A Study on Reducing Casting Defects of Sand Casted Water Pumps

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Casting is one of the useful processes in producing products from utensils to machinery components. However, major disadvantage of this process is accompanying of casting defects, which bring great loss to the industry. Casting defects occur due to various reasons which are hard to control under the industrial environment. Many researchers have conducted experiments to find the best combination of process parameters which causes minimum casting defects. In such efforts, casting defects has been considerably reduced (up to 6%) by varying the moulding sand properties.

Jinasena(Pvt) Ltd is one of the oldest pump manufacturers in Sri Lanka, however, currently they are suffering from high rate of sand-casting defects of 12% which leads to water leakage. This research focuses on analysis of these casting defects quantitatively and qualitatively, determining the causes, and suggesting effective solutions. It was found that shrinkage and blowholes were two critical defects leading to water leakage of water pump casing.

Generally, it is well known that molding sand properties, metal pouring temperature, design of gating system and chemical composition of the raw material are vital factors that lead to the formation of casting defects. The influence of these major factors on formation of shrinkage and blowholes was studied in this work. The experimental results showed that improper design of gating system and deviation of the moulding sand properties dominantly affect the shrinkage and blowhole defects.

Keywords: Water pump casing, Casting defects, Sand mold properties, Pouring temperature and Gating system design