

Development of a Robot Assisted Centrifugal Casting Machine for Manufacturing Multi-Layer Journal Bearing and High-Tech Machine Components

Authors : Mohammad Syed Ali Molla, Mohammed Azim, Mohammad Esharuzzaman

Abstract : Centrifugal-casting machine is used in manufacturing special machine components like multi-layer journal bearing used in all internal combustion engine, steam, gas turbine and air craft turboengine where isotropic properties and high precisions are desired. Moreover, this machine can be used in manufacturing thin wall hightech machine components like cylinder liners and piston rings of IC engine and other machine parts like sleeves, and bushes. Heavy-duty machine component like railway wheel can also be prepared by centrifugal casting. A lot of technological developments are required in casting process for production of good casted machine body and machine parts. Usually defects like blowholes, surface roughness, chilled surface etc. are found in sand casted machine parts. But these can be removed by centrifugal casting machine using rotating metallic die. Moreover, die rotation, its temperature control, and good pouring practice can contribute to the quality of casting because of the fact that the soundness of a casting in large part depends upon how the metal enters into the mold or dies and solidifies. Poor pouring practice leads to variety of casting defects such as temperature loss, low quality casting, excessive turbulence, over pouring etc. Besides these, handling of molten metal is very unsecured and dangerous for the workers. In order to get rid of all these problems, the need of an automatic pouring device arises. In this research work, a robot assisted pouring device and a centrifugal casting machine are designed, developed constructed and tested experimentally which are found to work satisfactorily. The robot assisted pouring device is further modified and developed for using it in actual metal casting process. Lot of settings and tests are required to control the system and ultimately it can be used in automation of centrifugal casting machine to produce high-tech machine parts with desired precision.

Keywords : bearing, centrifugal casting, cylinder liners, robot

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