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RESEARCH ON SUPER – GLUED SURFACES OF THE PLATES SINTERED

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Abstract: Need metalworking cutting through procedures as quick and efficient, and while cheap as measured by economic tools necessary to create hard and superhard materials with good mechanical properties . At high finish surfaces of the tools provided with bonded hard alloy plates are used currently in the process of cutting, diamond powders. They are used both as powder as well as pasta, which improves cutting through the processed surface roughness. High finish operation applies to the tools provided with hard-alloy plates stuck on the cutting tool body, because all surfaces by stripping their assets to obtain the desired quality. This paper presents a new method for super-active surfaces of tools provided with soldered carbide plates, leading to decrease the roughness processing, improved surface finish and geometry processing margins decrease from 0.5 mm to 0.2 mm.

Keywords: : high finish, abrasive stones, continuous improvement

1. INTRODUCTION

The objectives of processing procedures by high finish active surface of tools provided with hard alloy plates attached are: increasing quality by reducing surface roughness, improving the surface geometry, dimensional precision increase, improvement of voltage layer see figure 1. Processing procedures to remove fine material ensures high quality machined surfaces, resulting in roughness $Ra = 0.4 \dots 0.02 \mu\text{mm}$.

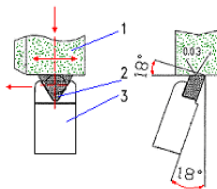


Figure 1. High finishing machining with abrasive stones. 1- abrasive stone; 2- metal working assembly; 3- knife support

Reducing the size of deformed layer from previous processing and the existence of micro

bumps that serve as lubricant deposits contribute to increased wear resistance surfaces. The procedure can be applied to any surface, using appropriate devices mounted on the universal machine tools, or machines using specialized tools. High finish can be used after any finishing operation, but it is recommended to be used after correction, taking into account the economic factors.

2. PERFORMING HIGH FINISH

Mentioned in many papers that the main problem of finishing operations creates abrasive tool, abrasive body use what is true of high finish.

By high finish machining means for processing very thin surface, with one or more bars straight-abrasive alternative performing rapid movements with small amplitudes, combined with advanced movements, performing a song slow motion across the joint direction of two movements.

Because not as we mentioned the piece that we have high finish flat interior, exterior - between peaks and without centers, the penetration and passage or profile. In general, high finish is performed using devices high finish and only for processing large numbers of machines used for high finish.

Port tool head movement and sound are established for each case processing in part based on the geometric shape of the surface to be processed, the high finished device we have, and the processing is done in the presence of a lubricant.

High finish processing takes place in three phases. The first phase occurs abrasive contact between the bar (3) and track (2), the top micro roughness work piece and abrasive grain tip (1), see figure 2. Phase follows the contact between wheels and track bar occurs only on top of grain without their overlap with micro bumps play. In the last phase, micro bumps are all almost completely processed, contact area is large enough so that the product of the size of contact area and pressure lubricating agent (4) gives a force which tends to balance the load force exerted by bar press abrasive.

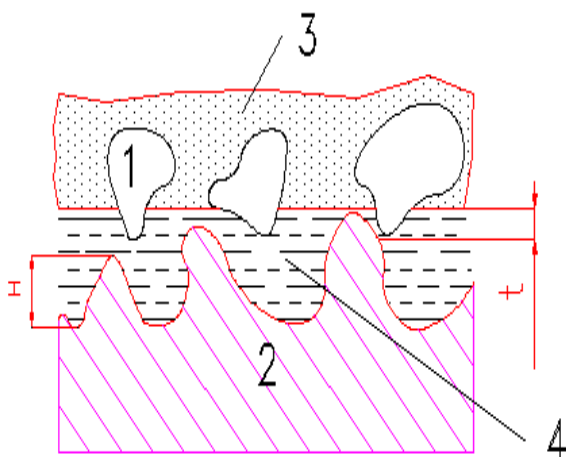


Figure 2. Contact between the abrasive bar and workpiece. 1-abrasive grains ; 2-piece; 3-bar abrasive; 4-lubricating agen

During the process of honing (see figure 1), the surface plate should completely match high finished stone surface.

This ensures a perfect coincidence excellent straight and allow a better surface roughness

correction plates subjected to superior finishing.

High finish in case of processing large number of active surface of the tools provided with hard alloy plates stuck on a machine running the latest finishing technology ASM-500 ZR / ZRT KOYO (see photo 1).



Photo 1- Machine for high finish ASM-500ZR

High finish rectilinear motion is a superposition of oscillating abrasive tool with a very fine grain, with an advance movement of the piece, in the presence of a special lubricant.

Head movements and clamping piece is set for processing each case, depending on the machine tool which is processing, geometric shape and surface processing device according to available car high finish [2] .

High finished construction machines are very different, depending on their destination. Use working speeds 2 ... 5 m/s, pressures of 50 ... 150 daN/cm² and added 10 ... 25μ mm processing. Stone grit abrasive used high finished cars must take into account the nature of the material to be machined, the surface obtained from previous processing and surface quality to be obtained.

In Photo 2 shows the pneumatic device for active surface high finish tools provided with carbide inserts glued, one of the most important assemblies that make the machine ASM-500 ZR / ZRT KOYO.

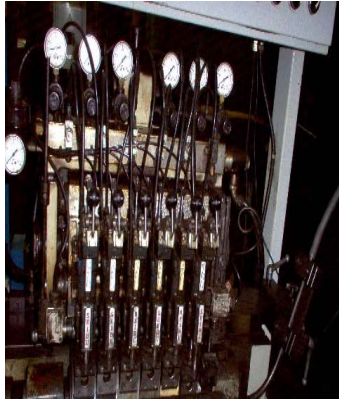


Photo 2- Pneumatic tools for High finish active surface provided with carbide inserts glued.

In photo 3 is represented the three types of stones used for cutting tools provided with pills high finish carbide bonded [4].

In photo 4 is represented an eccentric bushing which is part of the device provided with tools high finish alloys bonded and has a role to achieve a very low roughness ($R_a = 0,0348\mu\text{m}$).

To obtain very low roughness tools equipped with hard alloy plates glued to eccentric bush we use $e = 0.25 \text{ mm}$ (photo 4). Abrasive stones are made of abrasive grains and binder.

Abrasive grains are of the following materials: corundum, and silicon carbide carburant. Binders used are: clay, feldspar, kaolin, bake lite, shellac, rubber.



Photo 4. Main component eccentric bushing device from the superfinishing tools provided with hard-alloy glued plates.



a.



b.



c.

Photo 3. Type High finish stone tools used for bonded abrasives fitted with carbide insert: a) EK1-600-06-135VKH; b) SC9-NAS 1000-60; c) N-600.

Abrasive stone structure has the following groups: very thick, dense, medium rare, very rare and porous.

The added layer removal of the previous operation (fine grinding) which can be added up to $25 \mu\text{m}$, we use the rough bush High finish eccentric with $e = 2 \text{ mm}$. Thus the new method applied to the tools provided with hard alloy plates welded and mechanically fixed plates of hard alloys improve sustainability in exploitation tool and addition processing executed parts decreases from $0,5 \text{ mm}$ to $0,2 \text{ mm}$. It aims to reduce the addition of processing operation for rectification.

In production processes, the need for processing of metal cutting processes as quick and efficient, cheap and equally economically imposed the creation of tools from hard and superhard materials with good mechanical properties. So besides bonded sintered plates were created removable plates, all made from tungsten carbide material mineral - metal ceramic materials – ceramics.

It should be mentioned general orientation towards parallel with the development of hard carbide alloys and metallic compounds, minerals and hard materials branch ceramic. This shows that the economic benefits are much cheaper than metal carbides, for which particular interest, especially for construction cutting tools. For example tool applications are knives, drills for machining and grinding wheels with a wide range of practicality in various branches of production materials, consumer goods, and the construction of certain parts for the industry. The problem is of interest because these hard materials, metal plates are parallel to users fully sintered carbide and in some cases can be combined with them.

CONCLUSIONS

New method for active surface high finish tools provided with metal carbide inserts attached, the following advantages:

- achieve accuracy improving execution rate
- shortens the manufacturing cycle of a benchmark by reducing the number of work operations (phases)
- increasing quality by reducing surface roughness;
- geometry-improving surface finish;
- allowance made parts decreases from 0,5 mm to 0,2 mm;
- reduce transition time from one part to another;
- improve cycle processing capability for the first part done.

In the current and future program we intend to get new technologies high finish tool equipped with hard alloy plates bonded with

special material properties which enhance the durability and wear resistance.

These plates were obtained by sintering which is a process of agglomeration of solid polydispersity under prolonged action of heat and pressure to lower the melting temperature.

Sintering involves replacing the interface solid/gas by high energy solid/solid interface energy lower. This total energy reduction at the interface is the driving force for sintering process. A sintered material is always some porosity which decreases with sintering time. Grain growth, which has a detrimental effect on mechanical properties can also occur during sintering so that a compromise must be reached between maximum density and minimum grain growth.

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