ABOUT MODIFICATIONS SUFFERED FROM THE CONCENTRATOR TOOL. TEMPORALLY REMAKING WITH WHERE ULTRASONIC

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ABSTRACT

The work presents the modifications suffered from the concentrator tool temporally remaking with ultrasonic waves, modifications repertoire to size, and the physical features.

KEYWORDS: ultrasonic, working, sonotrod, mechano-phisical characteristics.

1. INTRODUCTION

The remaking through abrading erosion with ultrasonic waves, new method of remake material hard and the wild strawberries he emphasized through the advantages these remaking guys of material: Sapphires, diamonds, refractory steels, ceramics materials etc.
The principle dimensional remaking through abrading erosion in ultrasonic field is rendered schematically in the figure 1, and he consists of the conduction of kinetic energy of the tool (sontrode) we carry vibrates with a frequency of 18... 30 Khz about of a abrading particles funded out in a average suspension of these thing particles are in a outsize (depending on the section of the tool) fined out in suspension between tool and the object of remarked.

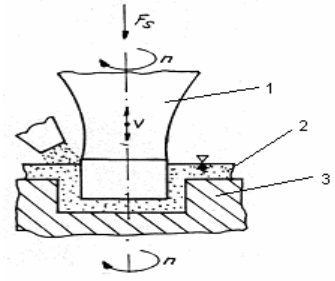


Fig. 1. Working schema.
1 – sonotrod; 2 – working medium; 3 – object for working .

In the process of remaking, due to the innumerability of strokes suffered from granules, these is used, the edges rounded off, diminishes their effect and is required these substitution, phenomenon achieved through recycler environment of thing.
And average of thing is affected of the vibrato of the tool, produced implosions ale the air bubbles from liquids resulting local shock waves of erect pressure.
Head of working from which does the part and the sonotrod presses with a force a static, which Fs assure a contiguous contacts sonotrod granules objects of remarked.
On all precursor remaking, the abrading granules strike the object of remarked fissured, and supplementary motion of rotation table with the object of remarked or the sonotrod) is taken off else easy the scrapings obtained abaft the process of remaking.
An element of big importance in the process of remaking abrasive with ultrasonic waves, but which he is very little studious, he is the detritions sonotrodului of the object of transfer (OT).
Temporally the process of remaking, due to the simultaneous act of abrading granules, as much about the object of remarked (OP), quotient and about OT, appears the detritions on longitudinal direction and on transversal direction.
Form this ordinariness is dependent so for form's sake initially OT, material from which he is achieved sonotrodul, quotients and of the way of thing, carry maybe be:

- Remaking with abrading stationary his suspension with abrading active out of place suspension through his aspiration splash);
- Remaking with motion of his rotation without motion of rotation.

2. EXPERIMENTAL DETERMINATION OF THE FORM FOR DEETRIORATION OF OT.

They were two established variants of thing:
A) Remaking with abrading stationary suspension, without the turning OP;
B) Remaking with abrading stationary suspension and with the turning OP.
In both material variants OT were same (OLC 45 with a hardness 38HRC and OL40 with a hardness of 24HRC) abaft remaking they obtained the forms of detritions presented in figure 2, for the case A and in the figure 3 for the case B. For remaking (60 min) and the conditions of thing feeder tension, static pressure, piece, abrading material, granulation were same, but massage and the sizes OT differed relatively little, because he is impossible to is obtained two OT identically. These little differences have no stricken the form and the size of the detritions OT.

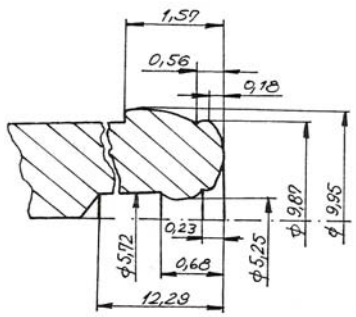


Fig. 2. The peculiar to detritions the remaking with abrading stationary suspension, without the turning OP.

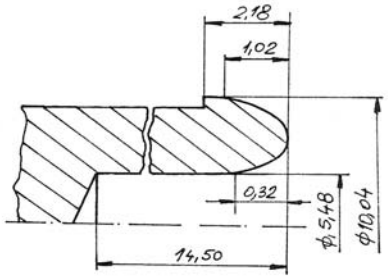


Fig. 3. The peculiar to detritions the remaking with abrading stationary suspension and with the turning OP.

Of reflection is the appearance two co ordinariness that is the difference for form's sake geometric obtained to the utilization two guys of remaking? In the figure 2 presents a bold modification of the profile, towards the part interior, due phenomenon impossibility evacuation inland the abrading granules, carry produce merely a plastic material deformation, causation of multiple strokes allocate the piece. The deformation presents is owed the effect of soak acoustics.
The effect of soak acoustics consists in the decrease of static tension of plastic deformation on the measure of the growth of the density of energy acoustics. This effect can be compared to the due effect of the heating of the proof of the feather to a certain value, but from quantitative viewpoint, between two energies exist a difference largish. The energy acoustics is absorbed except in those regions from the crystalline net in which is achieved the mechanism of plastic deformation, while the thermal energy is delivered homogeneous, through all the crystalline atoms comprising and the atoms don't assists in the process of deformation. Out bye, consisted rounded off it a due edges of liquid exit of thing from the zone of contact in company with the micro particles results from the burglary abrasive.
In the case of the figure 3 present the round off the internal edges and exterior, due to motion of rotation made of OP, what fact causes the appearance frictions between OP and OT. Out bye the ray of connect is elder, due to the fact that there they are in progress the frictions the intense maul than inland. Depending on the concrete conditions of thing (enlargements of the feeder tension) is can produced an easy accentuation of the phenomenon of detritions as much on the frontal part, of how much tool and on one lateral.
To first sight s believes that, through the enlargement hardness of the tool s obtains a detritions a little this maul, valid assertion just partial. Abaft of a experimental attempts he consisted that a hardness of elder a tool of 42HRC drives to the enlargement of the resistance to detritions, but he diminishes very many reliable ness of the tool, determining the appearance of micro his

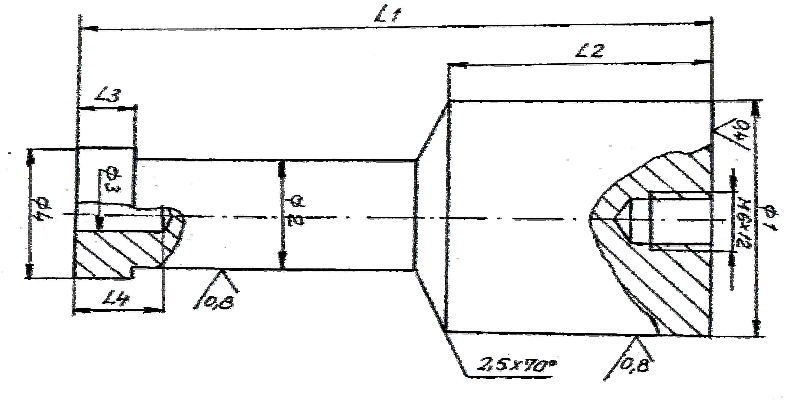
macrocraks, which phenomenon present definitively get up.
The effect of hardening acoustics, appears as a residual effect, after the activation with ultrasounds to intensities the big maul, specify the nature of each of the material fractionally. The effect consists in increasingly substantial the static exterior necessary tension of plastic of a deformation metals and highlighted alloys in previous with ultrasounds, concomitantly with the of a modification property ale the structure.
To the exhibition acoustic fishy intensities 43 W/cm^2 (the characteristic number criticizes material) is produced the rupture monocristal of material used-up.
The results concerning hardening of the materials with ultrasounds are present on the strength of the conceptions of the theory dislocations.
To the of an levels seas of energy acoustics, the activating degree dislocations blocked and for form's sake of we dislocations touches a sufficient value achieved in macrovolums prove elementary process of deformation the plastic art. Material in is produced a growth a density of dislocation, made an important number of obstacles by reason of the interaction of mobile particles with one motionless as well as the jammed knots of holidays, so after the completion (interrupt) activation ultrasonore
in metal is fixed a specific structure of

dislocation.

Through the use of cementing outfit with a low hardness, is obtained a significant growth reliable ness, but and an all-alike growth of significant the detritions attracts a modification in the mass a how much ensemble the and a modification dimensional what drives to the modification stability acoustic ensemble.
Anything modifies dimensional diminution of the size of acoustic chain below a certain limit drives to an unsteadiness of the process therefore to the diminution productivity remaking.
Is enforced therefore a cognition a deep maul state how much surface and dimensional OT in definitely hypostases from the time of the process of remaking in ultrasonic field.

3. DETERMINAREA EXPERIMENTALA A UZURII SI DURITATII

In the sight determination of the elements enforced studied they used two OT presented schematically in figure 4.
They accomplished experiments keep constants: The feeder tension transductorului, the material of remarked, static pressure, the abrading material the method of remaking (without rotation), alone parameter be duration of remaking. The values thus obtained were past in the tables 1 and 2.



	HRC 24	HRC38
Ø1	15.75	15.04
Ø2	9.5	9.51
Ø3	5.71	5.48
Ø4	9.95	9.92
L1	123.14	122.27
L2	60.52	60.58
L3	2.32	2.51
L4	13.04	14.83

Fig. 4. Dimension of OT used at the experimental work

Table 1. Modification of the active surface hardness with the time of work

Hardness [HRC]	0 min	30 min	60 min	90 min	120 min	150 min
OL 40	24	25	27	29	31	34
OLC 45	38	39	42	44	45	47+ **crakes**

Table 2. Modifications of the active surface dimension with the time of work.

Length [mm]	**0 min**	**30 min**	**60 min**	**90 min**	**120 min**	**150 min**
OL 40	2,32	2,23	2,16	2,06	1,93	1,76+**instab**
OLC 45	2,51	2,45	2,35	2,32	2,23	2,12

Through the research of the results presented the in the table 1 consisted a growth a hardness with 10 units for proof from material flabby the and with 9 units of the proof from steel the hard maul the which gift through caused the appearance of microfisuri what drives to dimensional modifications active his actually cylinder to tear OT. Although breed the in hardness he did with values comparable (about equal), the results are different, in favored the material toughly elder initial.
Through the research of the results presented the in the table 2 consisted a diminution an active cylinder with 0,56 mm for proof from material flabby determining an unsteadiness of the a process of remaking, through the modification of the length and table OT and with just 0,39 mm the proof from steel the hard maul maintaining the process of remaking in around the limit of operation.
Limit of operation is maintained consisted through the modification of the floor of synchronize the frequency of resonance with the length ensemble resonator equipments of used measure in standing of attempts, a voltmeter and an ammeter indicating an of a values the parameters from the time of the process of remaking. The stability of the process he obtained to a tension of 160V the and to an amperage of 2,5 A.

4. CONCLUSIONS

In the sight of the enlargement of the durability OT, this made from metallic carbide, carry is pasted on an intermediate concentrator, appearance presented schematically in the figure 5.
This guy of tool is used just in the case serial big his productions in the case in which is prompted a different accuracy for piece, because the ensemble OT is relative expensive through utilization of metallic carbide, carry maybe to present geometric complex configurations.
The concentrator 1 and 2 is can achieved from material as the: Steels of cementing outfit, OLC45, duralumin, OL40 or another material the cheap maul, but with acoustic good property. Certain in situations the one of two concentrators can be replaced of an alone concentrator what fact cause a stability an acoustics a maul hello through the elimination assemblage mechanic, carry represents his rupture better said a decrease of acoustic an effect through the decrease altitudinal oscillate, therefore is recommended as this his zone presents an amplitude null but is an amplitude a maxim tangential an wagons can by cut an element of assemblage.

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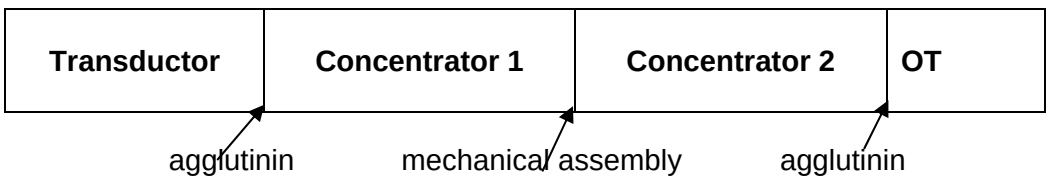

Fig. 5. Method of assembly the system transductor – concentrator - tool.