

PROGRAM BY CALCULATION THE REGIMES OF CHIP REMOVAL

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ABSTRACT:

This paper presents an enlarged application in the Visual Basic programming and Access database, which are resolving some aspects regarding the practical side in the designing of technologies in the field mechanical workings through cutting. The users of this soft are free of a great volume of repetitive calculations and work for transposing the results in technical documentations (plans of operations, technological files, and so on).

KEYWORDS:

application, technology, chip removal, technical documentation

1. INTRODUCTION

In the designing of technologies in the field mechanical working through cutting, the classical calculation of the cutting regime, is limited, because a lot of coefficient numbers, witch must be adopted. These coefficients depending of cutting tool (the material of the active part, the back rake, the main angle of incidence, the degree of wear an so on), and with the processed material (cutting workability, the state of material destined for the cutting process, an so on).

Because the cutting tools exist in a big variety, and, also the number of material destined for the cutting process is higher, the achievement of calculation programs, at witch coefficients automatically selected and adopted for the adequate cutting process guidance, is practically impossible to create. Also, the insert of this date, through the control keyboard, uses a long time, and in this case, the possible advantages of anyone calculation programmes, it may be possible to cancel being unefficient for any application.

From this reason, we created one of application program, witch try to resolve the practical size of the cutting range calculation. The users of this soft are free of repetitive calculations and work for transposing the results in technical documentation (plans of operation, operation sheet, and so on). The application program has be created on the model of the classical calculation mode of the cutting range. The phases of this program is the following:

- The material, destined for cutting, is choose; also, the type of the semi-finished product and the thermal treatment are chose, too;
 - In function of this metallic material destined for cutting operation, is adopted the cutting tool from the existing list of tools; the durability of this cutting tool is adopted automatically;
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- It is calculate the cutting depth, in function of the next cutting process, uses the classical formulas; the number of cutting phases it is introduced by the operators;
- The forward flow of the cutting process, is imposes by the program between an minimal and an maximal values, depending from the nature of process and the cutting depth;
- The cutting speed is a function of the materials witch is processed, the cutting tool, the depth of the operation and the forward flow of the cutting;
- The revolutions per minute is calculated in function of the material dimension and the minimal value indicated from the cutting speed; is adopted the value, witch is immediately lower at the revolutions per minute of the machine tool; the speed value will be recalculated, according to this value of revolutions per minute;
- The power of cutting is a function of the nature of the process, the depth, the cutting tool, and the materials nature; this value is compared with the value of the machine tool's power, and in the case of highly calculated power, the parameters of cutting will be modified;
- The time is calculated with the analytical formula, which take account the dimension of semi-finished product, the forward flow, the revolutions per minute and the numbers of the cutting phases;
- The values of cutting process, obtained in these phases of the programme, are transposes in the operational plans.

For resolving of this applications program, is used the Visual Basic programming, for the advantage, which is offered by this:

- Is very easy to learn – may be uses and understanding even the unspecialists;
- Is a visual programming language; the Windows type interface with the users can be easiness created;
- Is a language oriented on the objects and leading by the events; from each control's of the interface, is associated a code, formed on subroutines, each of these, being an adequate event;
- The program allowed many application which working with relational date (the recommended database of Microsoft for Visual Basic application is the Access database);
- A minimal hardware and software resources are necessary;
- At the base of this application stand the Microsoft Access database, which is content many table with technical characteristics of the machine tool, and the cutting tools, the durability of these, the representative forward flow for the cutting's nature, the cutting depth, power and speed of the process, depending of the material nature, and so on. The obtained results are cumulated and stoked in table, which is the source of technical operation (operational plans).

2. THE PROGRAM PRESENTATION AND MODE OF UTILIZATION



The application ProRA V.1.0 is executable, this launch is done with a double click on the associate icon (or on shortcut). In figure 1 is presented the main window of application. The entering in this program is possible through the accessing of the ENTER>> button.

In figure 2 is presented the dialog box, which permitted to the operators the selection of the materials destined for the cutting process, from the existing list of

materials in the program database. Also, is possibly to adopt the type of semi-finished materials (rolled material, forged, die forging or cast product) and the adequate heat treatment (hardening and tempering, hardening and lower annealing, normalizing). The displaying of the characteristics of these follows the select of the materials.

Through the ACCEPTA>> (ACCEPT) button, on pass at the next dialog box, presented in figure 3, which content the name of the test, the name of the choose mechanical operation, and, also the preferred machine tool.

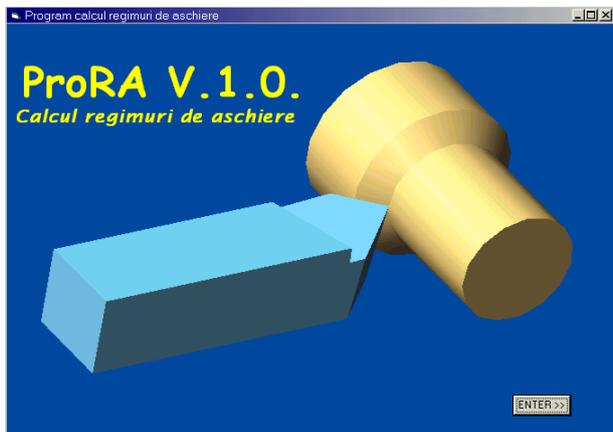


FIGURE 1. The Main Window of the ProRA program



FIGURE 2. The dialog Box for the Choose of Materials

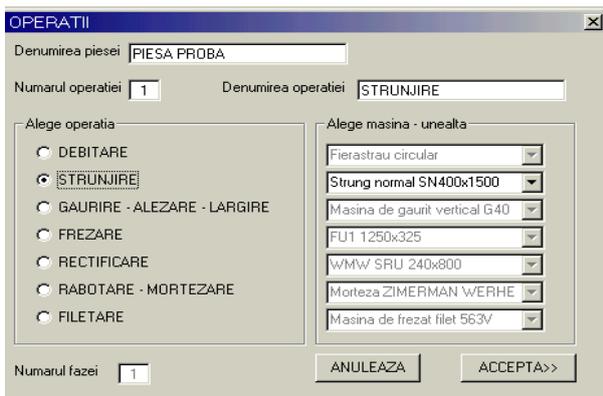


FIGURE 3. Dialog Box for the Choose of the Mechanical Operation

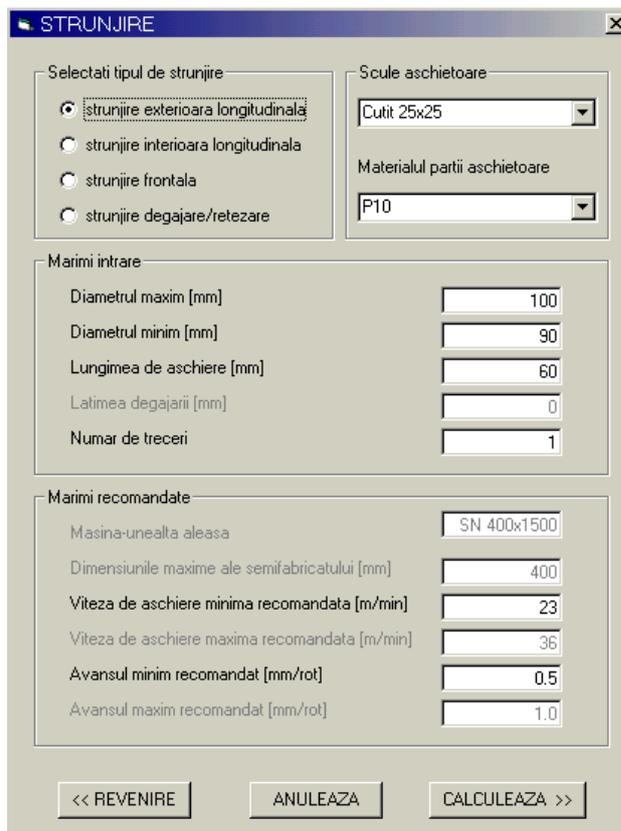


FIGURE 4. Window for turning operation

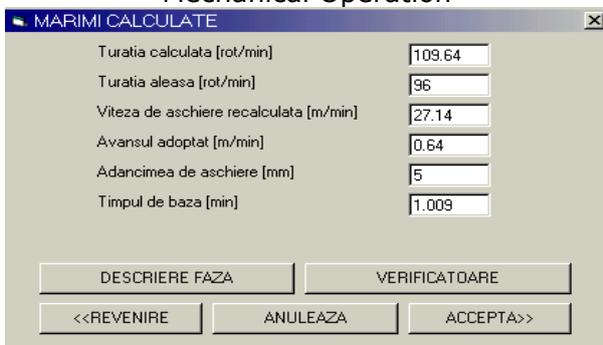


FIGURE 5. Window for the Calculate Values by the ProRA program

Through the choose of the machine tool, is selected also, the own characteristics and properties (the revolutions per minute, the overall dimension, the power of the adopted working machine, and so on).

Once with the choose operating mechanical process and adopted materials, the application program recommends automatically the adequate cutting range (the minimal and the maximal values of the cutting speed, the forward flows, and so on), which are presented in figure 3. In the dialog box it is enrolees the number (position) of the phase of the process in the frame of operational plan.

Through the ACCEPTA>> (ACCEPT) button of menu of this dialog box, on pass at the next box, or through the <<REVENIRE, return at the primary slot.

At the next – figure 4 – may be possible to choose the type of the adopted operation. It is introduces the primary dates, regarding the operation (the maximal and the minimal recommended values of diameters, the length of the cutting, the passing numbers, and so on). Both in this figure are presented the recommended values (MARIMI RECOMANDATE) for the adopted operation and the optimal characteristics of the cutting tool, especially the minimal cutting speed, the minimal forward flow, recommended by the program.

In figure 5 is presented the calculated date of the process, by the program, at which can be reach through the command CALCULEAZA (EXECUTE), contain in the dialog box, presented in figure 4. The values are showed in the operational plans and can be modifying in this steady of application program.

The two buttons in the figure 5 – DESCRIERE FAZA (DESCRIBE PHASE) and VERIFICATOARE – allowed the supplement of the adequate fields in the operational plan, can be called and will be appear the dialog box presented in figure 6.

The button ACCEPTA>> allowed entering in the next box of the application program, presented in figure 7. Through the SCHITA button is possible to insert the drawing of the respective operation. The drawing can be realized through the AutoCAD programme and insert in the operational plan form.

With the help of the TIPARIRE button can be possible to allow the printing of the operating plan (or the executive plan). Through the FAZA URMATOARE>> will be return to the operation phases of the program and will be resume the calculation for the next phases.



FIGURE 6. Windows for the Values Verify Option and Describe the Actual Phase



FIGURE 7 – Window for the Operational Plan

3. CONCLUSIONS

- The ProRA V.1.0 application program offered for the designers of the technology of processing through chip removal an efficient and comfortable alternative;
- This program can be used in the case of some cutting process, through introduction of minimal numbers of technical data, by the keyboard of the personal computer, in logical succession and through proposal of a convenient range of the operational plans and technological process;
- The interface is very sociable and friendly, being created upon as the known Microsoft Windows Application;
- The dialog box indicated in every steady, the next operation or the order of the application, which must be effectuated;
- The control of the program is very easy; every phase of this program allowed the introduction of the needed values, and the computer assured the adequate calculation;
- In this way, the time of calculation is reduced, and the precision of data is considerable;
- The subjective errors will be eliminated, because the calculation is very exact.

4. BIBLIOGRAPHY/REFERENCES

1. HEYMAN MARK, S. - Bazele VISUAL BASIC, Ed. Teora, București, 1996
2. PĂTRUȚ, B. - Aplicații în VISUAL BASIC, Ed. Teora, București, 1999
3. MSDN Microsoft – Documentația pentru Visual Studio 6.0
4. FÎNARU, L., BRAVA, I. – Visual Basic, primii pași și ...următorii, Ed. Polirom, 2001
5. EPUREANU, A., s.a. – Tehnologia construcției de mașini, Ed. Didactică și Pedagogică, București, 1983
6. PICOȘ, C., s.a. – Proiectarea tehnologiilor de prelucrare mecanică prin așchiere, vol. 1 și 2, Ed. Universitas, Chișinău, 1992
7. VLASE, A. s.a. – Tehnologii de prelucrare pe mașini de rectificat, Ed. Tehnică, București, 1995
8. VLASE, A. s.a. – Tehnologii de prelucrare pe mașini de găurit, Ed. Tehnică, București, 1994
9. VLASE, A. s.a. – Tehnologii de prelucrare pe mașini de frezat, Ed. Tehnică, București, 1993
10. VLASE, A. s.a. – Regimuri de așchiere, adaosuri de prelucrare și norme tehnice de timp, vol. 1 și 2, Ed. Tehnică, București, 1985