are in statutes for idols used for worship, lamps, doors, frames and agricultural implements. Earliest castings include the 11 cm high bronze dancing girl dated 3000-3500 BC. Casting is a process of forming metallic products by melting the metal and then pouring it into a cavity known as the mold and then allowing it to solidify. The molten metal takes the shape of the mold cavity and the product is cleaned and machined to the desired dimension.

Casting has marked advantages in the production of complex shapes, parts having hollow sections or internal cavities, parts that contain irregular curved surfaces and of parts made from metals that are difficult to machine. Because of these obvious advantages, proper consideration must be given in order to reduce casting rejects.

In all manufacturing techniques, the best results and economy are achieved if the designer understands the various options and tailors the design to use the most

* Research Scholar, Department of Computer Engineering, Federal University of Technology, Minna, Nigeria. E-mail: ajiboyemary@gmail.com
** Professor, Department of Mechanical Engineering, Federal University of Technology, Minna, Nigeria. E-mail: abolarinmatthew@yahoo.com
*** Lecturer, Department of Electrical and Electronics Engineering, Federal University of Technology, Minna, Nigeria; and is the corresponding author. E-mail: ajiboye2003@yahoo.com