SCHEME ANALYSIS TREE DIMENSIONS
AND TOLERANCES PROCESSING

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Abstract: This paper presents one of the steps that help us to determine the optimal tolerances depending on the technological capability of processing equipment. To determine the tolerances in this way is necessary to take the study and to represent schematically the operations are used in technological process of making a piece. Also in this phase will make the tree diagram of the dimensions and machining tolerances, dimensions and tolerances shown that the design execution. Determination processes, and operations of the dimensions and tolerances tree scheme will make for a machined piece is both indoor and outdoor.

Keyworks: tolerance, cost, process, capability.

1. Introduction

This paper (1) was presented a model for optimizing technological tolerances depending on the capability of processing equipment. To determine the optimal tolerances is thus necessary to take the study to represent schematically the operations are used in technological process of making a piece, which is why before proceeding to calculate standard deviations and the calculation function optimization, which in this case is to minimize the cost of running the play, it should be presented in tabular form, the technological process of track operations studied. Operations are presented in Table technological process have a minimum of information, but very important, concerning: the name of the operation, the reference surface, the surface is processed and the size of the process. Also in this stage, we help determine optimal tolerances, it is necessary to make the tree diagram of the dimensions and machining tolerances, dimensions and tolerances shown that the design execution.

2. Case Stud

To determine what is said in his practice (1) and above, use an example for the song in figure 1, which is considered to be achieved for large series and mass production.
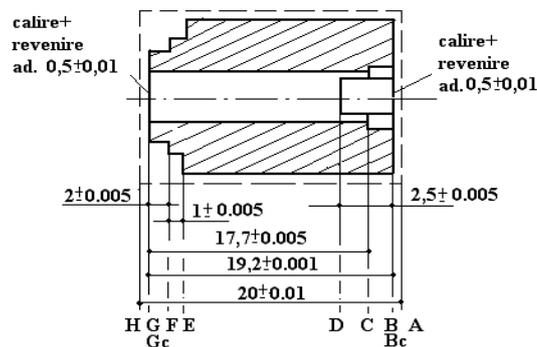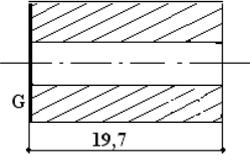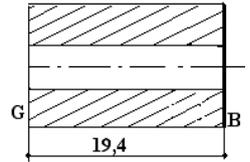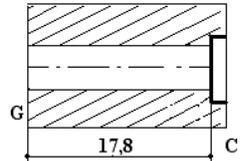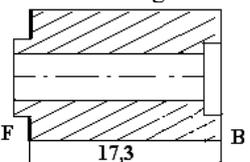

Fig.1. Chain elements tolerances of the workpiece dimensions.

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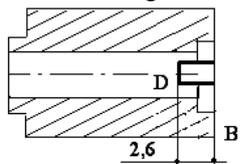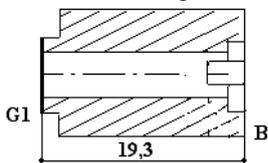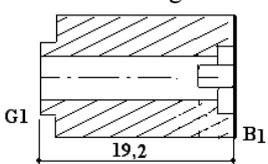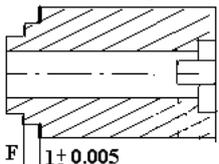*Editura "Academica Brâncuşi" , Târgu Jiu, ISSN 1844 – 640X*

The piece is worked both outside and inside and will include operations such as turning, milling, grinding and heat treatment (hardening + recovery).

In figure 1 presents the workpiece, and operations are presented in table 1 indicates the reference surfaces and surfaces prepared for each operation.

It will be noted in large areas of the workpiece. In addition, BC and GC are used to indicate heat-treated surfaces of B and G, G1 and B1 and B are generated surfaces respectively, G. To see chains processing tolerances can use the information given in table 1, and with it will draw a tree representation as shown in figure 2. The arrows represent the relevant processing operations. Areas that are connected ends of the arrows are flat reference surfaces. Areas that are connected arrowheads are manufactured surfaces (surfaces in bold). The songs were performed on numerically controlled machine tools.

Table 1. *Workpiece processing sequence.*

Number Operations	Operation	Reference area	Processed area	Working size (mm)
1	Turning	A	G	19,70
2	Turning	G	B	19,40
3	Turning	G	C	17,80
4	Turning	B	F	17,30

5	Milling	B	D	2,60
6	Grinding	B	G_1	19,30
7	Grinding	G_1	B_1	19,20
8	T.T hardening +recovery)	B	B_c	0,25
9	T.T (hardening + recovery)	G	G_c	0,25
10	Turning	F	E	1,00

NOTE: The table is not complied with the order process technology operations.

Using figure 2, where are the tree sizes and processing tolerances and dimensions and tolerances shown on the drawing performance can be obtained conveniently tolerances chains of processing operations.
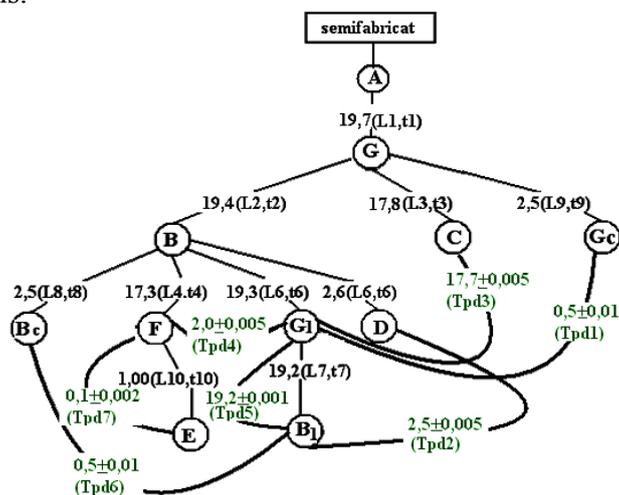
Fig.2. *Tree representation of the dimensions and tolerances in processing(L,t)*
and dimensions and tolerances shown on the drawings (Tpd).

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The tolerance chain dimensions have been obtained on the basis that tolerances results must be less than or equal to those of design specifications for implementation. Based on figure 2, were established bilateral ties maximum tolerance of the machining processes and machine tool gears.

The standard deviations of processes depend on the processed surface, the size of machines and cutting tools to machine tools. Based on the above information can move on determination standard deviations in writing optimization function at presentation restrictions and finally to determine optimal tolerances.

3. Conclusions.

Operations are presented in table technological process have a minimum of information, but very important, concerning: the name of the operation, the reference surface, the surface is processed and the size of the process. Using figure 2, where are the tree sizes and processing tolerances and dimensions and tolerances shown on the drawing performance can be obtained conveniently tolerances chains of processing operations. From the foregoing it is apparent that in order to apply an optimal method for allocating tolerances of components, design engineers and engineering technology should consider the process of implementation throughout the piece.

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