

ASSESSMENT OF TECHNOLOGICAL PROPERTIES OF MILLING TOOLS

Yoqubjonov Fayzullo Tursunali o'g'li

Andijan Machine Building Institute, Assistant of Material Science,
fdon411@gmail.com

Xojimatov Umidbek Turg'unboy o'g'li

Andijan Machine Building Institute, Assistant of Material Science,
xojimatovumidbek@gmail.com

Abstract:

This course work examines the technological properties of milling tools, provides comparisons of Russian manufacturers, as well as foreign ones. The characteristic features of the varieties of cutters are identified and described.

Keywords: Geometry of incisors; blade tool; classification of cutters; Organization of production; Increased wear resistance.

Introduction

In the modern world, there are currently a huge number of varieties of milling tools for different purposes that are used in mechanical engineering. The main methods for producing parts with complex profile surfaces include: casting, stamping, cutting.

However, in general, cutting, in particular milling, makes it possible to acquire surface parameters similar to the most established ones and reduce the subsequent period. Milling cutter is a blade tool for processing with a rotary main cutting movement of the tool without the possibility of changing the radius of the trajectory of this movement and with at least one feed movement, the directions of which do not coincide with the axis of rotation (GOST 25751-83) [1-2] Classification:

- by the location of the teeth relative to the axis
- by the direction of the teeth
- by design
- by tooth design
- by fastening method



There are a large number of milling tools for different purposes. Let's look at the main types.

Disc cutters are designed for: trimming work pieces, cutting grooves, sampling metal, chamfering, etc. Among the varieties of such tools are:

- grooved;
- slotted;
- cutting.

Face mills work with flat and stepped surfaces of metal parts. This tool has greater productivity than the cylindrical one. End mills require a large volume of work, which requires a variety of design options to solve the task. This tool has greater productivity than the cylindrical one. End mills require a large volume of work, which requires a variety of design options to solve the task.

A cylindrical cutter is a cutting tool used for processing planes when the cutter axis is positioned parallel to the surface being processed; they are used on horizontal milling machines for processing angular planes. The edge of a corner cutter is used for processing inclined surfaces, as well as for corner grooves. There are two types of corner cutters: single-angle and double-angle, differing in the location of the cutting edge. With the help of such cutters you can perform chip flutes, as well as machining open planes.

And most often, end (or finger) cutters for metal are used to create grooves, contour ledges and recesses, and process mutually perpendicular planes. Among the end mills, there are also spherical (ball) cutters, necessary for processing spherical recesses, radius cutters, used for cutting grooves of various shapes, and mushroom - carbide cutters for T-shaped grooves on work pieces made of cast iron, steel, and non-ferrous metals. End mills also include engraving cutters or engraving cutters that are used for cutting precious metals, copper, brass and other materials. End mills are divided into several types according to the relevant indicators:

- with a conical or cylindrical shank;
- for final processing of metal or for rougher processing with larger teeth.

Hob cutters are a worm with a point-like instant contact with the surface of the work piece, turned into a cutting tool. Hobs are divided into a number of subtypes according to the following parameters:

- solid or prefabricated;
- right or left;



- multi-pass or single-pass;
- with unpolished or ground teeth.

Shaped. Such cutters are actively used for processing metal parts with a significant ratio of the length of the workpiece to its width, since the shaped surfaces of short parts in large industries are often produced by the broaching method. Shaped cutters with a backed corner are the most difficult to sharpen [3-4]. The production and regrinding of shaped cutters requires special devices that ensure the acquisition of an accurate contour of shaped cutting edges during their production, therefore they are used mainly in large-scale and mass production.

The main manufacturers of Russian grades of hard alloys are: OJSC Kirovgrad Hard Alloy Plant (KZTS), OJSC Moscow Hard Alloy Plant (Sandvik-MKTS). OJSC "Pobedit", Vladikavkaz, OJSC "Volgoburmash", Samara. Ceramics are widely used for processing malleable cast iron, structural and tool steels. Polycrystalline superhard materials are also used as blade tools, which are divided into polycrystalline diamond and polycrystalline boron nitride.

There are many manufacturers of metal milling tools, so they can be divided into several regions of the world [5-7]. Among the leading manufacturers, the following enterprises should be highlighted: Volgograd Tool Plant, Tomsk Instrument, which over the last three years has implemented the largest investment project in the tool industry, "Organization of the production of high-precision tools."

All the time Europe is the leader in the production of milling cutters. At this stage, European technologies, having surpassed almost everyone else, have gone far ahead thanks to the great contribution of the well-known German company BOSCH. This company has more than 5,000 patents worldwide and approximately \$6 billion in investments. Milling cutters manufactured in America can be compared to European ones in quality, but they are much inferior in popularity due to the high cost of transportation [8-9].

In recent years, machining requirements have changed significantly. The share of difficult-to-process materials in mechanical engineering has increased from 10% to 80%, which means that the requirements for quality and processing productivity have also increased. All this, in turn, causes an increasing need for modern tools with improved performance characteristics. In recent years, a promising direction is the creation and use of nontungsten hard alloys, is the application of thin wear-



resistant coatings based on titanium nitride, titanium carbide, aluminum oxide to the cutting part of the milling tool. The main advantages of coated tools:

1. Increasing the dimensional stability of cutting tools;
2. Reducing the roughness of machined parts.

Conclusion:

As a result of this course work, we studied several types of milling tools and their purposes. We got acquainted with the geometry, as well as their design. As a result, we can come to the conclusion that Germany is a leader in the production of cutters, not far from which is the United States in terms of the quality of milling tools.

References

1. Фреза по металлу - все виды фрез по металлу [Электронный ресурс]. Режим доступа: <http://metall.org/obrabotka/prochie/freza-po-metallu.html>,
2. Фрайфельд И.А.(1959). Расчеты и конструкции специального металлорежущего инструмента. Фасонные фрезы, червячные фрезы для зубчатых деталей.- Режим доступа: <https://libbkm.ru/load/21-1-0-1598>
3. Yoqubjonov Fayzullo Tursunali o'g'li, Xojimatov Umidbek Turg'unboy o'gli. "TYPES OF POLYMER COMPOSITE MATERIALS AND METHODS OF THEIR USE." Web of Technology: Multidimensional Research Journal 2.3 (2024): 83-87.
4. Olimov Lutfiddin Omanovich. "A LOOK AT THE HISTORY OF ANTIMONY." Journal of new century innovations 23.4 (2023): 83-84.
5. Xojimatov Umidbek Turg'unboy o'gli. "TECHNOLOGICAL EVALUATION OF GRAPHITE AND ITS PROPERTIES." Journal of new century innovations 27.6 (2023): 68-73.
6. Xojimatov Umidbek Turg'unboy o'gli. "EVALUATION OF GRAPHITE AND ITS PROPERTIES." (2023): 162-166.
7. Xojimatov Umidbek Turg'unboy o'gli, Xojimatov Islombek Turg'unboy o'gli, Mamirov Abduvoxid Muxammadamin o'g'li. "PROSPECTS IN THE USE OF THERMOELECTRIC GENERATORS FOR VEHICLES." Ta'limning zamonaviy transformatsiyasi 6.1 (2024): 62-66.
8. Khojimatov Islombek Turg'unboy o'g'li. "INFLUENCE OF SILICON-BASED COMPOSITE MATERIALS ON SOME THERMOELECTRIC



PROPERTIES." Innovative Development in Educational Activities 2.17 (2023): 46-52.

9. Yoqubjonov Fayzulloh Tursunali o'g'li, Umidbek Turg'unboy o'g'li. "STUDY THE MICROSTRUCTURE OF COMPOSITE MATERIALS PRODUCED BY MIXING AL-SI PARTICLES." Central Asian Academic Journal of Scientific Research 2.7 (2022): 281-284.

