ABSTRACT

Presented thesis is focused on the technology of drilling of deep holes that is the machining of holes with extremely high depth-to-diameter ratio. Research problem concerns the wear of monolithic single-edge gun drill with the radius Ø8 mm that occurs during preparation of deep holes in samples of C45 steel with permanent delivery of Milpro HG12 lubrication oil. In order to solve the above problem, multi-aspect analysis of geometrical measures of the wear of the drill has been carried out together with its influence on the structure and shape of the outer layers of the drilled holes. To this end several parameters including: statistical, functional and fractal, each of which reflects different aspects of the surfaces in contact, have been used.

The thesis contains Table of Contents, concise Introduction into the research problem and 6 independent chapters that cover subsequent tasks included in the research plan that are necessary to achieve the research goal. First chapter presents the state-of-the-art of the field under study in terms of three main research areas: the technology of deep hole drilling using gun barrels (mainly single-edge ones), types and properties of the cutting tool materials with special attention paid to the tungsten carbide, and the wear of the cutting edge together with wear indicators. Chapter two addresses the main research problem including the aim and the scope of the work followed by the detailed research plan. Apart from that, there are also three research hypotheses suggested in this chapter following the main intuitions behind the undertaken investigation. Chapter three provides comprehensive descriptions of the materials and methods used in this study, while chapter four presents obtained results. These results are analyzed and discussed in chapter five, where critical verification of the research hypotheses has been made, final conclusions as to aimed research goal were drawn and some suggestions for future investigations were proposed. Chapter six provides the list of cited references, showed in the order of their appearance in the text.

In general, the results of performed works confirmed validity of the research hypotheses. Together with completion of all the other tasks scheduled in the research plan several interesting conclusions concerning the changes in the structure and properties of the materials brought into contact were drawn casting new light on the wear of the single-edge gun drill during deep hole drilling process.