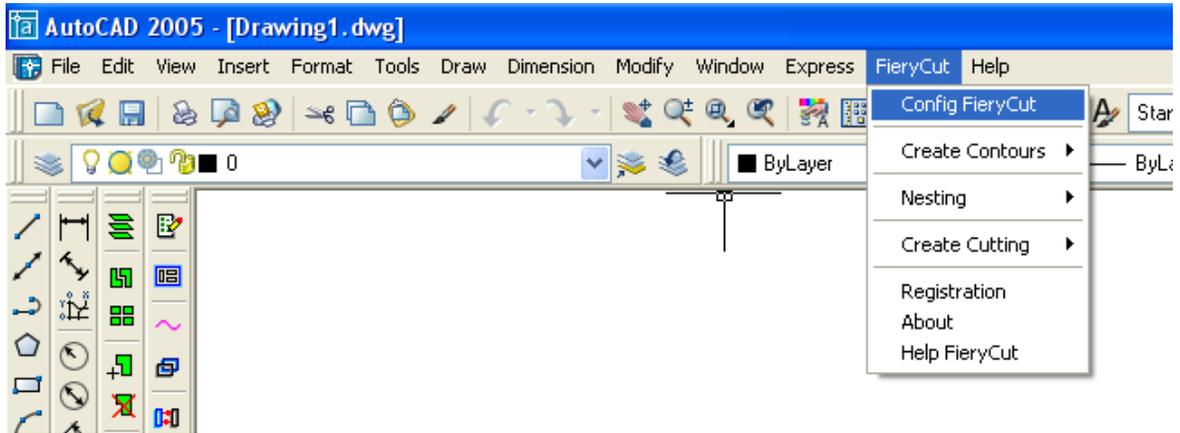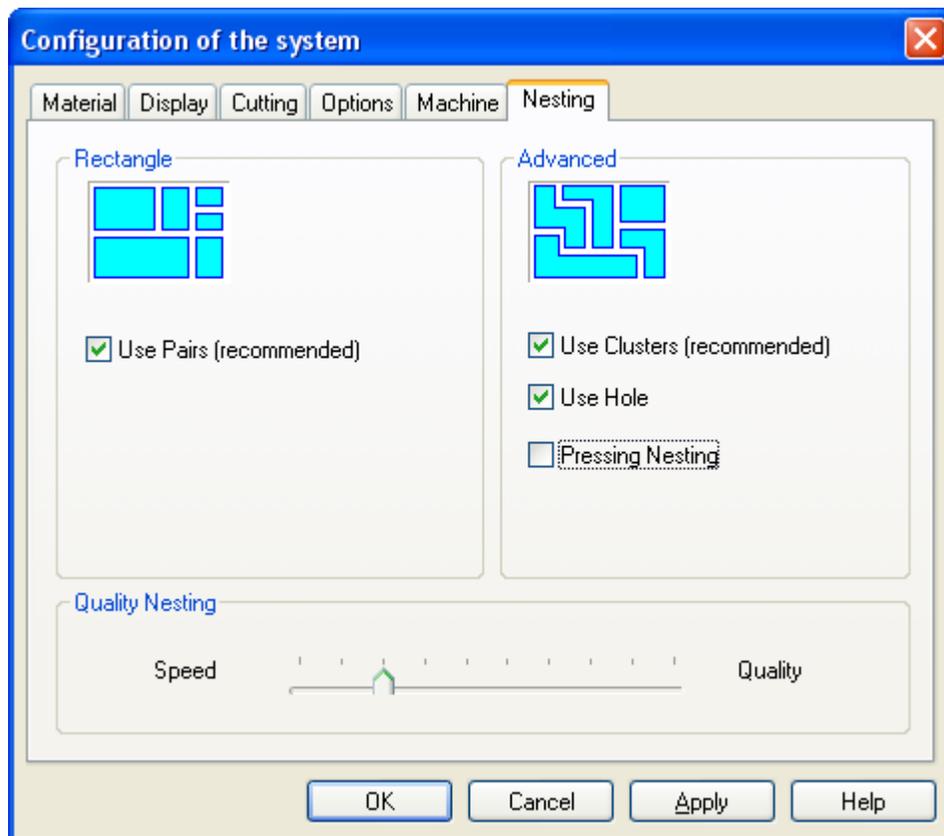# Tutorial

After successful installation of the program FieryCut is added to the main AutoCAD and Mechanical menu.

and toolbars

Before launching demonstration examples check up system FieryCut configuration, selecting consequently FieryCut-> Config FieryCut from the main menu and the page Nesting.
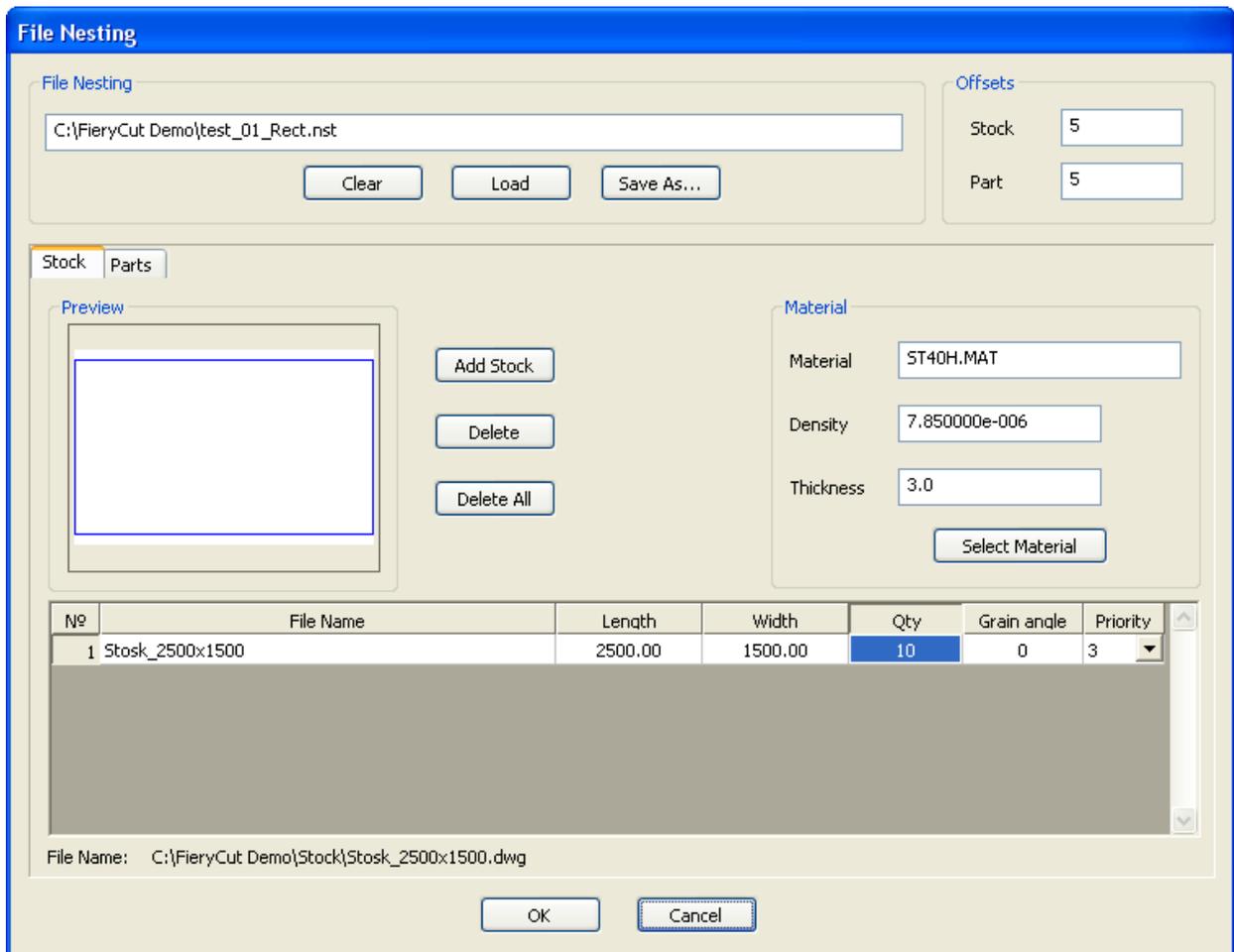
Program operation sequence is described at end of this section. For more detailed information on commands use help.

Step 1. Rectangle Nesting/Advanced Nesting

1. Press the button ≣ to load the definition for Nesting from the disk.

Press the button Load, in a dialogue top, and select a required file
C:\FieryCut Demo\test_01_Rect.nst

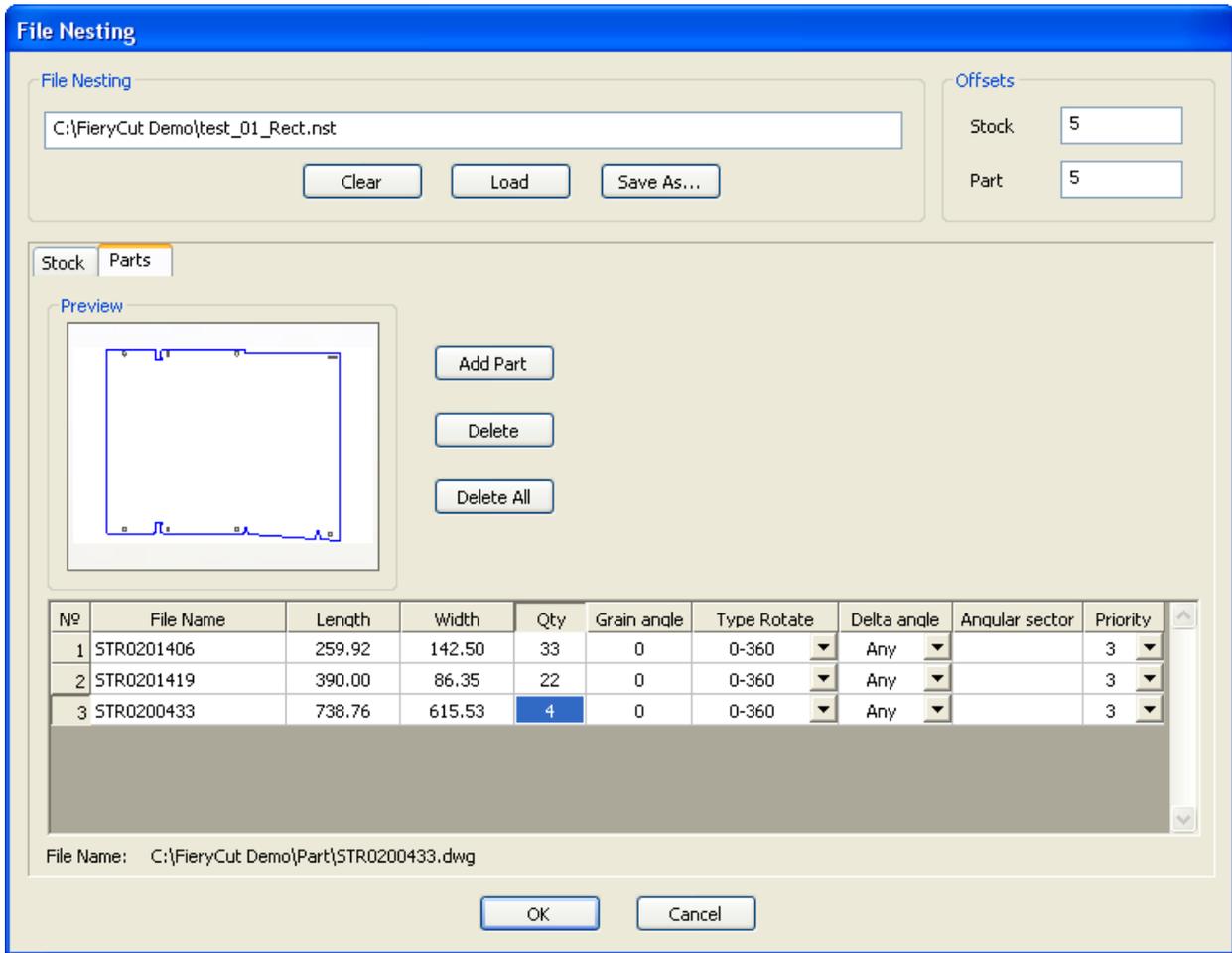
Select page Stock.
This page displays the information on stocks where we execute is part placing. On the same page it is necessary to select a stock material.

Select page Parts.
This page displays the information on parts which are to be placed.

File Nesting

File Nesting

C:\FieryCut Demo\test_01_Rect.nst

[Clear] [Load] [Save As...]

Offsets

Stock 5

Part 5

Stock | **Parts**

Preview

[Add Part]

[Delete]

[Delete All]

№	File Name	Length	Width	Qty	Grain angle	Type Rotate	Delta angle	Angular sector	Priority
1	STR0201406	259.92	142.50	33	0	0-360	Any		3
2	STR0201419	390.00	86.35	22	0	0-360	Any		3
3	STR0200433	738.76	615.53	4	0	0-360	Any		3

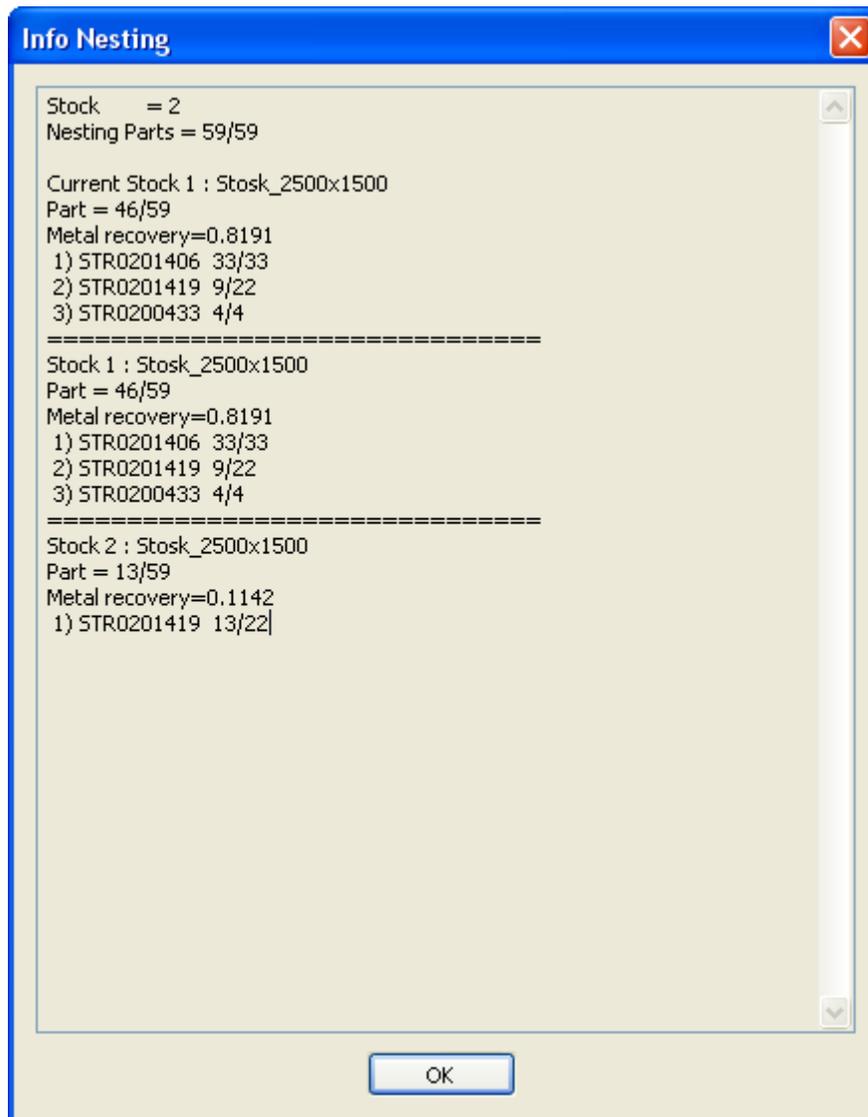File Name: C:\FieryCut Demo\Part\STR0200433.dwg

[OK]   [Cancel]

Parameters Offsets (in the upper right corner of the dialogue) establish minimum admissible distances between parts and stock.

Press button OK.

2. Press the button 🔳 to perform placing of parts by Rectangle Nesting method or the button 🔲 to perform placing of parts by Advanced Nesting method.

The program executes automatic nesting of parts and displays the first stock on the screen. The report on results of nesting is shown in the window Info Nesting.

```
Info Nesting                                            [X]

 Stock     = 2
 Nesting Parts = 59/59

 Current Stock 1 : Stosk_2500x1500
 Part = 46/59
 Metal recovery=0.8191
  1) STR0201406  33/33
  2) STR0201419  9/22
  3) STR0200433  4/4
 ================================
 Stock 1 : Stosk_2500x1500
 Part = 46/59
 Metal recovery=0.8191
  1) STR0201406  33/33
  2) STR0201419  9/22
  3) STR0200433  4/4
 ================================
 Stock 2 : Stosk_2500x1500
 Part = 13/59
 Metal recovery=0.1142
  1) STR0201419  13/22


                        OK
```

String Stock=2 - shows a quantity of the used stocks.
Nesting Parts=59/59 - shows quantity of the nested parts and full quantity of parts which have to be placed.

Below you can see the information on result of placing on current stock and the information on all stocks where placing of parts is performed.
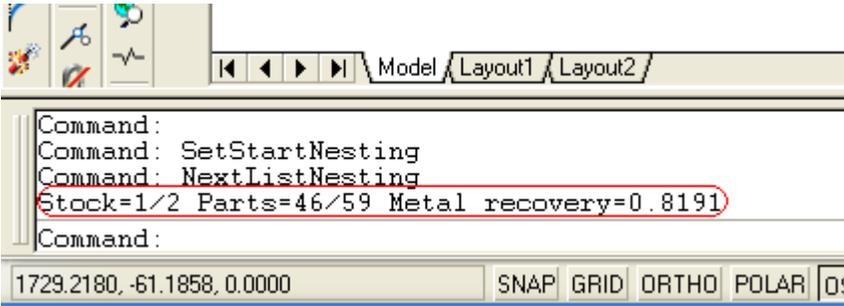
Press button OK.

3. Placing of parts on the first stock by Rectangle Nesting method is illustrated lower.
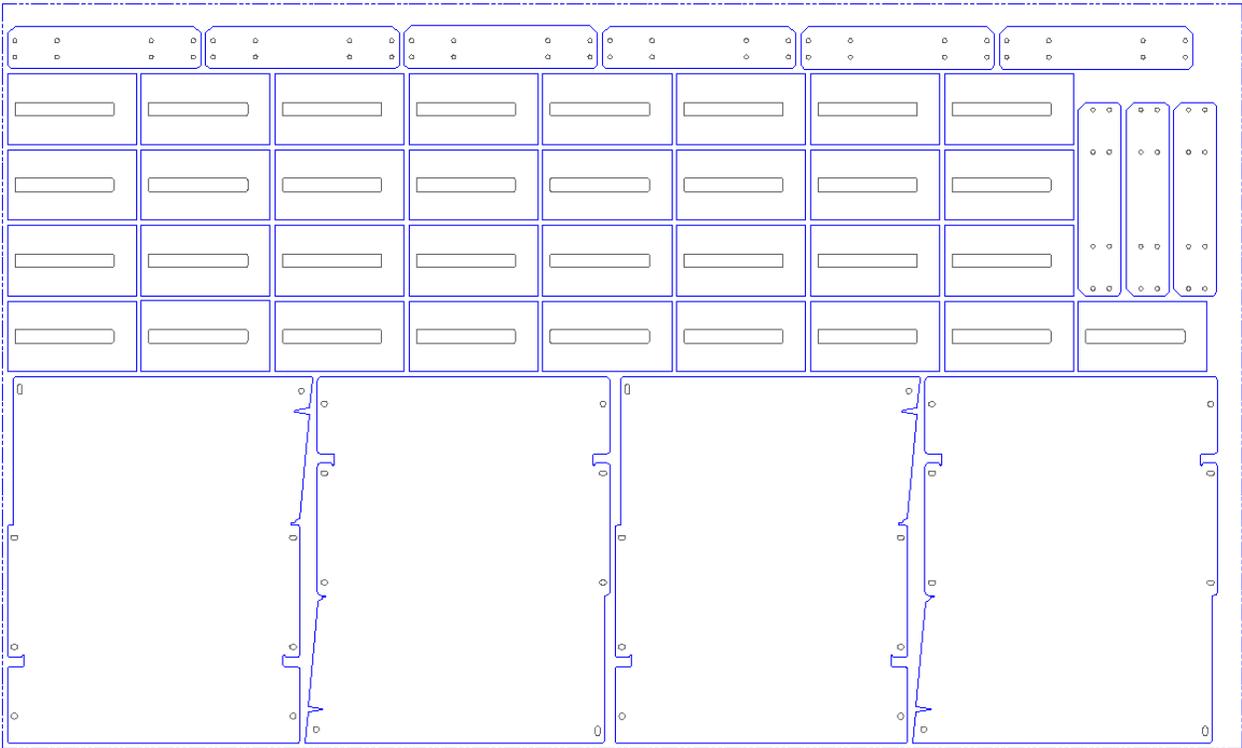
Note. Stock is shown in a dash-and-dot line "PHANTOM".

To show the following sheet of stock press the button ⬆, previous the button ⬇.

The information on results of placing on current stock is shown at the bottom part of the menu.


Stock=1/2 - stock 1 is displayed. Total used score is 2 stocks.
Parts=46/59 - on current stock 46 parts from 59 are placed.
Metal recovery=0.8191 – material using factor 81.91%

Note. If necessary it is possible to write down any sheet of nesting in a file .dwg. This file can be loaded as usual drawing AutoCAD, if needed you can edit it and create the CNC program.

Step 2. Creation of the CNC program

1. So, in Step 1 we have received placing of parts as shown lower.
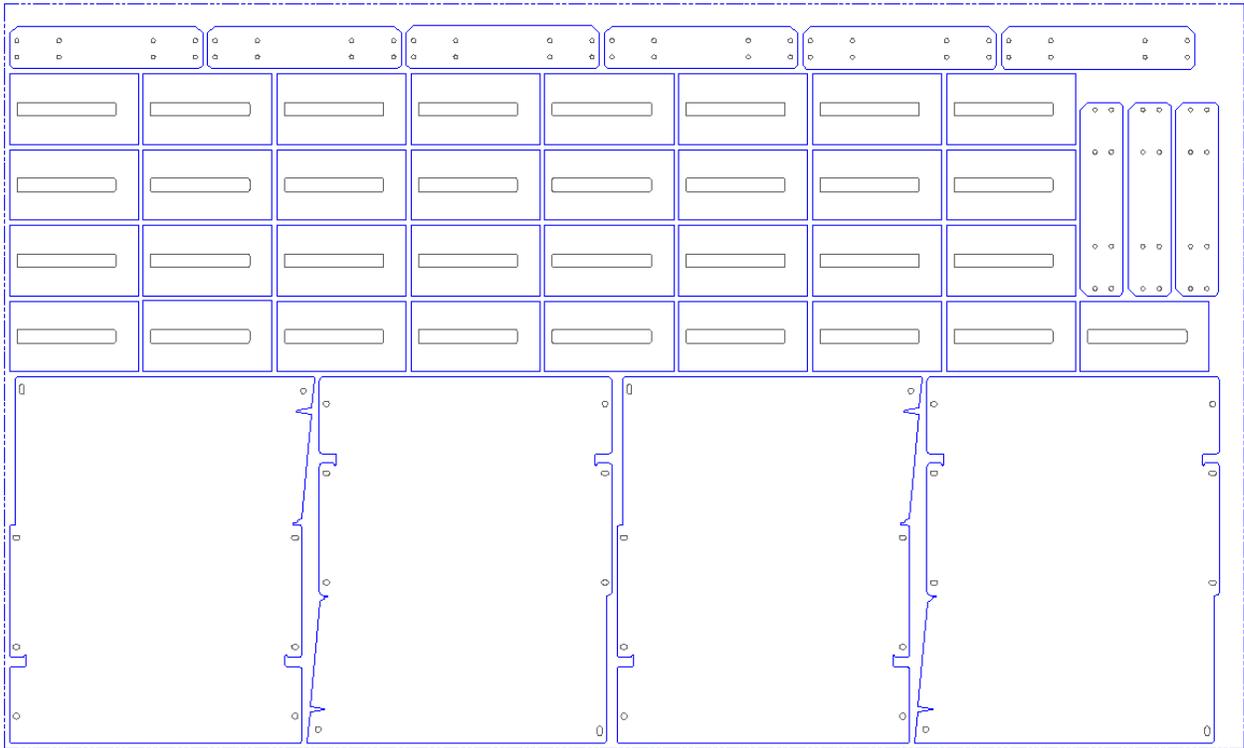
Note. It is absolutely of no importance in which way the placing has been created. It can be done by Nesting unit or independently using resources of AutoCAD or Mechanical. If the result of placing is saved on a disk, it can always be loaded for further operation.

Pay attention, stock should always be set line in style "PHANTOM".
If the stock is not set - the program will not calculate material using factor (Metal recovery).

2. Press the button ▣. The program checks the contours of parts and transforms them into a format necessary for Geometry unit. On the screen we receive the picture shown lower. Pay attention that color of stock has changed.
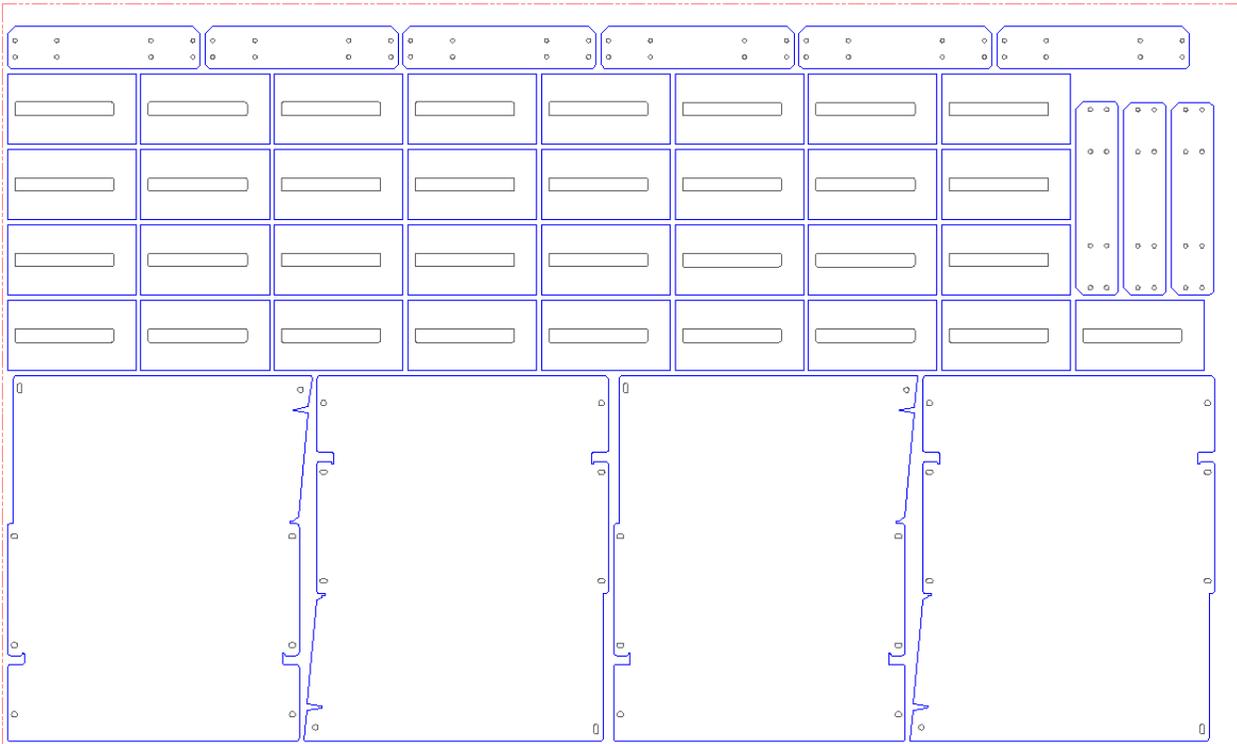
At the menu bottom the total information on the contours of all parts is shown.
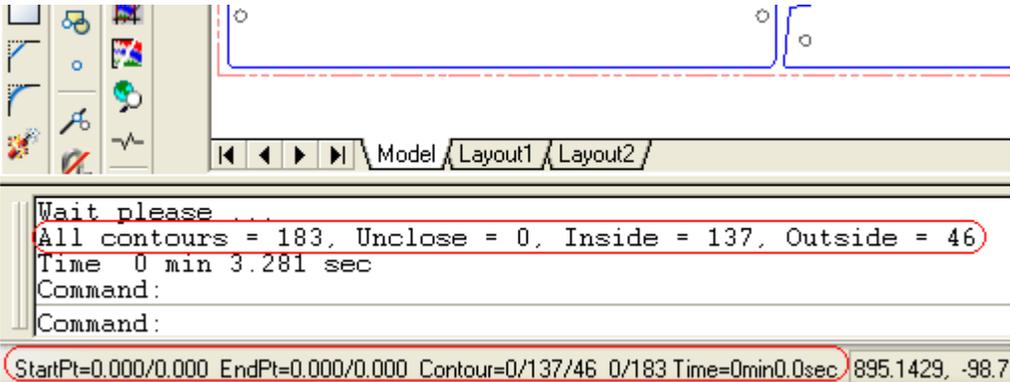

Geometry unit information is displayed in a status line:

StratPt - a starting point in the program.

EndPt - current coordinate where there is a cutting tool.

Contour - the information on contours (Unclose/Inside/Outside)

0/183 – quantity of the cut contours and a total quantity of contours.

Time=0 min 0.0 sec - an estimated time which is necessary for a cutting of contours of the parts by the machine tool of CNC.

Note. String Time 0 min 3.281 sec - shows time which has been spent for creation of contours. This information is displayed only for an estimation of command executions. It is not used anywhere more.

3. Press the button . The program creates sequence of cutting of parts contours. The program executes optimization of a cutting trajectory. If in grooves of parts there are other parts - internal parts are cut first. The nesting of parts is unlimited.

Note. If the start / exit on a contour can't be created correctly (because the leadin/leadout line intersect a part contour) - the program automatically selects other start point and adjusts leadin/leadout lines.
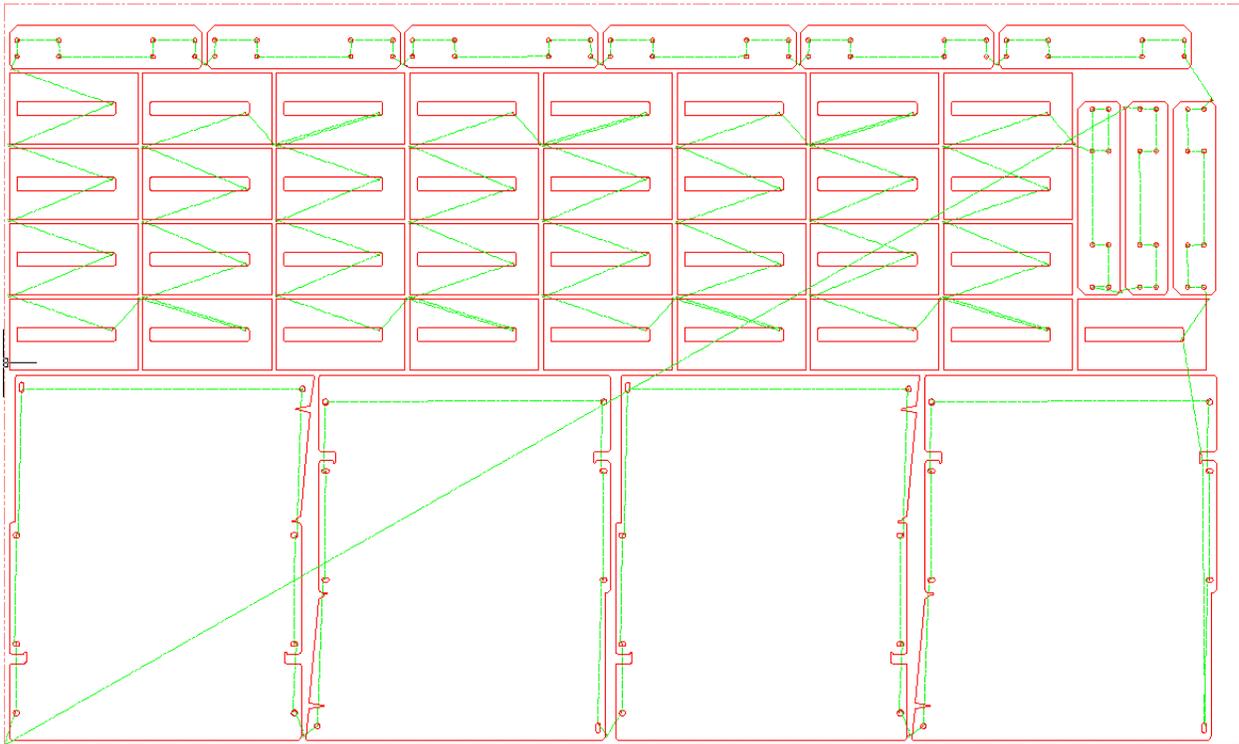
The following information will be displayed in a status line.
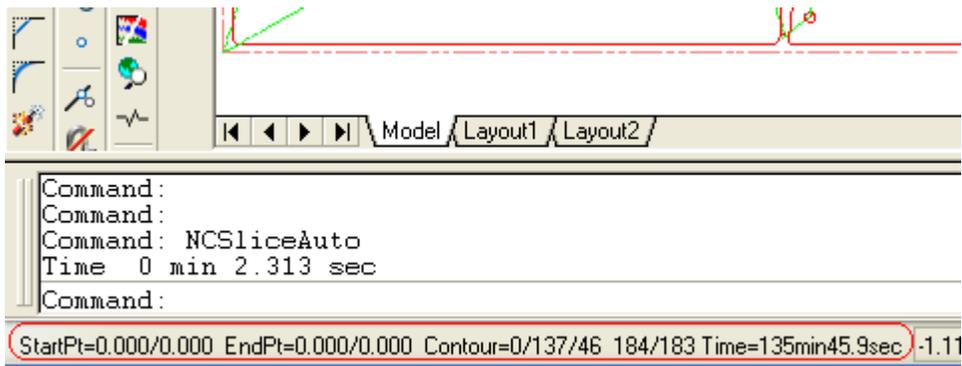
Time=135min 45.9 sec - an estimated cutting time of part contours by the CNC machine tool with current modes cutting.

The sequence of cutting can be saved on a disk in a format .dwg. The file can always be loaded as a usual file AutoCAD or Mechanical.

4. To create the CNC program press the button .
In the appeared dialogue you have to specify a filename in which it is required to write the CNC program.
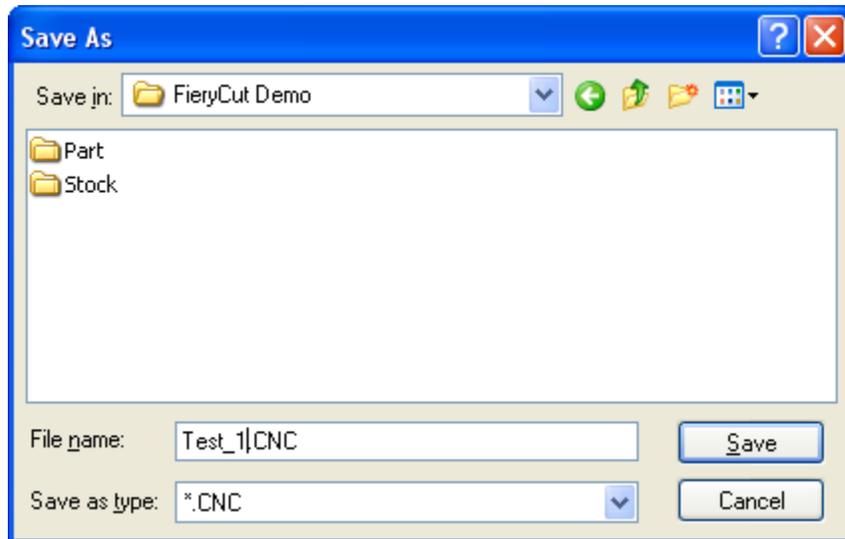
In following dialogue it is necessary to enter the information necessary to create CNC program.

Here it is possible to select the postprocessor for other machine tool and to change cutting modes. Cutting time is automatically calculated.
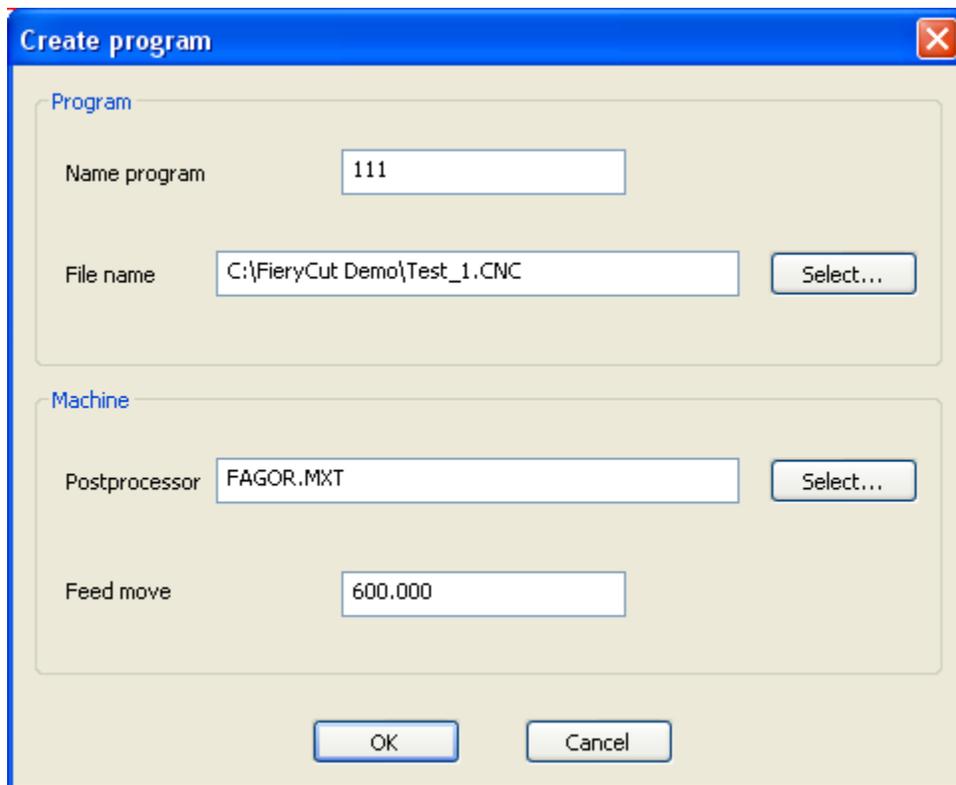
Press the button OK.

The CNC program is created. The program text is displayed in text editor WordPad where you can view the received text of the program and if necessary edit it.

```
Test_1.CNC - WordPad

File  Edit  View  Insert  Format  Help

Courier New      10      Cyrillic        B  Z  U

%111
N10(**********************************)
N15( FAGOR-LASER                      )
N20( MATERIAL - ST40H.MAT             )
N25( THIN=3.000                       )
N30( FORMAT                           )
N35( TIME 135 MIN 45.9 SEC            )
N40(**********************************)
N45G0X20.92Y64.87
N50M7
N55G1G41X21.88Y70.79D1F600.00
N60G2I2.13J-5.61
N65G1G40X24.21Y68.89
N70M8
N75G0X24.24Y203.90
N80M7
N85G1G41X21.51Y209.24D1
N90G3Y200.24I0.00J-4.50
N95G1X26.51
N100G3Y209.24I0.00J4.50
N105G1X21.51
N110G40X20.15Y206.57
N115M8
N120G0X23.79Y423.90
N125M7
N130G1G42X26.51Y429.24D1
N135G2Y420.24I0.00J-4.50
N140G1X21.51
N145C2V120.24I0.00J4.50

For Help, press F1                           NUM
```

Note. If there is a need to create the program for several machine tools of CNC, execute item 4 selecting a new postprocessor and changing cutting modes.

5. To receive the information on contours and cutting, press the button ▤. In the dialogue box the main information on groups is displayed.

Note. This information is accessible only in Geometry unit and Cutting.

Info Geometry/Cutting

General

Unit	MM
Material	ST40H.MAT
Thin	3.00
Density	7.850e-006
Area surface	3071455.01
Mass	72.3328

Contours

Unclose contours	0
An inside of contours	137
An outside contours	46
All of contours	183
Mode cut in start point	A cut is at home
Length of inside of contours	6.00
Length of outside contours	3.00

Cut

Postprocessor	FAGOR.MXT
Cutting feed	600.00
Length feed move	65947.55
Length rapid move	29577.74
Processing time	135 min 45.9 sec

Material consumption

Used	72.3328
Burnt	0.3106
Scrap	15.6691
Metal recovery	0.8191

OK

Step 3. Creation of contours of parts / stocks

Part contours can be drawn by resources AutoCAD, Mechanical or imported from any other system in a format .dwg or .dxf

Requirements to contours:
Part/stock contours should be drawn in line style - "Continuous".
The part can contain one external and many internal contours of any complexity.

It is admitted to draw open contours - these contours are cut without leadin and leadout.
For contours construction is admitted to apply the lines of the following types - line, arc, circle, polyline.
There is no difference between it stock and part contours. A part contour can be used as a stock contour so that to place other parts on it.

Note. If you use a demo version of the program - the part/stock file will be written without the expanded data which are necessary for operation of FieryCut units. If you work in a demo version of the program - use demonstration files of parts and stocks to test Nesting unit, Geometry and Cutting. Don't use auto save in AutoCAD when you work in a demo version of the program so that to disable the system to write data automatically.

1. Draw any contour of a part consisting of one external and several internal contours. The sizes in this case are of no importance. For us it is necessary to understand the principle of work of the program.
Draw a picture, as shown lower.
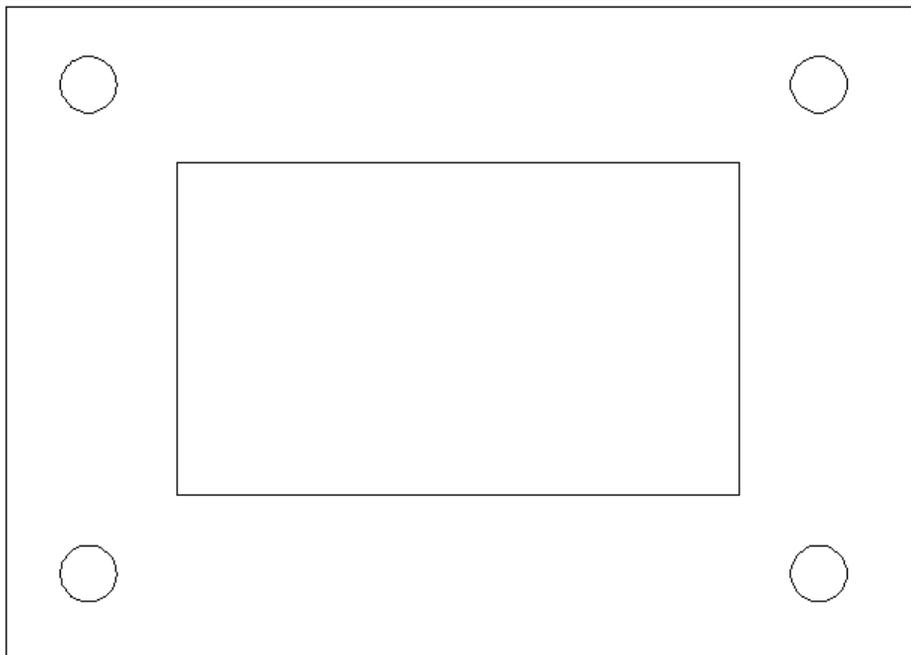
2. Create contours, having pressed the button 🔲. Pay attention, that color of contours has changed.
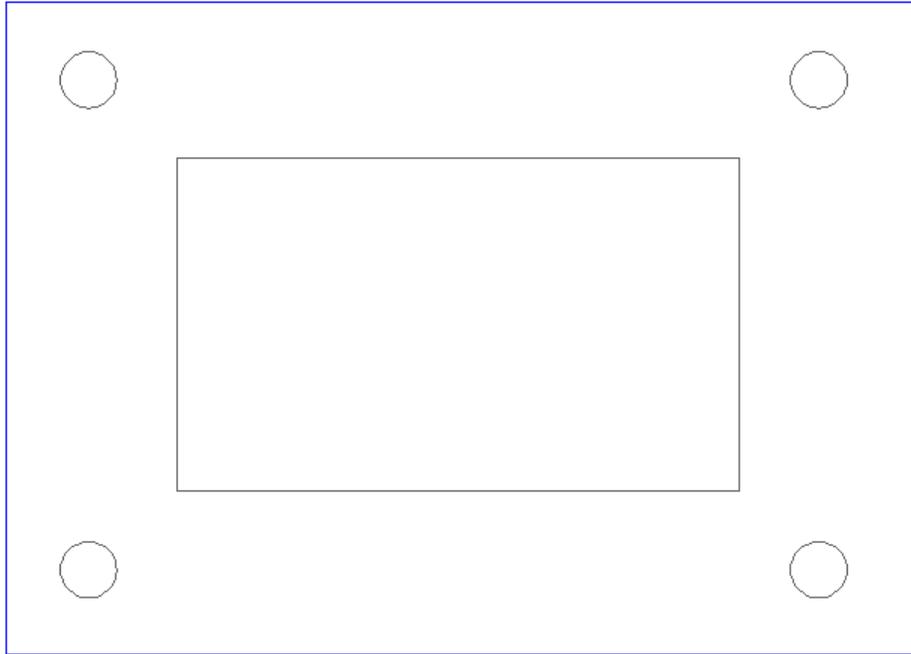
During creation of contours the program checks their correctness on ruptures, intersections and overlay of contours. The program automatically corrects errors. If it is not possible to correct - the error message is displayed.

To facilitate the search of errors about the contours of the parts use the following commands:

∿ - the command shows all open contours. There is a possibility of a zooming. It is possible to delete current or all open contours directly from the command.

⧉ - the command shows pairs of all intersected contours. There is a possibility of a zooming. It is possible to delete one of intersected contours directly from the command.

Having quitted ∿ command or ⧉ you can edit an error yourself using resources AutoCAD or Mechanical.

After editing repeat the command ▣.

3. Save the received drawing on a disk in a format .dwg. Now this file can be used in Nesting unit for allocation of parts on a stock.

4. To obtain the information on a part, press the button ▣. On the screen you will see the following dialogue.

Info Geometry/Cutting

General

Unit	MM
Material	STEEL.MAT
Thin	1.00
Density	7.850e-006
Area surface	233857.95
Mass	1.8358

Contours

Unclose contours	0
An inside of contours	5
An outside contours	1
All of contours	6
Mode cut in start point	A cut is at home
Length of inside of contours	6.00
Length of outside contours	3.00

Cut

Postprocessor	FAGOR.MXT
Cutting feed	600.00
Length feed move	0.00
Length rapid move	0.00
Processing time	0 min 0.0 sec

Material consumption

Used	1.8358
Burnt	0.0000
Scrap	A stock is absent
Metal recovery	A stock is absent

OK

Pay attention that in the dialog box displays information only on part geometry. The information on cutting of contours will appear only after you start to cut contours.

Step 4. Editing of allocation of parts in Nesting unit

We have learnt to use the main possibilities of the program on Steps 1-3. Now let's consider additional possibilities of the program.

1. Press the button ≧ and open the file C:\FieryCut Demo\test_21.nst

14

2. Press the button ⊞ to execute Rectangle Nesting. We receive a picture shown lower.

Using editing commands, we change a position and a turn of some parts.

3. Move a part to a new position. For this purpose press the button ✛, select a part and move it to the position which is required. The program automatically completes a part allocation in the current position.

Note. Commands of moving with an index "A" place a part in the way by which allocation of parts has been executed (Rectangle Nesting or Advanced Nesting).

4. To turn a part on 90 ° press ⊞ and select a part which is required to be turned. The part turns round its centre. Intersection contour check is not executed at the given stage. Turn three parts as it is illustrated in the pictures.
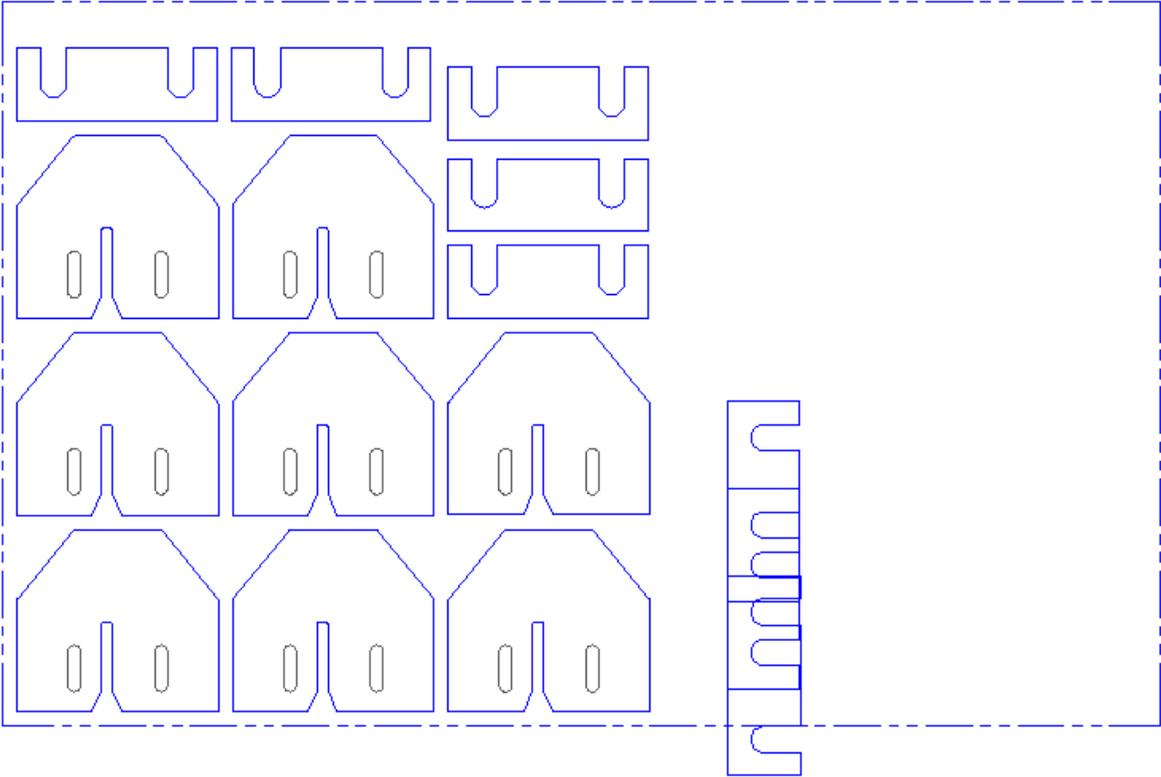

Do not pay attention, that parts are intersected and stock falls outside the limits.

5. Execute intermediate moving of two upper parts by means of ✛ command. The part remains in the position in which it has been inserted. Thus parts can intersect each other or fall outside the limits stock.

16
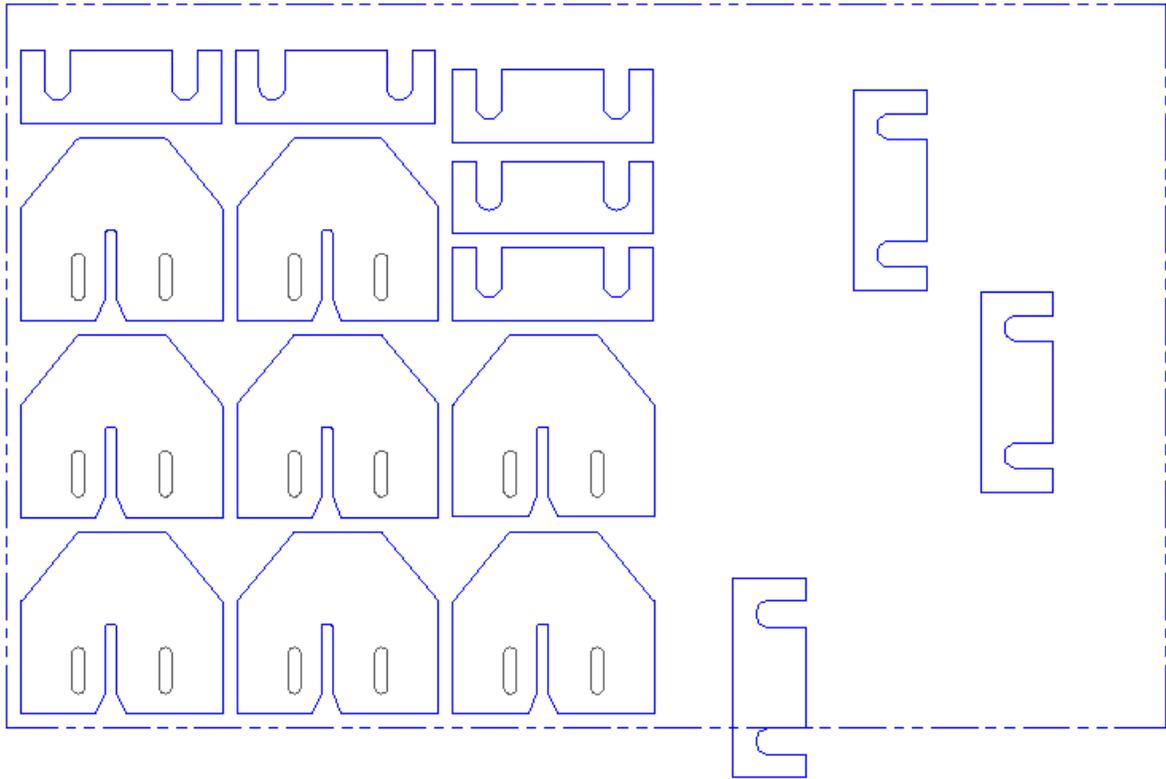
Note. Command ✛ is used to move the parts to the position different from automatic allocation. So, for example it allows placing a part inside another part even if you use Rectangle Nesting method of allocation. Correctness of allocation of parts is checked later - at the stage of contour creation by command ▣.

6. And at last let's complete allocation of parts using ✛ command.
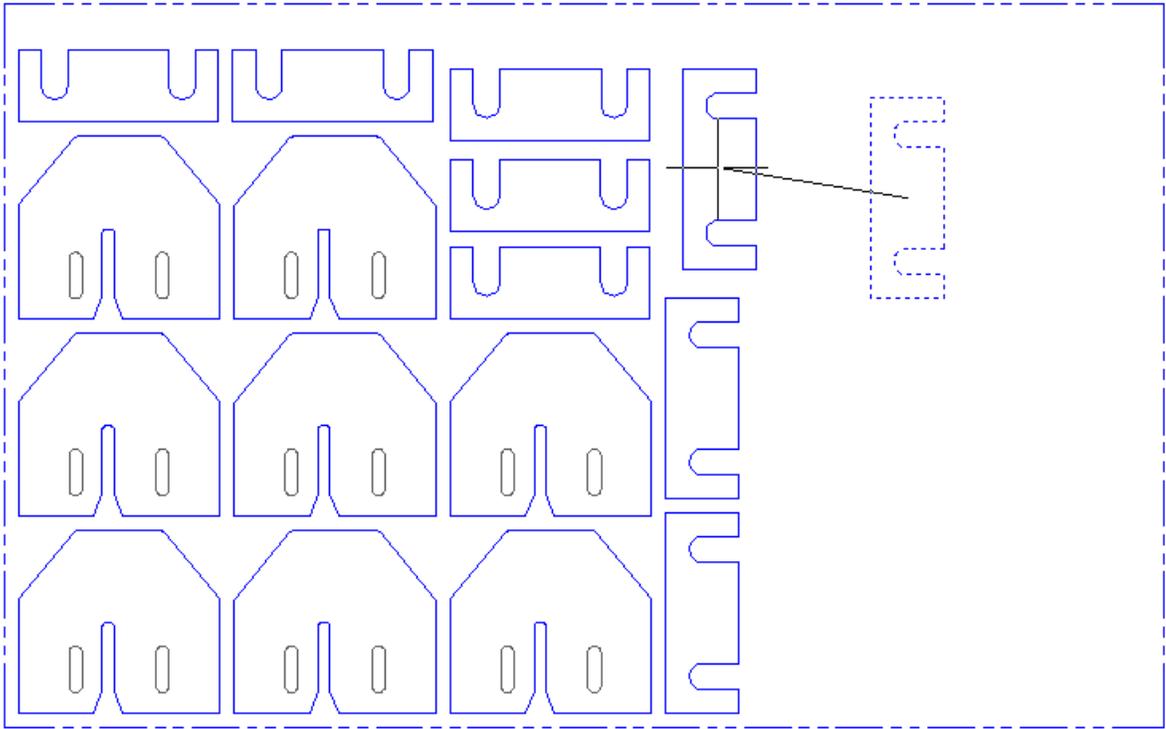
As a result we receive the allocation shown lower.
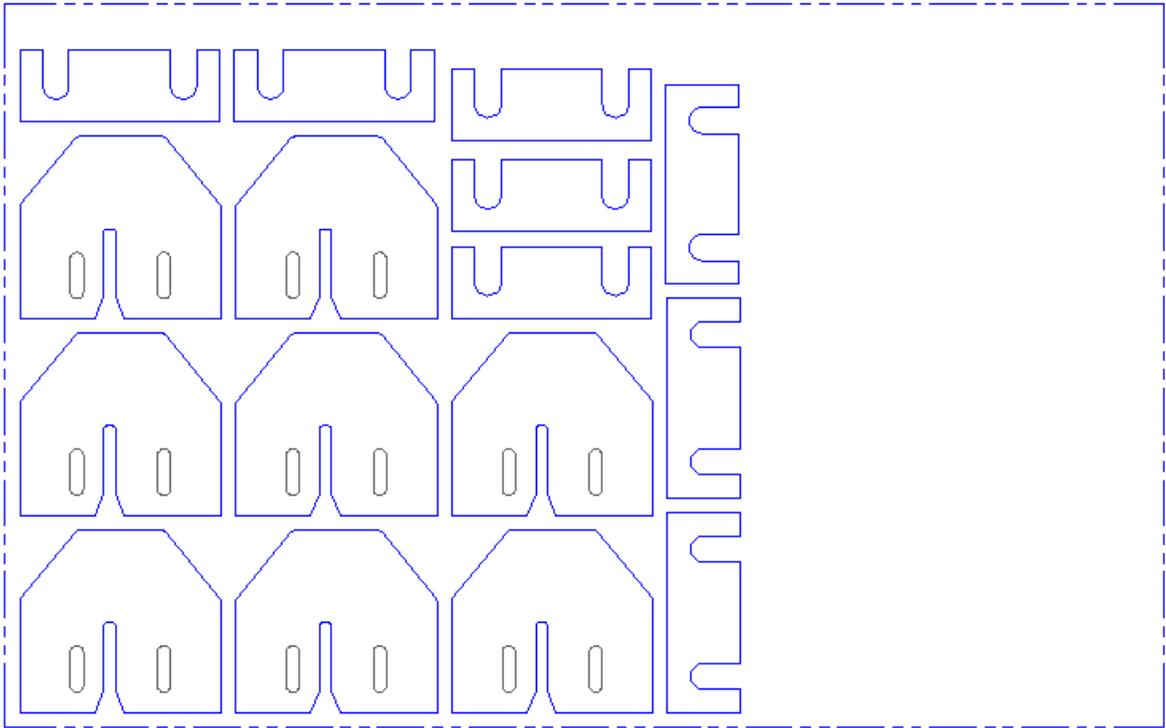
7. To delete a part from accommodation, press the button and select a part which is required to be deleted.

8. To add a new part press the button ⊞. From the appeared menu select a part which is required to be inserted on the current stock and press the button "Insert" - to place a part by ✛ command, "Insert Auto" - to place a part by ✛ command.
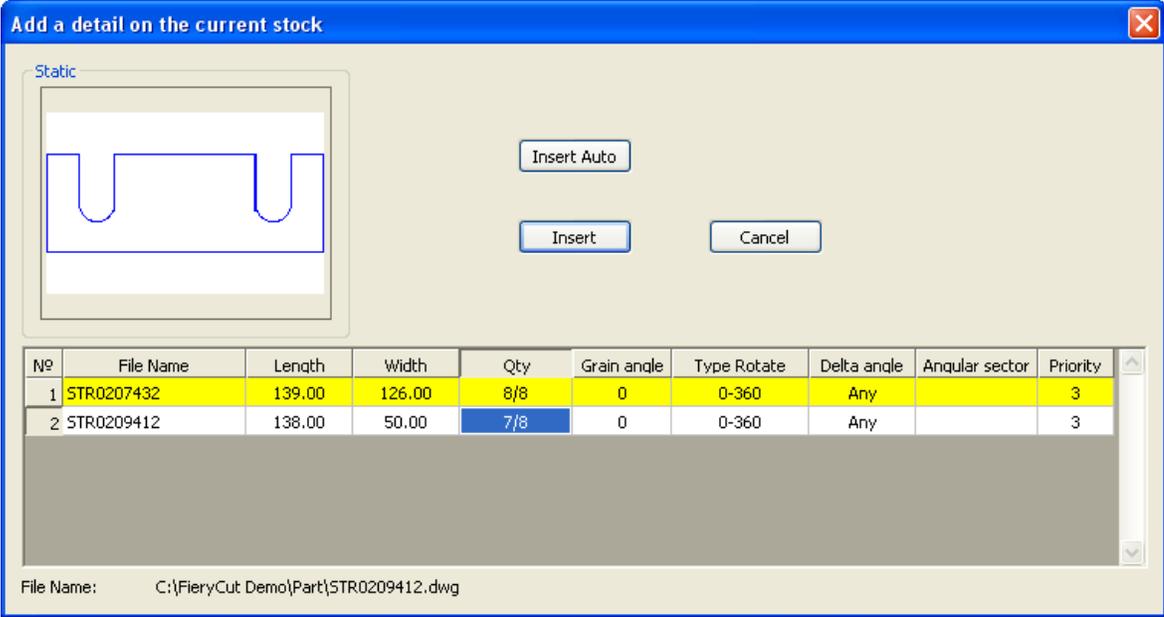
9. Use ⚑? command to receive the name of the selected part and quantity of these parts on the stock.

10. Command ⊞? displays the information on the allocation of parts.

```
Info Nesting                                              ✕

 Stock     = 1
 Nesting Parts = 16/16

 Current Stock 1 : Stosk_800x500
 Part = 16/16
 Metal recovery=0.4047
  1) STR0207432  8/8
  2) STR0209412  8/8
```
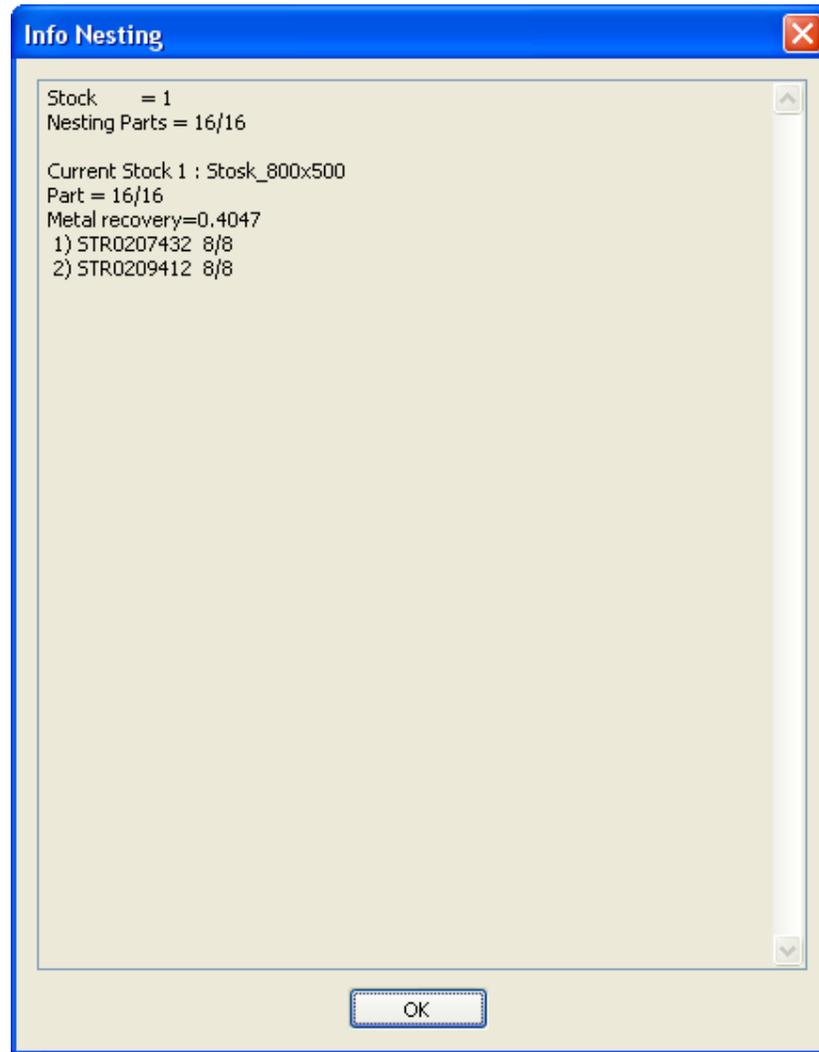
Step 5. Creation of allocation of parts on stock without Nesting unit. Editing of allocation of parts by resources AutoCAD or Mechanical

If you do not have Nesting unit you can place parts on stock yourself using resources AutoCAD or Mechanical.

The quantity of placed parts is of no importance. There can be one or many different parts there. Parts can be nested inside each other. The enclosure of parts is not limited.

You can also edit the allocation received in Nesting unit deleting placed parts and adding new parts, using resources AutoCAD or Mechanical.

After you have created allocation of parts on the stock, repeat the steps which you have executed in Step 2, starting with item 2.

If you add a stock contour - it should be drawn in line type "PHANTOM". In this case the program calculates material using factor.

1. Create a similar figure and press the button ▦ to create contours.

20
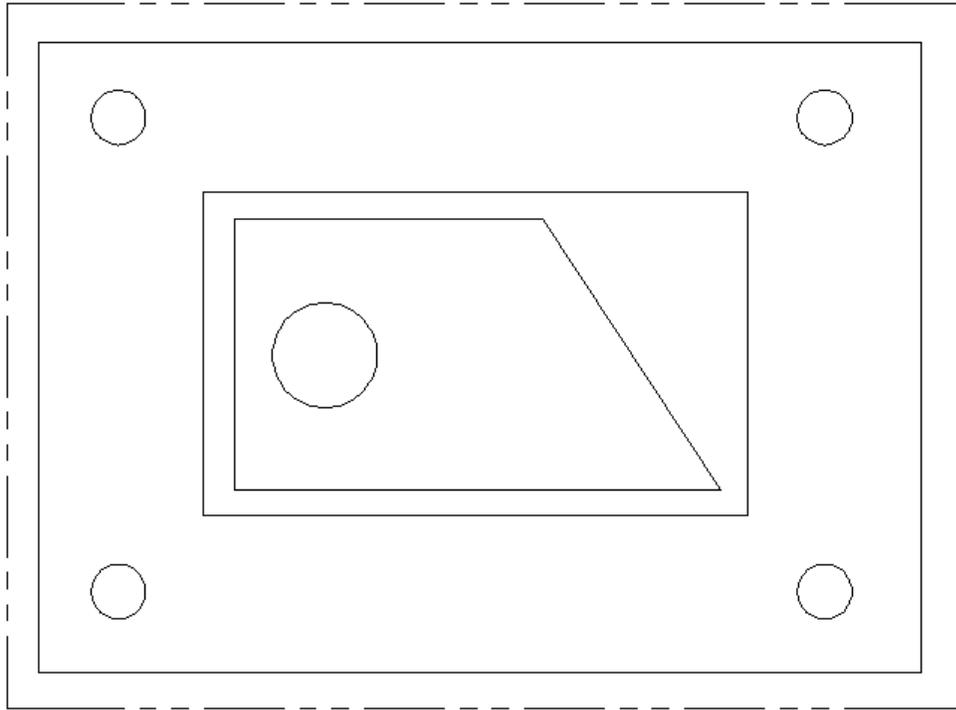
We receive the following picture.
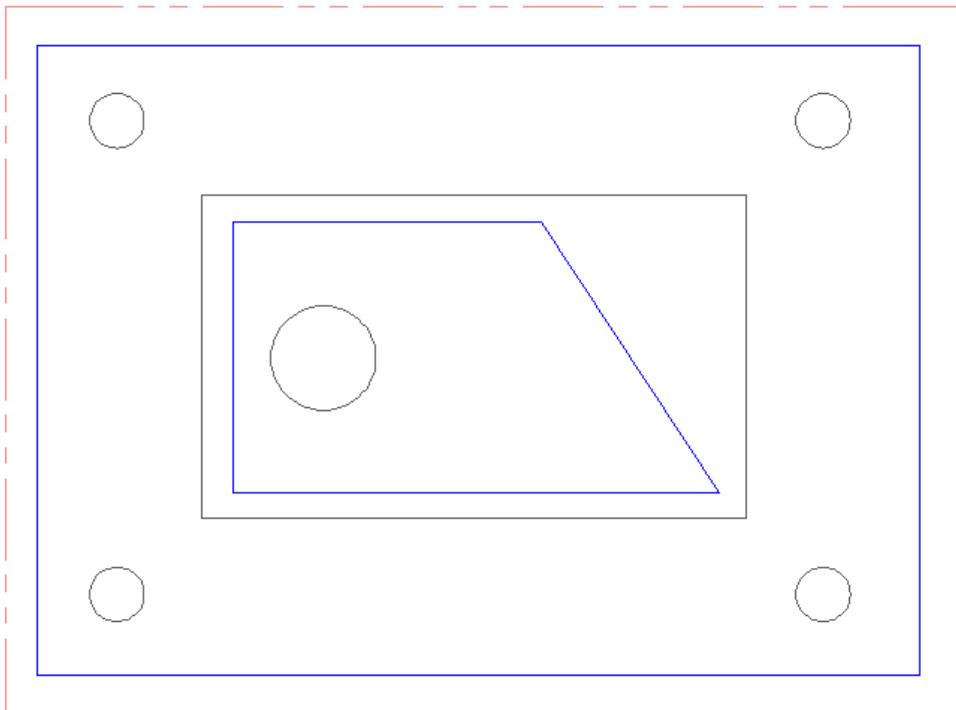
Pay attention, that the internal part is correctly recognized.

2. Now it is possible to cut contours by pressing the button 🔧 and to create the CNC program pressing the button 🗐. For the detailed description of these commands see Step 2.

Step 6. Editing of commands of cutting

At the previous lesson we received the following sequence of cutting.

The short description of commands is given lower. Try to work with them to gain some experience.

The description of commands

[LAST icon] - to delete the last command of cutting
[PICK icon] - to delete the specified command of cutting
[ALL icon] - to delete all commands of cutting

[icon] - the command automatically cuts all contours of parts
[icon] - the command cuts contours of parts, in the sequence specified by the user
[icon] - the command returns the tool to point Home. This command is to be executed last in the program.

[icon] - to insert the command of cutting. Select a contour behind which it is necessary to insert the command of cutting and specify in a contour which is required to be cut.
[icon] - to change sequence of cutting. Select one cut contour, then another cut contour which should be cut after the first contour.
[icon] - to recreate a contour. Select the cut contour, then the same contour from a point in which it is necessary to start cutting. If the contour is selected near to the end point of the line - leading starts at the end point of the line. If the contour is selected far to the end point of the line - the cutting starts at a specified point.

[icon] - to show sequence of cutting of all contours. To interrupt the command use key Esc. To change speed of display press + or - on the numeric keypad. In the course of display it is possible to execute a zooming and moving, using the mouse.
[icon] - it is similar to the previous command, but displays cutting process only of the selected contour.

Note. Commands of cutting can be executed only after creation of contours by command [icon].

If necessary it is possible to move a point of a leadin/leadout line, using resources AutoCAD or Mechanical. For this purpose select the cursor of 2 lines, as shown lower and place an angular point to a new position.
Attention. There mustn't be breaks between the lines.

Note. It is impossible to edit any other lines.

Sequence of work with the program

1. Draw contours of parts and stocks. Create contours by ▦ command and save them on a disk.

2. Place parts on stock, using one of variants or their combination
      a) Place parts using Nesting unit. For this purpose
         1) Press the button ≡, specify stocks, a material of a stock and parts which are to be placed. Set the distance between parts and a stock - Offsets.
         2) Execute allocation of parts by pressing the button ▦ or ⬒. To show another stock, use the button ⬆ or ⬇.
      b) Place parts yourself using resources AutoCAD or Mechanical.

Note. The obtained placement of parts can be saved on a disk to continue operation.

3. Create contours by ▦ command. At this stage the control of all contours (for example, an intersection of contours) is executed.

4. Create commands of cutting, pressing the button ⚡.

5. Create the CNC program, pressing the button ▤.

Note. The information received in items 2-4 can be saved on a disk in a file .dwg. If necessary the file can be loaded from a disk for further operation.