SUMMARY

OF

THE PUBLICATIONS RELATED TO THE

DISSERTATION OF

ENG. ALI ABDULKARIM GITAN

• *Metev H., Gitan A., Selection of optimal basic schemes in automated design of fixtures for the locating of workpieces during machining. International scientific conference UNITECH'19, Gabrovo, Bulgaria 2019, vol. 2, pp. 206-211.*

SELECTION OF OPTIMAL BASIC SCHEMES IN AUTOMATED DESIGN OF FIXTURES FOR THE LOCATING OF WORKPIECES DURING MACHINING

Hristo METEV Ali GITAN

Using a systematic approach, the schemes for complete basing of the workpieces in the fixtures for locating the workpieces during machining have been obtained and systematized for various combinations of the possible location technological bases with the possible to use basing elements. An analysis has been conducted which shows that the use of this systematization is significantly more rational compared to others described in the literature, since its structure reflects the sequence of choosing an optimal basing scheme - analysis of the theoretical basing scheme, analysis of the geometry of the workpiece, formation of the list of possible basing schemes. An algorithm for automatic selection of an optimal basing scheme based on the indicators of accuracy, minimum auxiliary time and cost is proposed. The need for research to define criteria for the geometric compatibility of the workpiece and basing elements is substantiated.

Keywords: *locating workpieces; fixtures; basic schemes; computer-aided design.*

• *Metev H., Gitan A., Amudzhev I. Selection of an optimal scheme for locating the workpieces and determination of the inaccuracy of basing in automated design of fixtures for locating the workpieces during machining. Journal "Mechanical Engineering and Machine Science", issue 31, pp. 18-24, Varna, 2021. ISSN 1312-8612.*

SELECTION OF AN OPTIMAL SCHEME FOR LOCATING THE WORKPIECES AND DETERMINATION OF THE INACCURACY OF BASING IN AUTOMATED DESIGN OF FIXTURES FOR LOCATING THE WORKPIECES DURING MACHINING

Hristo METEV Ali GITAN Ivan AMUDZHEV

The work proposes a methodology for automatic selection of an optimal locating scheme depending on the required accuracy in processing and the required service life of the fixture. A general scheme and algorithm for automatic selection of the optimal location scheme have been developed. By analysing the possible types of combinations of the surfaces of the workpieces used for location technological bases and the working surfaces of the basing elements, an algorithm has been developed and dependencies for determining the inaccuracy of basing have been derived, for which purpose the computational modules “plane-plane”, “cylinder-prism”, “cylinder-cylinder” and

"combined" have been considered. The development is part of a system for automated design of fixtures for locating workpieces during mechanical processing.

Keywords: *workpiece location; fixtures; positioning scheme; basing inaccuracy; automated design.*

• *Metev H., Krumov K., Gitan A., Selection of Locators in Automated Design of Fixtures for Locating Workpieces During Machining. Environment. Technology. Resources. Rezekne, Latvia, Proceedings of the 13th International Scientific and Practical Conference. 2021. Vol. 3, pp. 202-207. ISSN2256-070X.*

SELECTION OF BASIC ELEMENTS IN AUTOMATED DESIGN OF FIXTURES FOR INSTALLING WORKPIECES DURING MACHINING

Hristo METEV Kalin KRUMOV Ali GITAN

A systematization of possible schemes for basing the workpieces in the fixtures for location has been made with a view to their use in automated design. An analysis has been carried out, with the help of which the criteria for geometric compatibility of the workpiece and the basic elements have been defined, allowing the selection of a basing scheme that satisfies the geometric shape of the workpiece. An algorithm and database have been developed for the selection of basing element designs when using different locating technological bases. The development is part of a system for automated design of fixtures for locating workpieces in machining.

Keywords: *workpiece location; fixtures; basing scheme; computer-aided design.*

• *Gitan A. Programming implementation of an automated system for selecting the optimal scheme for locating the workpieces during machining. Journal "Mechanical Engineering and Machine Science", issue 32, pp. 56-61, Varna, 2021. ISSN 1312-8612.*

PROGRAMMING IMPLEMENTATION OF AN AUTOMATED SYSTEM FOR SELECTING THE OPTIMAL SCHEME FOR LOCATING THE WORKPIECES DURING MACHINING

Ali GITAN

Based on the analysis conducted, the most appropriate method for programming implementation of the selection of an optimal locating scheme has been established - object-oriented programming, in which the locating scheme and the base elements that build it are considered as objects for optimization, having certain characteristics and relationships. Models for the operation of the automated system have been developed in the form of diagrams of the classes and states of the locating schemes in the process of automated design, which can be used to develop a software product for selecting an optimal locating scheme. A structural diagram of the program package has been developed and the necessary database has been specified. A database with solid-state

models of base elements and tables for their automated selection has been developed. The database allows the inclusion of new base element structures.

Keywords: *workpiece locating; fixtures; locating scheme; automated design*

• *Gitan A., Metev H. Criteria for selecting an optimal locating scheme in automated design of fixtures for locating workpieces during machining. Youth Forum "Science, Technology, Innovation, Business - 21-22.11.2024, Plovdiv, Collection of Papers, 2024, pp. 111 - 116. ISSN 2367-8569.*

CRITERIA FOR SELECTING AN OPTIMAL LOCATING SCHEME IN AUTOMATED DESIGN OF FIXTURES FOR LOCATING WORKPIECES DURING MACHINING

Hristo METEV Ali GITAN

The work examines and analyses the criteria for selecting an optimal scheme for locating workpieces during mechanical processing - processing accuracy and service life (reliability) of the designed fixture. An algorithm has been developed and dependencies have been proposed for selecting an optimal scheme for locating with a view to their use in automated design of the fixture.

Keywords: *fixtures for location; accuracy; inaccuracy of locating; reliability; automated design.*