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## A SYSTEM FOR COMPUTER-AIDED SELECTION OF CUTTING TOOLS

### ABSTRACT:

The importance of cutting tools in production systems requires modern approach to their selection. Automation of tool selection can significantly enhance efficiency of processes planning. Presented in this paper is development of a system for automated selection of cutting tools. Global concept as well as the concepts of the system's constituent modules are reviewed. Basic modules of the system are knowledge base, and cutting tools database. A case study is also presented. Finally, concluding remarks are given with suggested directions for future investigation.

### KEYWORDS:

cutting tool, data base, knowledge base

### INTRODUCTION

Constant advances in computer technology widen the field for computer application in engineering, and, therefore, process planning. Basic goal is to create conditions for application of manufacturing technologies capable of rapid adjustment to new production programs, while maintaining high quality, increased productivity, and reduced costs of manufacture.

These technologies feature high level of automation and flexibility, which is the strategy of development of flexible manufacturing systems. This can be illustrated by numerous examples of developed CAX systems and software applications of various purpose, which are used to automate tasks in product design, process planning, product management etc [1, 4].

Within a manufacturing system, the factors which most influence the quality of process planning are: type of blank, cutting technology, sequence of machining processes, machine tools, structure of machining processes, concentration of processes and operations, cutting tools, fixtures, measuring devices, and other. In order to improve process planning, all of these parameters must be optimized [8]. In the chain of factors influencing the output effects of manufacturing process, cutting tools are of great significance. Inadequate management of cutting tools reduces efficiency and economic effects of manufacturing system as a whole.

Development of a proper system for cutting tools selection allows improvement and rationalization of process planning. Computer-based system for cutting tools selection is one of the segments of computer

integrated system (CIM), and as such is integrated into the sub-system for production planning and management [6].

There are several general characteristics of the so far developed systems for automated cutting tools selection [2, 3, 5, 6, 7]:

- these systems were developed for parts of pre-defined geometry,
- they allow interactive selection of cutting tools for specific set of machining processes,
- they are based on a rigid, algorithmic structure,
- they do not take into account all parameters that influence optimum selection of cutting tools.

The goal of this paper is to solve the above listed problems, through a development of an integrated and intelligent system for automated cutting tools selection. The system should allow selection of cutting tools for as large number of cutting processes, and typical operations as possible, regardless of complexity of part geometry.

### SYSTEM STRUCTURE

The structure of the system for automated cutting tools selection is shown in Fig. 1.

The system input consists of necessary input information. These information are crucial for system functioning. According to entity characteristics which they describe, input data can be classified into:

- geometry data - comprise all data which are directly related to workpiece design, including the data related to geometric specification of product (dimensions, tolerances, surface quality, etc.).





