IMPROVEMENT OF MODES OF HEAT TREATMENT OF MEDIUM-ALLOYED STEEL FOR IMPLEMENTATION OF EFFECTIVE METALLIC PROCESSING

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The relevance of issues related to increasing the reliability and durability of parts of machines, equipment, devices, as well as increasing the efficiency of their work and quality, do not cause any doubts. In order to solve such problems, it is necessary to study in more detail the issues of improving the modes of heat treatment of steel depending on the technological requirements, its chemical composition and purpose.

In the research, the improvement of heat treatment modes of medium-alloy steel was carried out, which makes it possible to implement effective metal cutting treatment. To fulfill the given task, it is necessary to provide such indicators of hardness and structure of steel that would satisfy the set requirements.

Heat treatment was carried out according to the following regime: hardening to a temperature of 920^0 C, holding at this temperature with future cooling in oil. Studies of the resulting structure indicate the presence of bainite and granular carbides. The hardness measurement results are within 38-42 HRC. Tempering was carried out for 180 minutes at a temperature of 680^0 C. The analysis of the obtained hardness measurement results shows that it significantly decreases compared to the hardened sample, and is within 24-27 HRC, which, nevertheless, ensures the preservation of the bainite component in the structure .

But despite such low hardness indicators, metal cutting is unsatisfactory. Therefore, in order to find out the kinetics of hardness distribution, heat treatment of the samples was carried out at a temperature of 930^0C for 30 minutes, after which they were quenched in oil followed by tempering in a wide range of temperatures with a holding time of 180 minutes.

The obtained results made it possible to establish the most optimal modes of heat treatment, which would provide the necessary hardness for medium-alloy steel at the level of 23-25 HRC, at the specified heating temperature with subsequent tempering in the temperature range of 660-720^0 C. However, it should be noted that the bainite character is preserved in the structure with the presence of carbide grains in steel alloy.

Having analyzed the results of the conducted research, as well as taking into account the requirements for the implementation of effective metal cutting processing, it was established that the regimes obtained as a result of the conducted research fully satisfy the set requirements, both in terms of hardness indicators and operational properties.