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ECOLOGYCAL ASPECTS OF FINPLAST PROCCEDING

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***Abstract**: This paper presents an analysis of the process FINPLAST compared to other similar finishing processes . The analysis is done in terms of environmental effects that accompany the surface finishing operations anti-friction bearings with sliding alloys*
***Keywords**: FINPLAST, sliding bearings, finishing, cold plastic deformation, ecology method*

Description of the process of technological parameters and performed experimental device
Process description

Basically the process is not new absolute because solidification operation is used for processing stainless steel in food industry, finishing and hardening surfaces of sliding bearings.

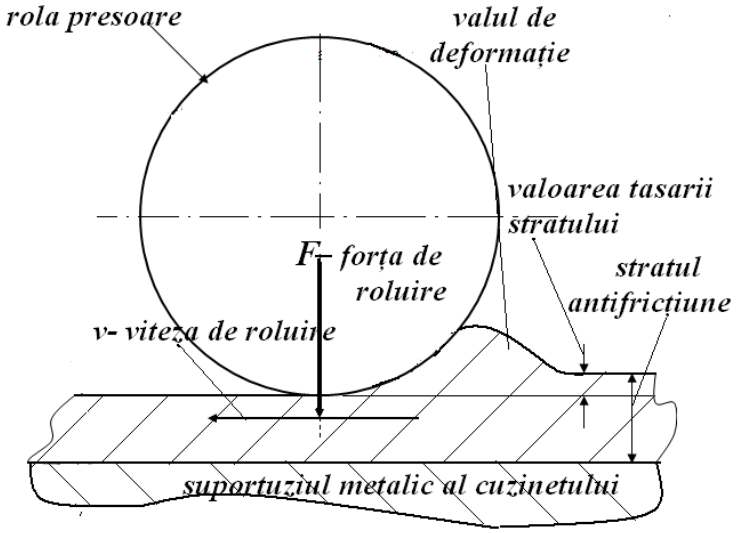
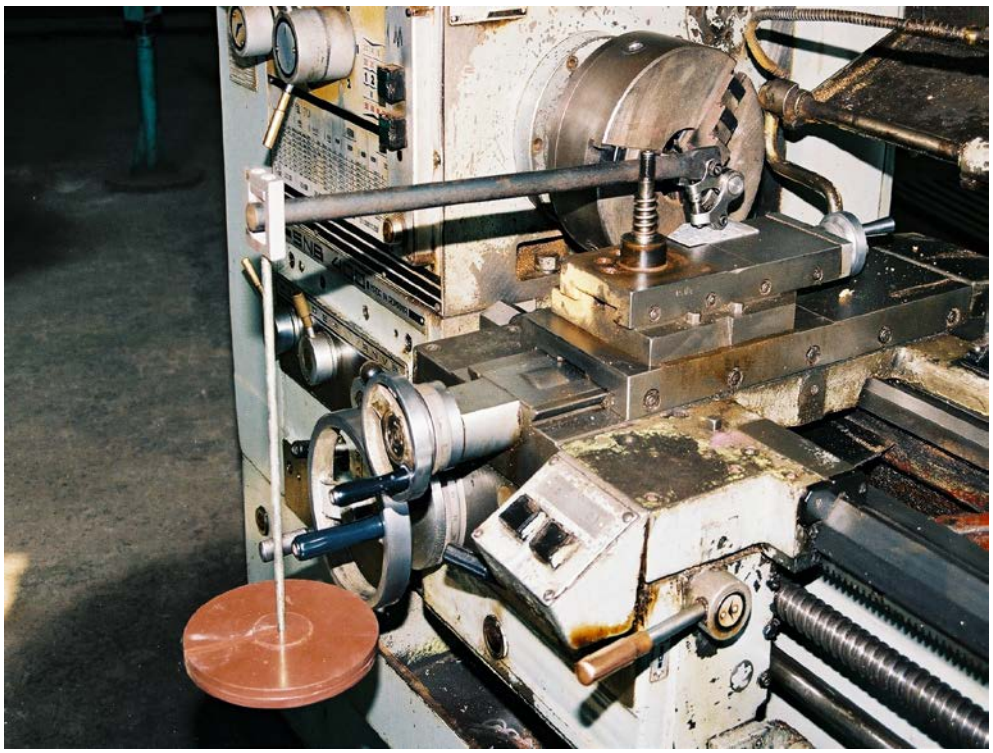
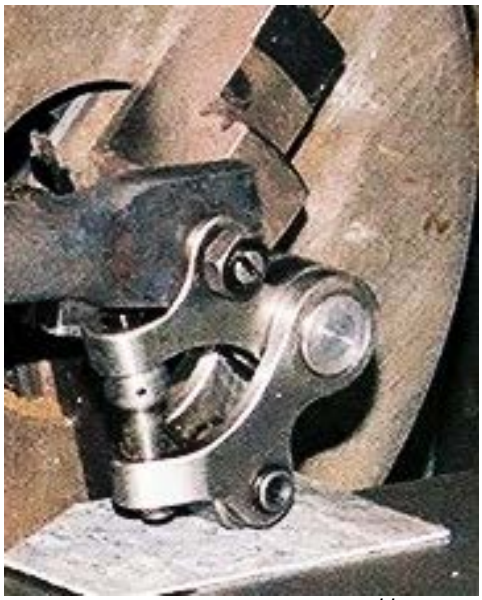


Fig.1 Principiul procedeului

The originality lies in the fact that this time is used in the finishing area of anti-friction material contacts tribological slip couplings, previously obtained by a cutting operation. After cutting surface presents a deep layer called layer different characteristic structural changes influenced by cutting shortened to SIA [1]. The plane surface geometric errors are obtained as rough waves, etc.
Limited possibilities of finishing antifriction made useful process proposed by the author. As can be seen in figure 1. the process is very simple. This blank consists of compaction machines under the action of the pinch roller driven by a constant rolling force *F*, while the blank is moving at speed V along with the weight roller which is movable in this place. Pinch roller can freely rotate with peripheral speed equal to that of the blank. After contact between the roller driven by force F and rough, moving with speed *V*, due to its anti-friction material layer plasticity characteristic soft *Δh* tamp it down. Roller surface, hard, smooth and precise processed to generate deformations, softer material surface, roll profile prints on the surface turners.
Technological parameters
To achieve rolling operation involved several technological parameters which obviously influence the outcome of the process. Of these, for the study were chosen:
• *F - rolling force;*
• *N - number of passes;*
• *Anti-alloy plating and module support, whether during processing or not lubricated contact.*
• *Anti-friction material and way of submission.*
In this application was used a roll having *d = 25 mm, B* - roll width 10 mm. In addition to these parameters, the processing result may be influenced by other quantities, such as rolling speed, which is equal to the velocity of the stage device, the surface roughness and hardness of the pinch roller to the rigidity of the device and the accuracy of relative position of the axis of the roll mobile meal plan, load and speed constancy rolling, anti-friction material layer thickness h, etc. Besides the degree of deformation in setting the parameters have considered other side effects that can intervene by changing to the desired results. A high speed rolling, deformation due Elastoplast can lead to undulations of the finished surface. Due to local thermal effects can be achieved instantly at temperatures in spots that cause structural transformations adhesion by welding alloy pinch roller compacted, etc .. In order to avoid adhesion can use liquid or solid lubricants. *Roll diameter D* it is necessary to be correlated with the thickness of the first anti-friction alloy. Experimentally observed that with increasing anti-friction material layer thickness h, must be increased and *D*. A too small diameter alloy can produce a discharge, resulting alloy disengage from the support, the appearance of cracks as the emergence of trends rippling surface. Force correlate with these parameters in terms of the degree of deformation calculation and compliance with the conditions previously mentioned plastic deformation. The influence of these parameters will be analyzed based on numerical simulation and experimental results. Experimental alloy was observed Anti influence both used and how its submission (cladding, sintering, etc.). The existence of pressing lubricant will study the influence of surface performance achieved. The process is very simple, as proof solution used by the author to conduct the study samples presented below.
Description of the device used for the study
For the study was used two rectangular steel *OL 37*, one plastic deformation clad alloy wheels *CuPb5 and AlSn10* and one filed by hot sintering. Both materials are used in the plant

SC. ,, Rulmentul "SA Brasov in series production necessary to achieve sliding bearings that Romanian industry and export.
To obtain anti-friction surface and thickness to the front turning on a lathe used normally by setting rigid plate on a support plan, which secured the universal lathe machines is maintained at the same level surface.
Turning *AlSn10* alloy was done with the following technological parameters: speed *n = 460 r / min, s = 0.14 mm* radial feed / rev and depth of cut, *t = 0,57mm*. For *CuPb5* alloy or used: *n = 460 rev / min, s = 0.18 mm / rev, t = 0.5 mm.*
Cutting parameter values were determined according to the literature and correcting them where appropriate, with both very small thickness of the layer of alloy anti-friction and low rigidity of the laminate which has been submitted. To take samples to study author designed and developed a simple device, fitted on a universal lathe SN 500, capable of carrying out processing conditions described, at an affordable price. The solution used is shown in the photo. 1. Roll, device manufacturing tool is bearing supported on its axis by means of bearing pins, the yield is very good.





a. assembly
b. detail
Foto 1. The device used to create the samples

Environmental aspects of the FINPLAST process

Based on the description of the process it is observed that, in addition to the advantages described above in terms of eco it presents multiple advantages.
This process splinter. Experimental demonstrated [1, 2], not in all cases lubrication is needed contact, presenting environmental advantage. For lubrication, the amount of lubricant is particularly low, potentially very high percentage of recovery and it does not degrade.
During rolling process the environment is not heated. Also is not produced gas and liquids which have an adverse effect over the operators or the environment.
The only source of electrical energy which is also the transformation work is clean.
Blank preparation operations, consisting of washing its small volume and light solvents, are washing after finishing operation at very low risk of pollution. If these discharges spent solvents they contain a very small percentage of pollutants.
And in terms of the effects on the functioning of the camps finished by this process can be drawn ecological effects.
Thus according to experimental results [1, 2], the process results in an increase in hardness surface layer plus the positive effect of the structural improvement of the superficial layer of coupling that resulted from cutting SIA is defined. In addition, as determined by profilometry experimental and finished surfaces profilography through "FINPLAST" is reduced to extinction those specific surface roughness with sharp edges resulting from cutting which allows the creation of a film of lubricant flow as close as drafting possible. Thus, these asperities risk of detachment because of weak ties with the state, the basic fatigue due to requests that generate oscillatory phenomenon of pitting on the surfaces of soft materials Anti couplings is greatly reduced.

Also based on these effects is quite possible that habituation wear that occurs during the running to reduce greatly. Therefore, the thickness of adjustment provided for the wear decreases. Thereby, increase the thickness of normal wear increases the reliability of the coupling, therefore proportionally increasing the life of the bearing.

By increasing hardness anti-friction layer, can reduce sliding bearings gauge FINPLAST finished by the process.

The possibility of achieving minimal layers, according to practical requirements [1] 0.3mm has the effect of considerably reducing specific consumption of materials.

This reduction gauge bearings with increased reliability is considered as a positive effect in terms of environmental pollution due to declining multiple environment during the preparation as materials for construction camps and achieve further technological processing, to the finished product.

At the same time, this process is achieved by applying the possibility of an optimal structural preconfiguration anti materials as defined by the author in [3].

The effect of the optimal configuration, for the purposes of the work is carried out normally, after a period of time during normal operation of the bearing. This time, however, is quite high, and compaction layer combine disadvantageous due to the loss by wear to accommodate the mass of anti-friction material layer. This reduction of thickness is achieved speeds resulting in rapid increase in functional game, reducing the negative effect of the bearing during normal operation.

Also, reducing the coefficient of friction, as is clear from [1, 2], shall constitute a positive environmental impact by reducing specific fuel consumption, energy or mechanical work of equipment containing such camps.

Wear oil after running in period is reduced substantially.

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