Abstract

The solidification of metals continues to be a phenomenon of great interest to physicists, metallurgists, casting engineers and software developers. It is a non-linear transient phenomenon, posing a challenge in terms of modelling and analysis. During the solidification of a casting in a mould, the heat-transfer between the casting and the mould plays a vital role. This paper attempts to study heat flow within the casting, as well as from the casting to the mould, and finally obtains the temperature history of all points inside the casting. The most important instant of time is when the hottest region inside the casting is solidifying. ANSYS software has been used to obtain the temperature distribution in the casting process by performing Transient Thermal Analysis. Results obtained by simulation software are compared with the experimental reading of temperature and found to be in good agreement. Further the significance of filling pattern and appropriate orientation of gating system has also been studied. Thus, it was observed that the simulation of casting helps in obtaining temperature distribution of various parts of the mould which is an important factor in improving the casting quality. It also helps in reducing the cost of development and material utilization (yield).
References

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Index Terms

Computer Science

Applied Sciences

Keywords

Casting  Solidification  Thermal  Simulation  Temperature Distribution.