

SOME ASPECTS OF MANUFACTURING USING JET JSG 96 MACHINE

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Abstract: The technical papers presents the first step in planning research activity using Jet 96 machine tool. Also is presented some general information about the band polishing.

1. INTRODUCTION

For the band polishing process are used two main abrasive type, such as: alumina Al_2O_3 , synthetic, and carborundum, SiC synthetic.

Into the table 1 are presented the most used abrasive bands belongs of famous companies such as: Naxos, Klingsport GmbH Haiger.

Table 1 The type of abrasive bands, ([1])

Indication	Cover link	Base link	Alloy	Application
PL 21	Paste	Paste	Al_2O_3	Manufacturing of dry metal, polishing with free band
KL 351	Paste	Paste	Al_2O_3	
LS 309	Resin synthetic	Paste	Al_2O_3	Plane polishing of steel, elastic polishing of steel and low duty metal
CS 310	Resin synthetic	Resin synthetic	Al_2O_3	Rough polishing of steel, aluminium, bronze, polishing of cast pieces etc.
CS 333	Resin synthetic	Resin synthetic	SiC	Fine polishing of steel, low duty metal and plastic materials, alloy polishing with hard surface and dry polishing of bed cinder
CS 321	Resin synthetic	Resin synthetic	SiC	Glass polishing, synthetic resin, porcelain, ceramic pieces, marble and hard steel, high precision polishing

The main factors which has a important influence upon band polishing process are: cutting speed limited by abrasive material, band durability, vibrations of technological system; working feed; textile elasticity band.

The figure 1 presents the manufacturing schemes without against the abrasive band (figure 1a) and with against the abrasive band (figure 1b).

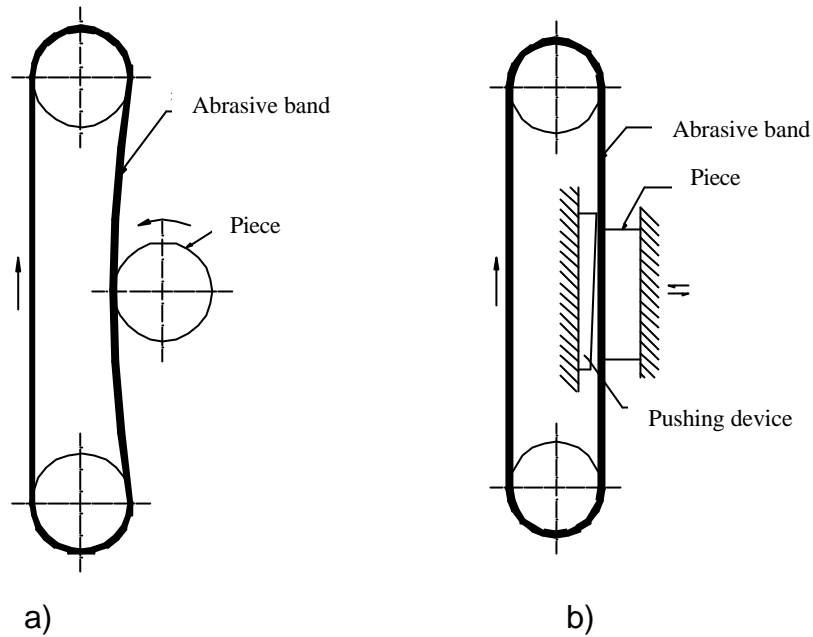


Figure 1 Schemes of abrasive band manufacturing, ([1])

The figure 2 presents the polishing scheme of shaft pieces using the pushing device of band above the piece.

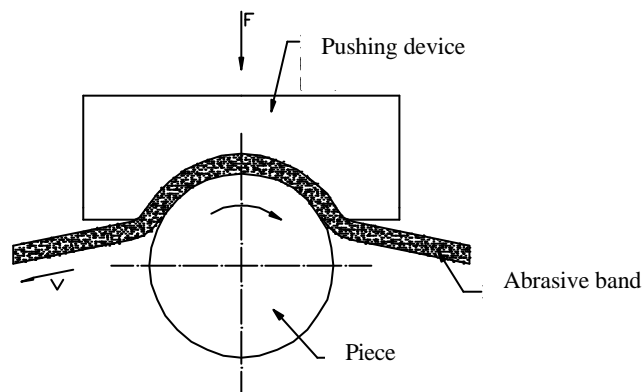


Figure 2 The polishing scheme using pushing device of band above the piece, ([1])

This type of process is used to increase the roughness of surfaces, dimensional and corections of deviations, outside and cleaning of surfaces.

2. EXPERIMENTAL RESEARCH PREPARATION

The finally target of any research consists of link relation determination between system factors and its objectives functions, as follow:

$$y = f(x_1, x_2, \dots, x_k) \quad (1)$$

where k is the number of factors took in to account.

The mathematical type of model (figure 2) involved the following:

- the general knowledge for physics systems;
- information of systems and models similary more or less with studies one;
- the own experience modelling into research area.

To solve all this problems thare two different strategies:

- the classic strategy (Gauss-Seidel) with the „one factor to one period of time” like motto;
- the new strategy (Box-Wilson) with the following motto: „all factors in each period of time”.

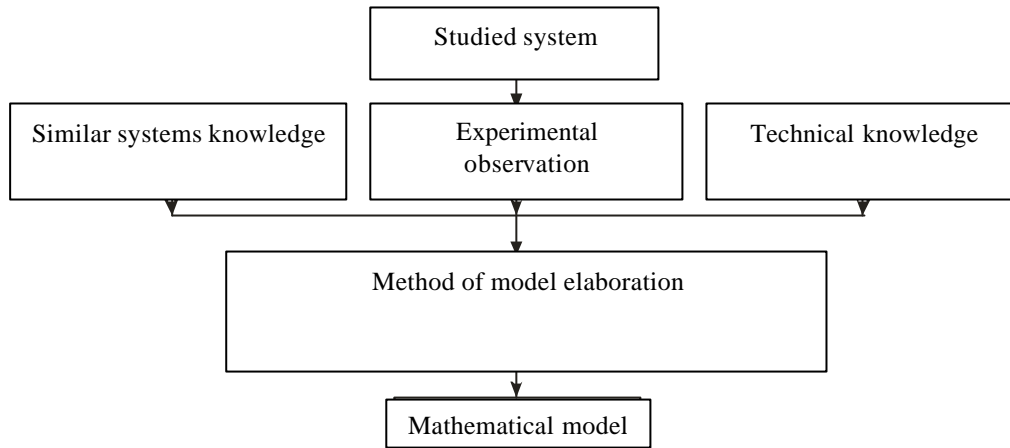


Figure 3. The steps of mathematical model

Into the model 1 there are another factors ($Z_1, Z_2...Z_m$) with semnificative influence during the research.

The factorial experiences has some advantages, such as:

- reducing the number of experiments;
- easier to establish the conclusions of factors interactions.

The most used factorial experiments are 2^k and 3^k types (k is the number of factors). Each factor has two or three values from variation field.

It is thought the the base level is zero and high/low is +1/-1. This code of levels factors is make using the variable change:

$$z_j = \frac{x_j - x_{j0}}{l_j} \tag{2}$$

where: x_j the phisic value of factor; x_{j0} is the phisic value of base level of j factor; l_j the variation limits of j factors comparative with base level. The size of interval is as follow: $x_{j\max} - x_{j0} = x_{j0} - x_{j\min}$.

Thus for $x_j = x_{j\max}, z_j = (x_{j\max} - x_{j0})/l_j = +1$; and for $x_j = x_{j\min}, z_j = (x_{j\min} - x_{j0})/l_j = -1$.

The matrix of experimental programme is achieve by table way (table 2). Into the columns are factors and beside the lines the experimental research of programme. The levels of factors are marked with +1/-1 values code.

Table 2 Matrix of experimental programme

Research number	Coding values of influence factors						Values of objective function				Dispersion
	Z ₁	Z ₂	...	Z _j	...	Z _k	y _{i1}	...	y _{im}	\bar{y}	
1	-1	-1	...	-1	...	-1	y ₁₁	...	y _{1m}	\bar{y}_1	S ₁ ²
2	+1	-1	...	-1	...	-1	y ₂₁	...	y _{2m}	\bar{y}_2	S ₂ ²
...
i	-1	+1	...	-1	...	-1	y _{i1}	...	y _{im}	\bar{y}_i	S _i ²
...
N	+1	+1	...	+1	...	+1	y _{N1}	...	y _{Nm}	\bar{y}_N	S _N ²

Into the table 3 are presented the variation levels of input parameters belongs to research.

Table 3 The levels of input parameters

Level	Factor	Z ₁ , Material	Z ₂ , abraziv e type	Z ₃ , the roughness before the process. [µm]
First level, (+)		steel	P180	at least 1,6
Second level, (-)		bronze	P150	at least 1,6

After the experimental research we can establish the following: objective functions with the all influence of input parameters upon the finally surface roughness.

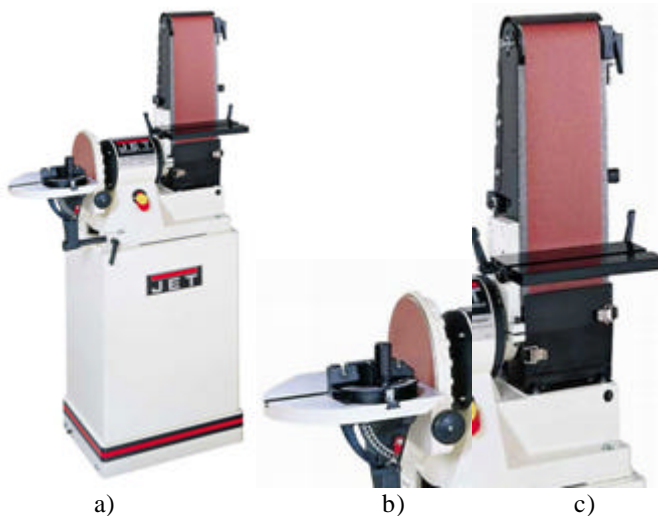


Figure 4 The JET JSG 96 machine, ([5])

3. THE EXPERIMENTAL MACHINE USED

The experimental research will be done using the JET JSG 96 machine (figure 4).

Using this machine type we can manufacturing the different types of surface (frontal, plane). In case of using the first table (figure 4b) it is possible to regla the deviation of work table of machine by manual one. The main working motion is the rotation of disk.

In case of second table of machine (figure 4c) the working area is at 90° with the liniar band motion like main motion.

The both tables has T channals and special device for orientation and fixing of pieces.

4. REFERENCES

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