



Department of «Integrated technologies engineering»

PROPOSALS for cooperation



«Integrated technologies engineering» department

Head of department – *prof. Anatoly Grabchenko.*

E-mail: grabchenko@kpi.kharkov.ua

Areas of research:

- **Technological preparation of additive manufacturing of complex products**
- **Forming of wheel working surface with conductive bonds during grinding**
- **Development of scientific bases and ways of practical implementation of adaptability control at diamond grinding of superhard materials**
- **Scientific foundations of forming of edge tools from polycrystalline superhard materials**

«Integrated technologies engineering» department

Participation in international projects

- Tempus SM SCM-T038B06-2006 "Introduction of the two-level system into mechanical engineering specialty";
- Tempus JEP-27198-2006 "Computer aided industrial design training for Ukrainian engineers";
- 517138-TEMPUS-1-2011-1-CZTEMPUS-JPCR "EU-PC double degree master program in automation/ mechatronics".

Articles in the editions included in database Scopus - 47.

«Integrated technologies engineering» department

Proposals for further joint research

Areas of research. Development of scientific bases of technological preparation of additive manufacturing.

The purpose work is to develop scientific bases and a computer system of technological preparation of complex products materialization to improve the efficiency of layered manufacturing (SLS, SLA, etc.).

Scientific novelty

The concept of technological preparation of additive manufacturing of complex products on the basis of statistical methodology and voxel representation of the initial 3D models. It is proposed to integrate the solution of tasks of rational orientation, structural decomposition and arrangement of the products composition on the working platform equipment on the basis of science-based common criteria evaluation.

Practical significance

Scientific bases of technological preparation for the materialization of complex products by additive manufacturing, using statistical approaches allow to solve complex technological tasks to ensure a high level of performance and quality, the equipment efficiency.

«Integrated technologies engineering» department

Proposals for further joint research

Areas of research. Development of scientific foundations and technological principles for the design of diamond-abrasive tools and grinding processes.

The purpose work is the efficiency of diamond grinding increase due to the choice of the rational structure and properties of the diamond-bearing layer.

Scientific novelty

A methodology for diamond-abrasive tool designing, based on three-dimensional modeling of its formation and grinding, has been developed; it allows the scientifically based selection of the rational structure of the diamond-bearing layer and the properties of its elements, depending on the type of material being processed and the quality requirements of the treated surface.

Practical significance

Practical recommendations on the rational composition of a diamond-bearing layer on polymer and ceramic binders for grinding superhard materials and hard alloys were developed. The three-dimensional solid model is developed, the analysis of the stress-strain state of which allows to predict the degree of binder and grains destruction during the manufacturing and operation of diamond-abrasive tools.

There are 18 articles in the journals of the SCOPUS database in this direction.

The head of the scientific direction: prof. Vladimir Fedorovich,

<https://www.scopus.com/authid/detail.uri?authorId=6701762355>

E-mail: fedvlad49@gmail.com

«Integrated technologies engineering» department

Proposals for further joint research

Areas of research. Improvements in flat face grinding process due to controlling the parameters of contact zone between grinding wheel and workpiece.

The purpose work is devoted to improvements in flat face grinding process due to controlling the parameters of contact zone between grinding wheel and workpiece that directly affect thermal stress reduction in the processing zone.

Scientific novelty

Analysis of linear parameters and area of the contact zone between wheel working surface and workpiece are analysed and the dependences for their determination are obtained. This has made it possible to propose methods of grinding, based on controlling of spindle axis inclination for the purpose of regulation of values of such parameters of grinding process as concavity, height of residual ridges and area of the contact between wheel working surface and workpiece.

Practical significance

The original technical solutions in order to enhance the efficiency of flat face grinding process by means of improving the factors affecting its temperature decrease in grinding zone are proposed.

There are 10 articles in the journals of the SCOPUS database in this direction.

The head of the scientific direction: prof. Ivan Pyzhov,

<https://www.scopus.com/authid/detail.uri?authorId=6505941089>

E-mail: ivanpyzhov55@gmail.com