Processes and Application of Casting Simulation and Its Software's

Authors : Surinder Pal, Ajay Gupta, Johny Khajuria

Abstract : Casting simulation helps visualize mold filling and casting solidification; predict related defects like cold shut, shrinkage porosity and hard spots; and optimize the casting design to achieve the desired quality with high yield. Flow and solidification of molten metals are, however, a very complex phenomenon that is difficult to simulate correctly by conventional computational techniques, especially when the part geometry is intricate and the required inputs (like thermo-physical properties and heat transfer coefficients) are not available. Simulation software is based on the process of modeling a real phenomenon with a set of mathematical formulas. It is, essentially, a program that allows the user to observe an operation through simulation without actually performing that operation. Simulation software is used widely to design equipment so that the final product will be as close to design specs as possible without expensive in process modification. Simulation software with real-time response is often used in gaming, but it also has important industrial applications. When the penalty for improper operation is costly, such as airplane pilots, nuclear power plant operators, or chemical plant operators, a mockup of the actual control panel is connected to a real-time simulation of the physical response, giving valuable training experience without fear of a disastrous outcome. The all casting simulation software has own requirements, like magma cast has only best for crack simulation. The latest generation software Auto CAST developed at IIT Bombay provides a host of functions to support method engineers, including part thickness visualization, core design, multi-cavity mold design with common gating and feeding, application of various feed aids (feeder sleeves, chills, padding, etc.), simulation of mold filling and casting solidification, automatic optimization of feeders and gating driven by the desired quality level, and what-if cost analysis. IIT Bombay has developed a set of applications for the foundry industry to improve casting yield and quality. Casting simulation is a fast and efficient solution for process for advanced tool which is the result of more than 20 years of collaboration with major industrial partners and academic institutions around the world. In this paper the process of casting simulation is studied.

Keywords : casting simulation software's, simulation technique's, casting simulation, processes
Conference Title : ICMPE 2015 : International Conference on Manufacturing and Production Engineering
Conference Location : Montreal, Canada
Conference Dates : May 11-12, 2015