

## Abstract

The aim of this work was to analyse the basic phenomena in the grinding zone of planar knife blades using grinding wheels with grains of cubic boron nitride (cBN) in three kinematic variants (grinding with the circumference of the wheel, grinding with the face of the wheel, grinding with the conical face of the wheel) enabling the selection of conditions for the realisation of this process ensuring in effect an increase in the service life of shaped tools in the process of skinning flat fish.

In connection with the above, the dissertation contains an analysis of the literature (Chapter 2) concerning the current state of knowledge in the field of organic material cutting, types and shapes of cutting tools, methods of shaping technical blades and problems occurring in the process of soft tissue cutting as well as methods of assessing the sharpness of technical blades. The next part (Chapter 3) contains methodological elements characteristic of PhD theses, such as objectives, hypothesis, research problems and the scope of the work. Chapter 4 describes in detail the methodology of the research work carried out in such a way that it can be reproduced. The information is divided into three basic stages of research: exploratory research, proper research and operational research conducted in industrial conditions. An important part of the work (Chapter 5) is the description of construction of the author's test and measurement stands. In the course of work, a 5-axis grinder equipped with the CNC (Computerized Numerical Control) system, a stand for measuring the cutting force and a stand for removing material elements from the edge of the blade created in the grinding process were designed and constructed. The most important substantive part of the dissertation consists of three chapters describing the results of exploratory research (Chapter 6), proper research (Chapter 7) and the results of operational tests conducted in industrial conditions in the process of skinning flat fish (Chapter 8). The last chapter (Chapter 9) of this dissertation contains a summary and a set of conclusions divided into cognitive, utilitarian, methodological and conclusions concerning the directions of further works.

The conducted operational tests have proved that it is possible to obtain about 18% extension of the blade life, which in the conditions of a fish processing plant allows to obtain the effect of scale and has a favourable influence on both the reduction of tool costs and the reduction of downtime of the technological line, connected with the replacement of blades in the skinning machine.