UDC 21.746.3:669.184

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# INFLUENCE OF CYCLE TIME FOR THE PULSE-MODE OF WARMING-UP OF CASTING LADLE ON HEAT-CONTENT OF FETTLING

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As a result of researches on a computer model it is shown the possibility for a significant energy- and recourse saving at impulse heating of casting ladle. The dependence of the heat-content of fettling ladle from the cycle duration for the pulsed mode heating has been received.

Keywords: casting ladle, fettling, heat-content, impulsive mode, duration of cycle, modeling

For decline of energy costs on the warming-up of casting ladles the pulse-mode, at which purposeful control by heat stream, transferable from a torch and foods of fuel combustion to the fettling of ladle, increases temperature pressure and surface of heat exchange, and also intensity of convective heat exchange is widely used lately. Application of the pulse-mode assists more even warming up of fettling, reduces probability of initiation of its local overheat and, in result, promotes efficiency of the use of fuel and efficiency of process.

A research purpose is determination of dependence of heat content of fettling for casting ladle from time cycle of the pulse-mode for the economy of energy resources on thermal setting of ladle for producing steel and comparison of efficiency continuous and impulsive modes. For research of change of heat-content of lining-up in the process of impulsive warming-up of casting ladle in a computer model there are use the method of eventual elements.

The 120-ton temped casting ladle, having a form of the truncated cylinder with an internal diameter a 3.00 m, height in a 4.100 m and number of taper for wall 0.06 is chosen as the investigated object. Geometry and location of every layer of fettling and casing ladle is taken into account in a engineered model.

As a criterion of efficiency of warming-up of casting ladle there are used specific heat-content of wall and bottom of ladle is in characteristic sections (for a wall - at the level of slag belt, and for a bottom - on its axis).

On the first stage there are investigated influence of cycle time $\tau_c$ fore heating of ladle, for what consistently modeling its warming-up at $\tau_c$ = 15; 30; 45; 60; 75; 90 minutes and, further, 2; 4; 6; 8 and 12 hours at the block coefficient of cycle 0.90. The analysis of the got results shows that efficiency of impulsive warming-up practically droningly increases with diminishing of cycle time arriving at $\tau_c$ = 15 mines of values 0.997 for the section of wall at the level of slag belt and values 0.991 for the axial section of bottom.

However practical realization of warming-up impulsive method puts on certain technical constraints on discreteness of process. On the average for a wall and bottom

maximal value of efficiency criterion – 0.99 realized at cycle time of heating 45 minutes and block coefficient 0.90.

On the second stage there are investigated the change of heat-content of fettling at continuous and impulsive modes of warming-up of ladle during a 24 clock. As a result, a relation of efficiency criteria for these modes was 0.996, thus the economy of fuel arrives at 10 %.

Thereby, the analysis of modeling results demonstrates high efficiency of the pulse-mode of ladle warming-up of. These results can be useful for energy- and resource saving at setting of casting ladles.