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RESEARCH ON INFLUENCE OF INTEGRATED METHOD OF COOLING THE GRINDING ZONE WITH COLD AIR AND CENTRIFUGAL LUBRICATING WITH OIL AEROSOL ON THE RUN AND RESULTS OF INTERNAL CYLINDRICAL GRINDING PROCESS

This Ph.D. thesis presents the state of knowledge and techniques in the field of methods of cooling and lubrication of the grinding zone divided into conventional methods and methods of minimizing the expenditure of cooling, lubricating and antiadhesive agents (chapter 2). This analysis was the basis for defining the hypothesis, objectives, research problems and scope of work (presented in chapter 3) and for the development of the innovative method of cooling and lubrication of the grinding zone integrating centrifugal lubrication with the minimum quantity lubrication using the MQL technique and stream of cooled compressed air, described in detail in chapter 4. The hypothesis of this dissertation was formulated as follows: it should be expected that the application of the method of cooling and lubrication of the grinding zone integrating centrifugal lubrication with minimum expenditure of the MQL method and cooling with a stream of cooled compressed air, enabling enrichment of the minimum quantity lubrication method with the cooling function and will have a positive impact on the course and results of the internal cylindrical grinding process. The main goal of the thesis was the analysis of elementary phenomena occurring in the grinding zone during the internal cylindrical grinding process with the use of an innovative method of cooling and lubrication of the grinding zone combining the centrifugal feeding of oil aerosol with the MQL method and the feeding of compressed cooled air with cold air gun nozzles. The goals of the Ph.D. thesis were achieved through simulation studies described in chapter 5. and experimental studies of the internal cylindrical grinding process, presented in detail in chapter 6. The obtained results of the research and analysis formed the basis for formulation of final conclusions divided into cognitive, methodical and utilitarian conclusions, as well as determination of directions of further research, contained in chapter 7 of this work.

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