

16TH ECMI MODELLING WEEK

AUGUST 23 - SEPTEMBER 1, 2002

Temperature Stabilisation During the Casting Process

Project description:

The problem comes from one of the companies producing small AlSi covers for electric devices. For the casting process moulds with special channels surrounding the mould chamber are used. The channels are filled with running fluid, the temperature of which can be regulated down or up. The process of casting one cover has a duration of about 60 seconds. The AlSi alloy introduced under pressure into the mould has temperature of about 700°C. The procedure is repeated many times.

Since at the beginning of the casting process the temperature of the mould is not sufficiently high, the first casting details are rejected because of no good quality. It means that one of the most important factors having influence on the quality of casting of such covers, is to stabilise the temperature inside the mould especially in the mould chamber.

Problem:

Since we would like to minimise the mould temperature stabilisation time, we should construct a mathematical model of the heat transfer and temperature distribution throughout the mould. Modelling phenomena, we should take into account the location of channels and influence of the running fluid temperature. Another question related to this problem is how to locate the temperature sensors in the mould body (how many, in which places) to get representative information concerning the temperature inside the mould chamber to describe and control all process of casting.

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