WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 3, Issue 10, Oct., 2022

INCREASING THE PERFORMANCE OF CUTTING TOOLS IN MECHANICAL WORKS

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This article discusses the factors affecting the metal-cutting tool used in the machining of metals, the choice of effective cutting conditions when machining with a metal-cutting tool, increasing the productivity of processing, lengthening the stagnation period of the cutting tool, reducing friction and temperature due to the removal of chips from the cutting zone, methods for increasing the strength of parts, dedicated to solving issues such as ensuring the quality of the cleanliness of the surface layer.

Keywords: physical and mechanical properties of the material, tool stability, tool material property, depth of cut, stop value, tool geometry, tool body, tool wear, type of processing, cutting fluid.

ПОВЫШЕНИЕ ПРОИЗВОДИТЕЛЬНОСТИ РЕЖУЩИХ ИНСТРУМЕНТОВ В МЕХАНИЧЕСКИХ РАБОТАХ

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В данной статье рассмотрены факторы, влияющие на металлорежущий инструмент, применяемый при механической обработке металлов, выбор эффективных режимов резания при обработке металлорежущим инструментом, повышение производительности обработки, удлинение стагнационного периода режущего инструмента, снижение трения и температуры за счет отвода стружки от зоны резания, методы повышения прочности деталей, посвященные решению таких вопросов, как обеспечение качества чистоты поверхностного слоя.

Ключевые слова: физико-механические свойства материала, устойчивость инструмента, свойство материала инструмента, глубина резания, величина упора, геометрия инструмента, корпус инструмента, износ инструмента, вид обработки, смазочно-охлаждающая жидкость.

In mechanical processing, the main sabes and surface layer of the tool eat. When processing into alloys with high strength (difficult to process), the increased intensity of the grinding of the cutting tool is determined by the second facts: with the second degree of friction ability of titanium alloys and extremely high temperatures in the boundary layers, depending on the cutting conditions, the degree of influence of these factors changes. When the cutting line and the pushing value are increased, the heat factor values increase-the mowing process intensifies, and the lakhzali shedding of the cutting edge begins. With a decrease in these parameters, the increased amounts begin to be eaten abrasive, decreasing. [1, 2]

The high degree of friction of titanium alloys is due to certain aspects of their physical chemical properties and structure. the source indicates that because it contains extremely hard inclusions in the form of nitride and Carbide oxide, titanium-based alloys have a high degree of obrusive effect on the cutting tool.

Depending on the cutting conditions, the crease coefficient can be from one to six. For example: K=3.64 for a 20 x brand (Steel) under certain cutting conditions, and K=6 for copper is greater thanok. When passing brittle materials, the coefficient of crease approaches together, (K=1). The value of the crease coefficient will depend on the property of the materials to be directed, the geometry of the cutting tool, the cutting mode and the cooling fluid. When cutting with large speeds, the cutting angle is reduced, and as the front angle and shear thickness increase, the crease coefficient decreases. This means that the less the cutting layer is deformed, the less effort will be spent on the cutting process. Therefore, knowing the value of the quotient coefficient K in certain conditions of Cross-operation has practical significance.

Coagulation (hardening) and its importance. In the process of cutting, not only the layer to be cut will be subjected to plastic deformation, but also the layer of a certain thickness will be deformed from the chipped surface. The distribution of plastic deformation that occurs when cutting metal is shown schematically. As can be seen in this, the deformation zone spreads ahead of the cutting edge and penetrates under the surface to be processed. How much arcuate (h) on the chipped surface of the plastic deformation and how much distance ( ) the cutter enters in front of The tig is a link to the cutting mode, tool geometry, the amount of which will be in the range ℓ=5...15 mm h=0.1...1.5. As a result of plastic deformation, which occurs during the

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ISSN: 2776-0979, Volume 3, Issue 10, Oct., 2022

cutting process, the deformation (hardening) occurs in the deformed zone. With an increase in hardness in the deformation zone, fragility increases, the structure of the metal changes; the grains of the surface layer are crushed under the influence of cutting pressure and temperature, as a result of which the hardness of the perforated layer increases. For example, in aluminum, the hardness of this layer increases by 2 times, and in soft steel-by 1.5 times. For example, the ductility of the punched execution (h) is 0.4... in the case of a sketching with a chisel for steel of medium hardness... It is 0.5 mm, 0.07 ... 0.08 mm when cleaning, 0.002...0.04 mm when polishing. The punched layer increases the resistance of the detail to being eaten. But this layer will be a bolt, Harden and move to a tightened state.

The puffy layer under the rolled surface affects the quality and thermal processing of the detail when cleaning. Also, the cutter leads to the rapid eating of the tool. Generally, soft and plastic metals are more likely to clot than hard and brittle metals (such as cast iron, bronze [3].

The appearance of a tumor. During the cutting process, there will be a tumor dressing on the front surface of the chisel, especially near the cutting edge. The material from which it is being processed consists of a strongly compacted mass of particles, which are firmly attached to the cuticle. The tumor is mainly dressing when working to cut plastic materials. The tumor dressing is affected by the cutting speed and angle, the thickness of the shearing and the hardness of the material to be processed. When the tumor is typical, the cutting angle changes significantly in size, with which the cutting layer is deformed, so it is important to study the factors that cause the tumor.The hardness of the tumor is 2.5...3 times greater than the hardness of the metal being cut high. As soon as the tumor becomes infected, the cutting angle becomes smaller. The tumor jumps the cutting edge of the chisel from the effects of the cutting heat and from the mowing. In the process of cutting, the shavings are not raised to the front surface of the chisel, but to the tumor layer. The tumor is eroded under the influence of the processing force that will be dressing between the tumor and the scraping. If part of the tumor gets stuck in the crumb, part will stick to the surface to be chipped. After that there will be more tumor dressing. As soon as a tumor is formed, a split surface becomes chipped. For this reason it is harmful to have a tumor dressing when cleaning. The reason for the dressing of the tumor is worked, some small particles coming out of the metal are high, that is, they stick to it with a blow to the front surface of the cuticle during liquefaction. If the cutting speed is small (= 3 ...5 m/min), The tumor will not be infected due to the fact that the separated particles are not so warm. As the cutting speed increases, the tumor begins to grow. The largest amount of the tumor is the cutting speed V= 10...20m/min. As the cutting speed increases from this indication, the tumor decreases. Dressing will not occur when working with a large cutting speed (V= 70...80m / min; the reason for this is that since there is a high proportion dressing between the shavings and the keskich, the shavings material, including the tumor metal, which occurred before working at a speed not much higher, becomes plastic in this khararat, and there is a chance to lick the shavings that are separating it, besides, when the plasticity increases, the Thus, dressing the tumor is harmful when working cleaning, as it is useful when working to cut the sketches.

Analysis of factors affecting cutting tools in mechanical processing. With the increase of cutting speed in mechanical processing, the working flour of the machine will increase, the main technological vacuum going to chipping will decrease, and the purity of the detail-oriented surface will increase. But when the cutting speed is increased, the cutting tool is quickly eaten, which reduces the durability of the cutting tool. The permanence of the Freza instrument is understood as the competence to work until its passage.

The preparation and the cutting speed of the metal milling Cutter Tool are explained by the factors in the kiymati melody:

1. To the physical and mechanical properties of the material to be directed:
2. Keskich's stay:
3. To the properties of the keskich material:
4. Cutting ingenuity and push kiymatiga:
5. To the geometry of the keskich:
6. Keskich body to the size of the kundalang section:
7. Keskich yul to the degree of burnt eating:
8. By type of processing (chipping, chipping expansion, torets chipping, cutting)
9. Lubrication is the dependence on whether or not to use cooling fluid:

When mechanical processing of metals, we determine the following main disadvantages of cutting tools:

1. When cutting metals of the cutting tool, cracks are formed perpendicular to the front surface of the tooth. When the cutting tool is cutting and working, these cracks increase in size and spread to the back of the tooth. The contact voltage is high. High vibration amplitude during shocks. Low efficiency. High price.
2. The periodic change in the cutting forces of the cutting tool when cutting metals leads to unwanted forced vibrations of the technological system as a source of external influence. At the same time, due to the resumption of vibration waves on the cutting surfaces formed in series by the milling teeth in the process of removing the crumb.

3. Difficulty working at the speed of cutting. Low processing accuracy. High cutting forces.

We use various methods to eliminate identified shortcomings, conduct research and draw conclusions about the effectiveness of improved milling.

Elimination of the first drawback.

1. Description of the situation leading to his research.

Milling is one of the main types of metal processing. At present, the milling cutters do not have sufficient durability, which leads to an increase in the cost of processing. These scientific studies are carried out to increase the service life of the tool of the milling cutters.

Counter milling-the durability of the milling cutters does not meet the production requirements.

2. Research analysis.

Longitudinal cracks are formed on the front surface of the Freza tooth perpendicular to the edge of the incision in the middle of the edge. When the Freza is working, these cracks increase in size and spread to the back of the tooth.

An increase in the quality of the milling material leads to an increase in the cost of the tool.

3. Development of a solution. To increase the durability of the milling cutters, it is necessary to improve the material of the cutting teeth.

Solution. the milling is to cover the teeth with an edible-resistant coating; the teeth of the milling cutter are made of strong materials and have high edible-resistant properties.

4. Search for information.

Based on a study from sources, we came to the conclusion that the coating must meet the following requirements:

a) coating – should ensure a decrease in the temperature generated during the cutting process and the temperature of the cutting edge, the most important thing is to reduce the vibration amplitude of this temperature during Operation.

b) to limit the processes of formation of cracks in coatings, their viscosity and strength characteristics and residual stresses in the coating must ensure that a significant pressure voltage is generated during work and loose strokes.

The scientific research carried out makes it possible to make the following conclusions:

1. When cutting preparations, the laws of influence on the contact processes, heat state and intensity of the tool eating will be such as the effect that coatings have on

such processes in the longitudinal PATH, which makes it possible to apply the principle of formation of multilayer coatings for longitudinal routing conditions in relation to cutting tools.

2. The application of multi-layer mowing-resistant coatings makes it possible to significantly increase the working capacity of the cutting tool in preparation cutting operations.

It should be noted that 3 factors have the greatest influence on this process. Having decided on the processing properties of this alloy, it is necessary to find methods that, if possible, can compensate or eliminate these negative effects. [6]

The difficulties that arise when cutting high-temperature steel and alloys are associated with their special physical and mechanical properties, the main of which are as follows:

1) high viscosity ability, welding (assembly)of chips in this tool;

2) low thermal conductivity, which leads to increased cutting performance, heat conversion, poor heat dissipation, and overheating of the tool and workpiece;

3) Increased energy absorption during plastic deformation of the processed material, significant increase in its hardness and hardening of the cut layer due to the formation of stepped chips;

4) increased friction ability of recycled material due to the presence of solid particles (carbides) in its composition;

5) the ability to maintain hardness and strength at high temperatures.

Based on the conducted vibrotebranish Diagnostics, a decrease in the amplitude of the average signal with an increase in thrust and stiffness was found when approaching the middle of the workpiece, as well as a decrease in the frequency of vibration, which had a positive effect on the quality of processing, and the tool's mowing decreased.

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