

CNC mdl **Engraver Ver. 01a**

Not only Engraver
Part 01



WORK EXAMPLES

Engraver, even though it was designed to perform incisions, can also do something else. This software does not automatically prepare preliminary and final grinding; it can however, as the examples below, give him some commands fit for purpose.

In the pages that follow are given, only for instance, some examples to provide ideas. The images were obtained during testing of the software.

For the execution of the tests, it is used mainly as wood, in addition to the cuts to "empty" at maximum speed; this to speed up and, consequently, test the speed of execution instructions and the correspondence with the machine tool.

Obviously, the cut in the steel or in alloys will be much "cleaner" than wood.

Enjoy.

STRAIGHT CUT ON THE CYLINDER

Open the software and click on the XYZA button



Set the cutting parameters:

Descrizione	U.M.	Dato	Esito
Raggio Esterno (NO SCALA)	mm	12,500	NO fattore Scala!
Profondità di intaglio (NO SCALA)	mm	4,000	NO Fattore Scala!
Numero intagli XYZA - su Cilindro	nr	10	
Profondità di Taglio (per Steep)	mm	0,500	
Luce libera traslazione utensile	mm	1,000	
Velocità Profondità Z	F	200,000	
Velocità intaglio	F	600,000	
CNC- Sistema Gradi Asse "A"	Gradi	360,000	
Fattore di Scala X->A	1X	1,000	
Fattore di Scala X	1X	1,000	
Fattore di Scala Y	1X	1,000	
Fattore di Scala Z	1X	1,000	
Traslazione Origine X	mm	0,000	
Traslazione Origine Y	mm	0,000	
Traslazione Origine Z	mm	0,000	
Traslazione Origine A	Gradi	0,000	

Descrizione	U.M.	Dato	Esito
Numero passate (Steep)	nr	8	Nr. Passate Ok
Profondità di Taglio- calcolato	mm	0,500000	
Lunghezza Asse Y"	mm	19,805	
Raggio Interno	mm	8,500	
Diametro esterno	mm	25,000000	
Circonferenza Esterna	mm	78,339816	
Diametro Interno	mm	17,000000	
Circonferenza Interna	mm	53,407075	
Interasse intagli	mm	7,853982	
Interasse intagli	Gradi	36	

As we can see we will make a cut 4 mm deep, removing 0.5 mm per step, and will perform on the cylinder 10 cuts.

Now let's check the codes "CNC base codes":

RIGA	Codice
1	G0 G49 G40 G17 G80 G50 G90
2	
3	M3 S20000
4	
5	
6	
7	
8	
9	
10	

RIGA	Codice
1	G0 Y2 A0
2	G0 Z12
3	G01 A2800 Y=20 F10000
4	
5	G0 Z15
6	G0 X0 Y0
7	
8	
9	M5
10	M30

We can see that in the final part of the program we manually entered some "G-Codes": these codes will be executed at the end of the program. The codes are placed there for a final cleaning and adjustment of our work.

In detail we wrote:

G0 Y2 A0

- G0 (rapid positioning)
- Y2 (go to the coordinated Y2)
- A0 (bring the A-axis to zero degrees)

G0 Z12

- G0 (rapid positioning)
- Z12 (bring the Z-axis to quota 12)
 - o Note: we set dimension "Z" equal to 12 so our adjusted diameter will be 24 mm.

G01 A28800 Y-20 F10000

- G01 (linear interpolation)
- A28800 (turn A-axis of 28800 degrees, or rather, turn the A-axis for 80 laps)
- Y-20 (go to the coordinated Y-20)
- F10000 (hold a feed of 10000)
 - o Note: we calculated a pass of 0,25mm per revolution, then for cleaning 20mm we have to perform 80 laps ($20\text{mm} * 4\text{laps/mm} * 360\text{degrees} = 28800\text{degrees}$)

G0 Z15

- G0 (rapid positioning)
- Z15 (bring Z-axis to quota 15)

G0 X0 Y0

- G0 (rapid positioning)
- X0 (go to the coordinated X0)
- Y0 (go to the coordinated Y0)

Then we insert the data:

Coordinate	NR	Linea nr	X -> A	Y	Correzione Z	Correzione X	Correzione Y
1	1	1	0,000	0,000	0,000	0,000	0,000
2	1	1	0,000	-15,000	0,000	0,000	0,000
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							

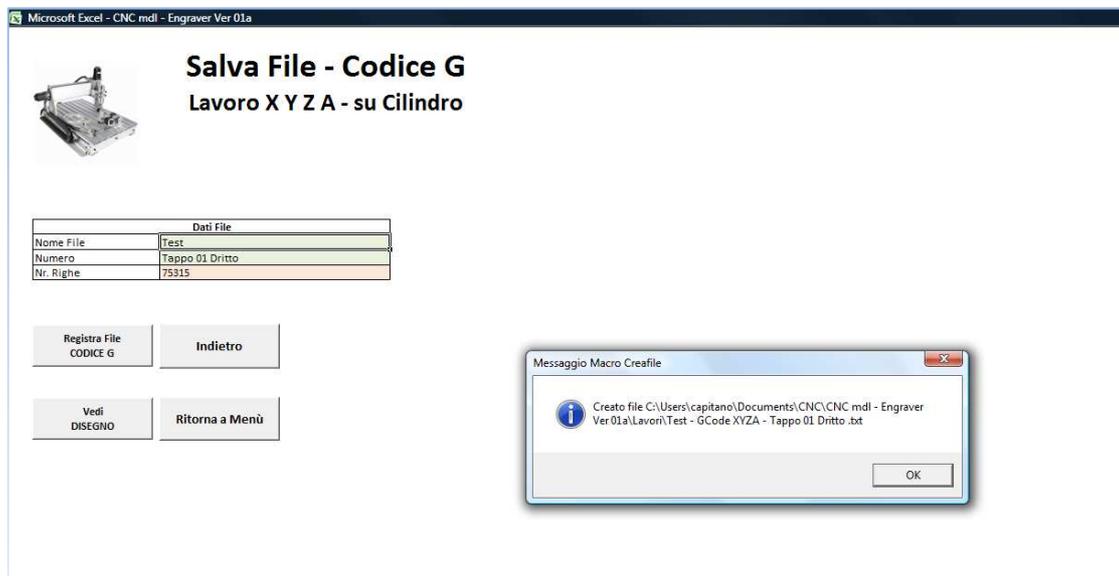
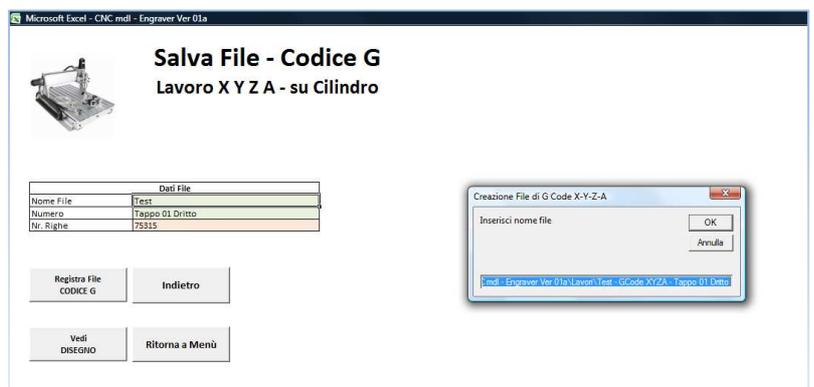
As we can see we wrote only two lines:

- starting point;
- ending point.

Let's check the work development: will be shown the cuts and the related measures.



Now we save our G-Code file:



We have finished.

Now we upload our files on our CNC, we set the machine coordinates and begin our work.

This is the result:





Start job of cleaning and grinding:



The work finished as instructed:





An example for “Bottle cap”



CUTTING SCREW ON CYLINDER

Open the software and click on the XYZA button



Set the cutting parameters:

Descrizione	U.M.	Dato	Esito
Raggio Esterno (NO SCALA)	mm	12,500	-NO Fattore Scala!
Profondità di intaglio (NO SCALA)	mm	4,000	-NO Fattore Scala!
Numero intagli XYZA - su Cilindro	nr	10	
Profondità di Taglio (per Steep)	mm	0,500	
Luce libera traslazione utensile	mm	1,000	
Velocità Profondità Z	F	200,000	
Velocità Intaglio	F	600,000	
CNC- Sistema Gradi Asse "A"	Gradi	360,000	
Fattore di Scala X->A	1:X	1,000	
Fattore di Scala X	1:X	1,000	
Fattore di Scala Y	1:X	1,000	
Fattore di Scala Z	1:X	1,000	
Traslazione Origine X	mm	0,000	
Traslazione Origine Y	mm	0,000	
Traslazione Origine Z	mm	0,000	
Traslazione Origine A	Gradi	0,000	

Descrizione	U.M.	Dato	Esito
Numero passate (Steep)	nr	8	Nr. Passate Ok
Profondità di Taglio- calcolato	mm	0,500000	
Lunghezza Asse "Y"	mm	15,000	
Raggio interno	mm	8,500	
Diametro esterno	mm	25,000000	
Circonferenza Esterna	mm	78,539816	
Diametro Interno	mm	17,000000	
Circonferenza Interna	mm	53,407075	
Interasse intagli	mm	7,853982	
Interasse intagli	Gradi	36	

As we can see we will make a cut 4 mm deep, removing 0.5 mm per step, and will perform on the cylinder 10 cuts.

Now let's check the codes "CNC base codes":

CODICI INIZIO PROGRAMMA	
RIGA	Codice
1	G0 G49 G40 G17 G80 G50 G90
2	
3	M3 S20000
4	
5	
6	
7	
8	
9	
10	

CODICI FINE PROGRAMMA	
RIGA	Codice
1	G0 Y2 A0
2	G0 Z12
3	G01 A28800 Y-20 F10000
4	
5	G0 Z15
6	G0 X0 Y0
7	
8	
9	M5
10	M30

We can see that in the final part of the program we manually entered some "G-Codes": these codes will be executed at the end of the program. The codes are placed there for a final cleaning and adjustment of our work.

In detail we wrote:

G0 Y2 A0

- G0 (rapid positioning)
- Y2 (go to the coordinated Y2)
- A0 (bring the A-axis to zero degrees)

G0 Z12

- G0 (rapid positioning)
- Z12 (bring the Z-axis to quota 12)
 - o Note: we set dimension "Z" equal to 12 so our adjusted diameter will be 24 mm.

G01 A28800 Y-20 F10000

- G01 (linear interpolation)
- A28800 (turn A-axis of 28800 degrees, or rather, turn the A-axis for 80 laps)
- Y-20 (go to the coordinated Y-20)
- F10000 (hold a feed of 10000)
 - o Note: we calculated a pass of 0,25mm per revolution, then for cleaning 20mm we have to perform 80 laps ($20\text{mm} * 4\text{laps/mm} * 360\text{degrees} = 28800\text{degrees}$)

G0 Z15

- G0 (rapid positioning)
- Z15 (bring Z-axis to quota 15)

G0 X0 Y0

- G0 (rapid positioning)
- X0 (go to the coordinated X0)
- Y0 (go to the coordinated Y0)

Then we insert the data:

Coordinate						
Coordinate plane mm						
NR	Linea nr	X -> A	Y	Correzione Z	Correzione X	Correzione Y
1	1	0,000	0,000	0,000	0,000	0,000
2	1	-6,000	-15,000	0,000	0,000	0,000
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

As we can see we wrote only two lines:

- starting point;
- ending point.

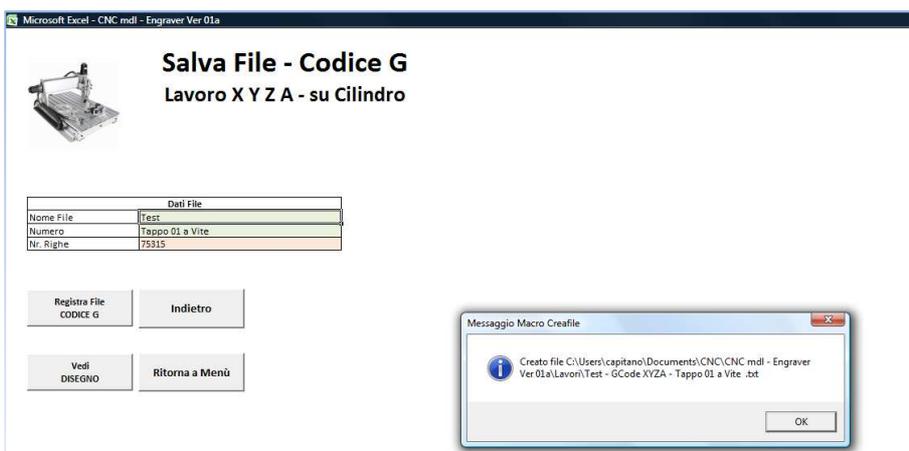
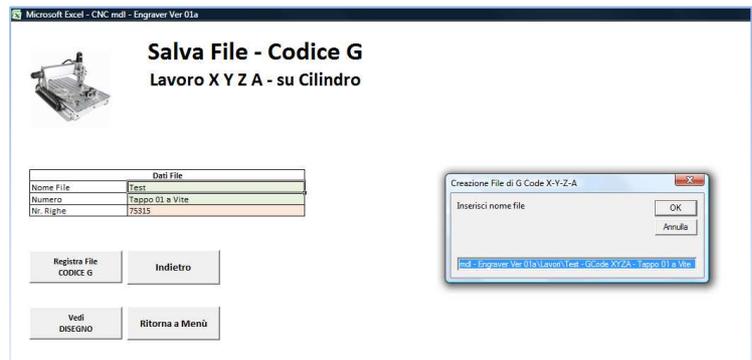
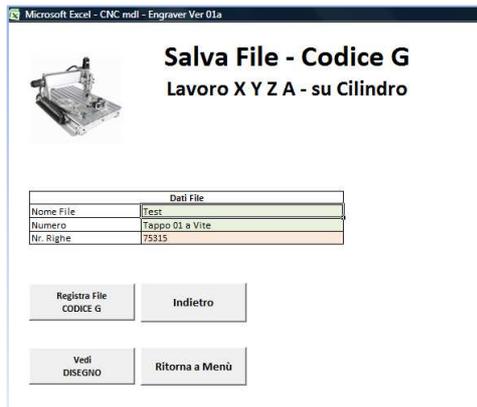
In this case we set the axis “X-> A” to -6: which means that the axis “A” will make a clockwise rotation for a number of degrees equal to the extent of the arc of the outer circumference to 6 mm (in this case we have a base for the outer circumference a radius of 12.5 mm or a diameter of 25 mm).

At the same time the Y-axis will step back of 15mm (“-“ sign).

Let’s check the work development: will be shown the cuts and the related measures.



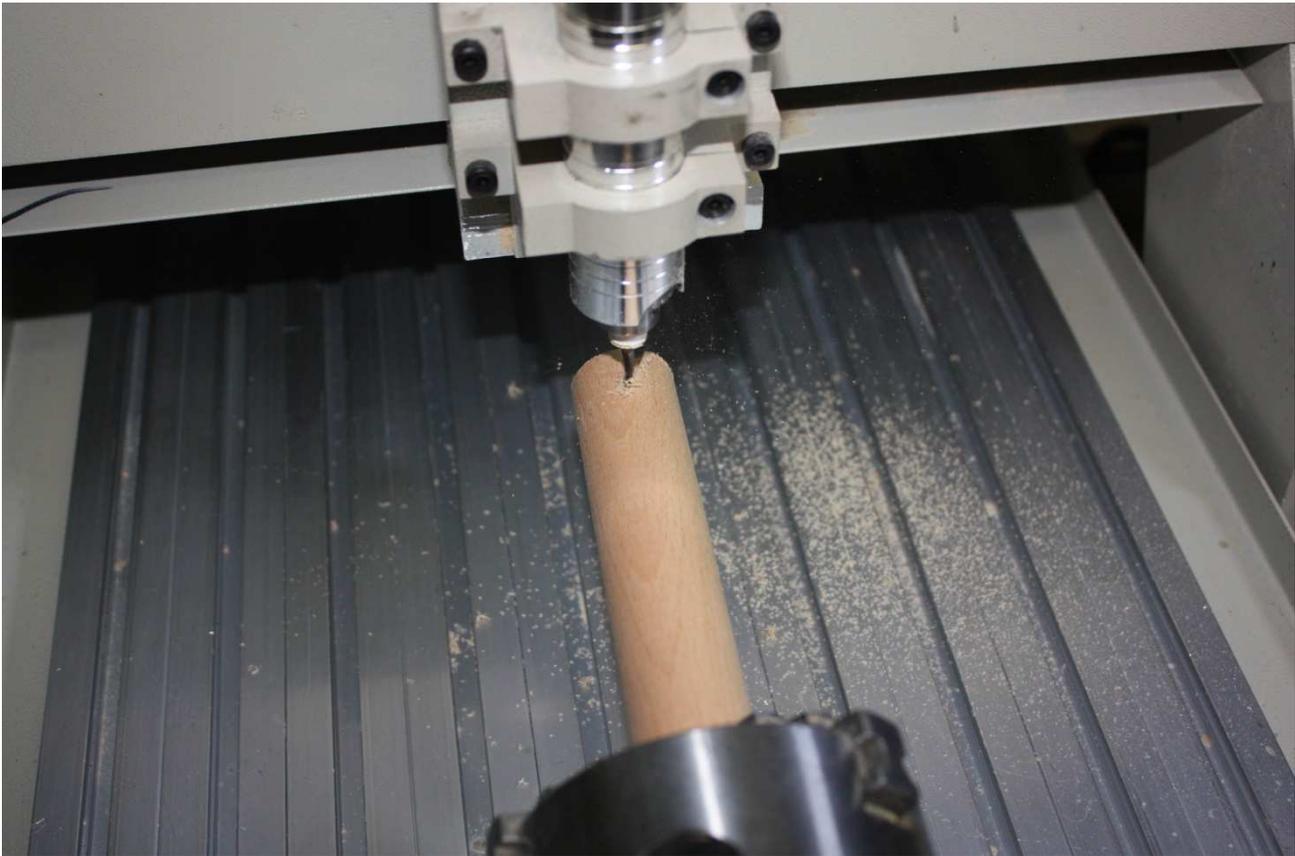
Now we save our G-Code file:

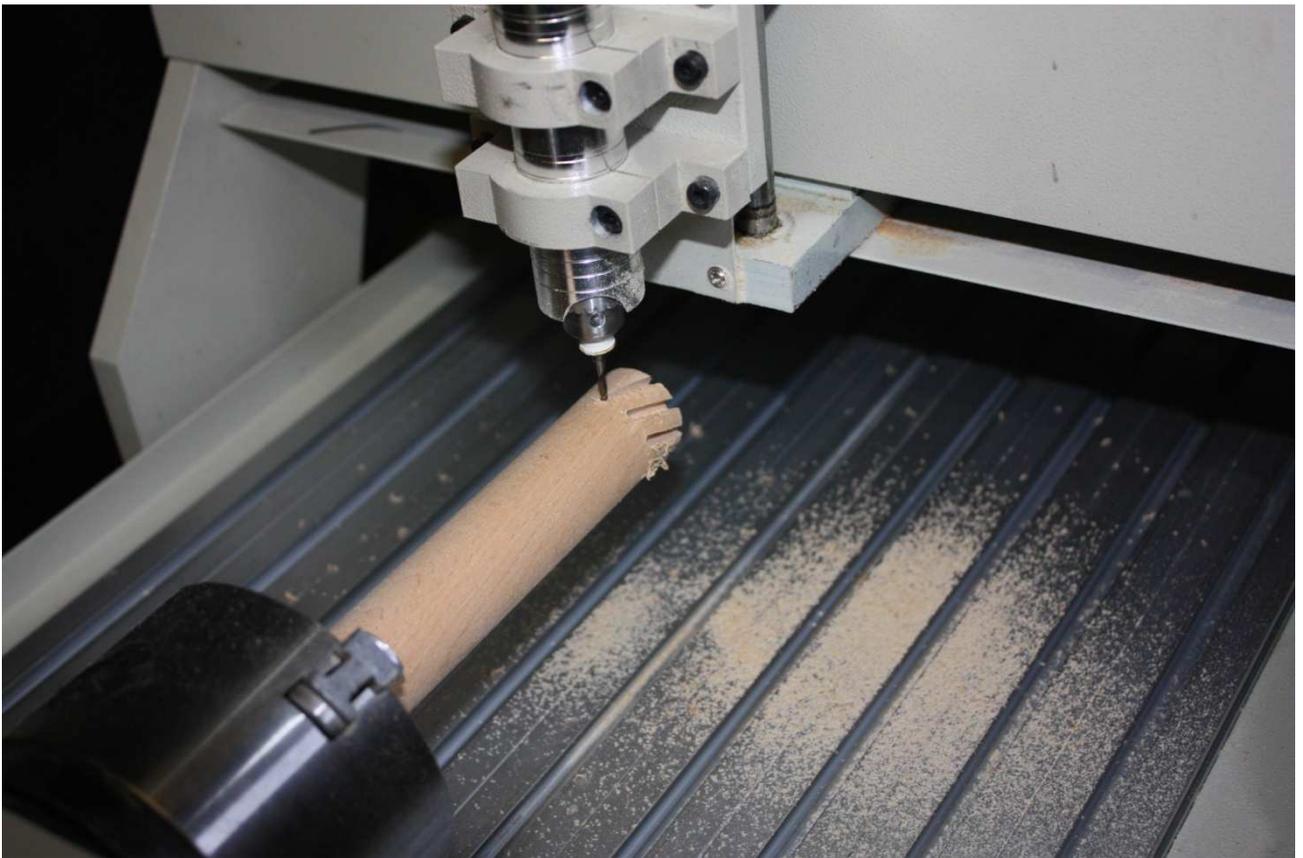


We have finished.

Now we upload our files on our CNC, we set the machine coordinates and begin our work.

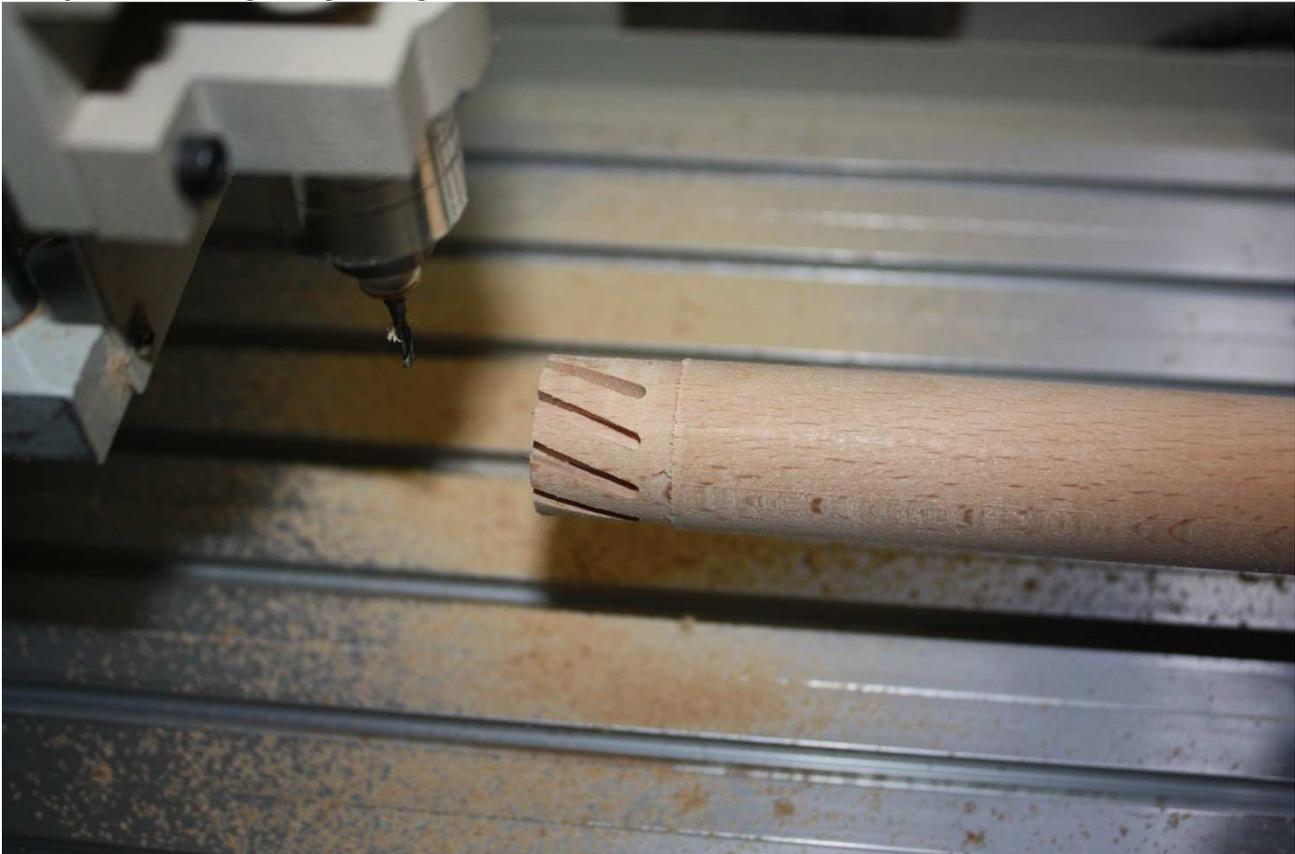
Here is the result:







Start job of cleaning and grinding:



An example of “Bottle cap”



CUTTING SCREW ON CYLINDER FITTING ZERO

Open the software and click on the XYZA button



Set the cutting parameters:

Preparazione Lavoro X Y Z A - su Cilindro

Descrizione	U.M.	Dato	Esito
Raggio Esterno (NO SCALA)	mm	12,500	NO Fattore Scala!
Profondità di intaglio (NO SCALA)	mm	-4,000	NO Fattore Scala!
Numero intagli XYZA - su Cilindro	nr	10	
Profondità di Taglio (per Steep)	mm	0,500	
Luce libera traslazione utensile	mm	1,000	
Velocità Profondità Z	F	200,000	
Velocità Intaglio	F	600,000	
CNC-Sistema Gradi Asse "A"	Gradi	360,000	
Fattore di Scala X->A	1:X	1,000	
Fattore di Scala X	1:X	1,000	
Fattore di Scala Y	1:X	1,000	
Fattore di Scala Z	1:X	1,000	
Traslazione Origine X	mm	0,000	
Traslazione Origine Y	mm	0,000	
Traslazione Origine Z	mm	0,000	
Traslazione Origine A	Gradi	0,000	

Descrizione	U.M.	Dato	Esito
Numero passate (Steep)	nr	8	Nr. Passate Ok
Profondità di Taglio- calcolato	mm	0,500000	
Lunghezza Asse "Y"	mm	15,000	
Raggio interno	mm	8,500	
Diametro esterno	mm	25,000000	
Circonferenza Esterna	mm	78,539816	
Diametro Interno	mm	17,000000	
Circonferenza Interna	mm	53,407075	
Interasse intagli	mm	7,853982	
Interasse intagli	Gradi	36	

Buttons: CNC Codici di base, Richiama Lavoro salvato, Ritorna a Menù, Procedi con INSERIMENTO DATI, HOME

As we can see we will make a cut 4 mm deep, removing 0.5 mm per step, and will perform on the cylinder 10 cuts.

Now let's check the codes "CNC base codes":

Parametri di base Lavoro X Y Z A - su Cilindro

CODICI INIZIO PROGRAMMA	
RIGA	Codice
1	G0 G49 G40 G17 G80 G50 G90
2	
3	M3 S20000
4	
5	
6	
7	
8	
9	
10	

Buttons: Visualizza Codici G, Visualizza Codici M

CODICI FINE PROGRAMMA	
RIGA	Codice
1	G0 Y2 A0
2	G0 Z12
3	G01 A28800 Y-20 F10000
4	
5	G0 Z15
6	G0 X0 Y0
7	
8	
9	M5
10	M30

Buttons: Avanti, Ritorna

We can see that in the final part of the program we manually entered some "G-Codes": these codes will be executed at the end of the program. The codes are placed there for a final cleaning and adjustment of our work.

In detail we wrote;

G0 Y2 A0

- G0 (rapid positioning)
- Y2 (go to the coordinated Y2)
- A0 (bring the A-axis to zero degrees)

G0 Z12

- G0 (rapid positioning)
- Z12 (bring the Z-axis to quota 12)
 - o Note: we set dimension "Z" equal to 12 so our adjusted diameter will be 24 mm.

G01 A28800 Y-20 F10000

- G01 (linear interpolation)
- A28800 (turn A-axis of 28800 degrees, or rather, turn the A-axis for 80 laps)
- Y-20 (go to the coordinated Y-20)
- F10000 (hold a feed of 10000)
 - o Note: we calculated a pass of 0,25 mm per devolution, then for clearing 20 mm we have to perform 80 laps (20mm*4 laps/mm*360 degrees = 28800 degrees)

G0 Z15

- G0 (rapid positioning)
- Z15 (bring Z-axis to quota 15)

G0 X0 Y0

- G0 (rapid positioning)
- X0 (go to the coordinated X0)
- Y0 (go to the coordinated Y0)

Then we insert the data:

Inserimento DATI
Lavoro X Y Z A - su Cilindro

Salva Lavoro | Lavoro nr. 4

Vai alla STAMPA | Vedi DISEGNO | Richiama Lavoro salvato | Recupera DATI da XYZ

Vedi Sviluppo DISEGNO | Carica lavoro da file XYZ | Indietro | Ritorna a Menù

Coordinate	Coordinate plane mm					
NR	Linea nr	X -> A	Y	Correzione Z	Correzione X	Correzione Y
1	1	0,000	0,000	0,000	0,000	0,000
2	1	-6,000	-15,000	5,000	0,000	0,000
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						

Percorso Utensile

As we can see we wrote only two lines:

- starting point;
- ending point.

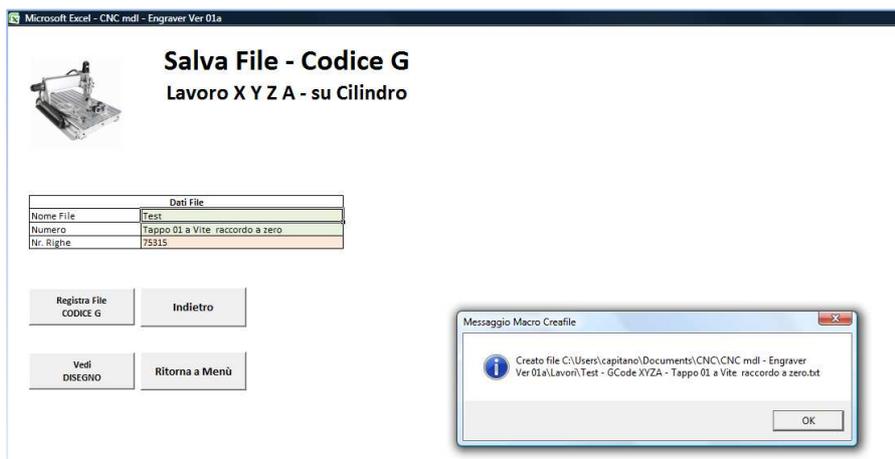
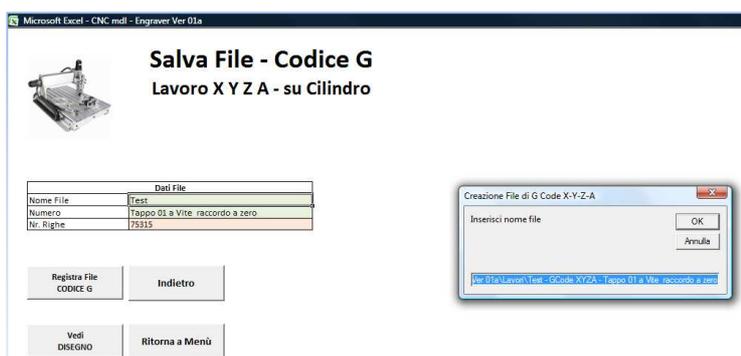
In this case we set the axis "X → A" to -6: which means that the axis "A" will make a clockwise rotation for a number of degrees equal to the extent of the arc of the outer circumference to 6 mm (in this case we have a base for the outer circumference a radius of 12,5 mm or a diameter of 25 mm).

At the same time the Y-axis will step back of 15mm (“-“ sign).
 This time we used a “Z correction” on the second line of 5 mm: which means that, for every step, the tool will start at the indicated quota but, going to the second line and for interpolation, it will rise of 5 mm. In the pictures we will see the result.

Let’s check the work development: will be shown the cuts and the related measure.



Now we save our G-Code file:

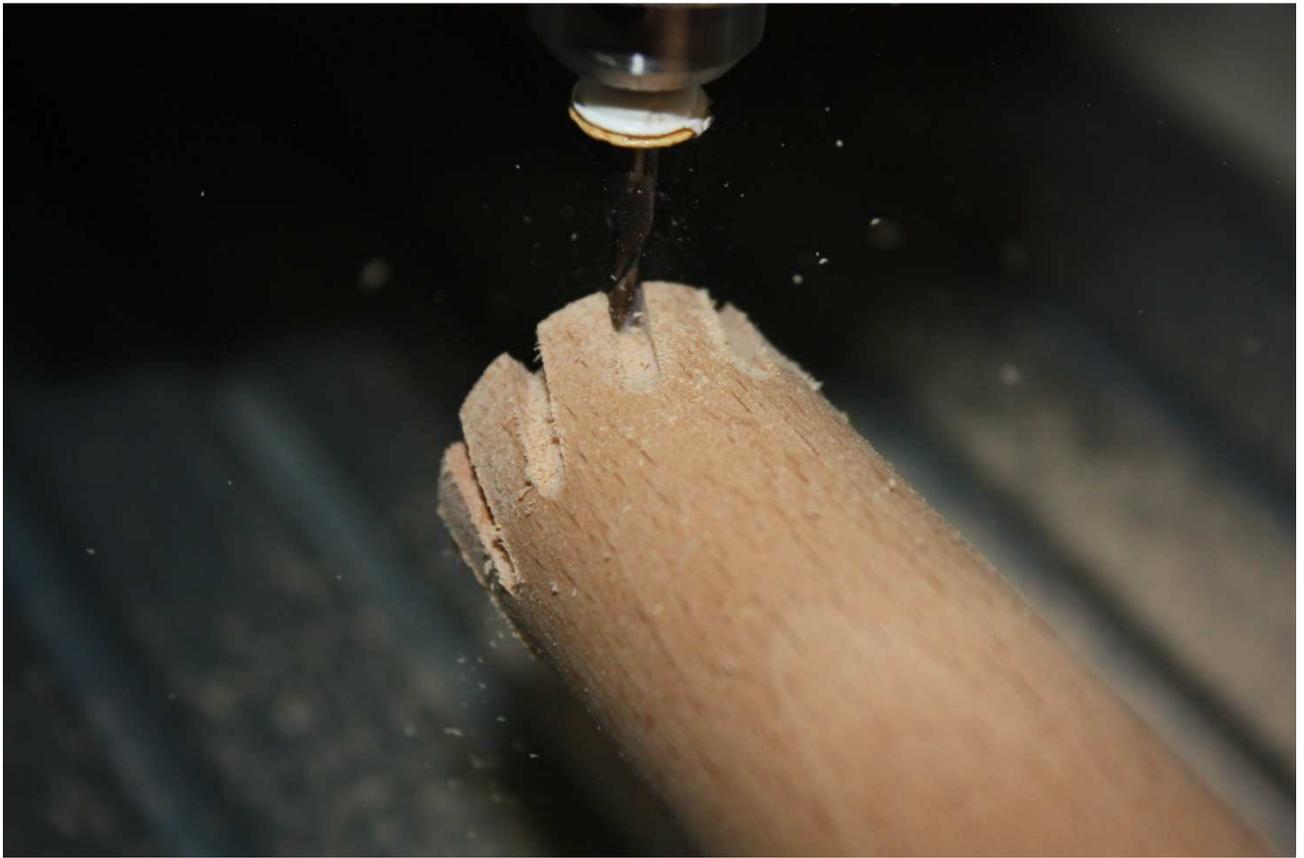


We have finished.
 Now we upload our files on our CNC, we set the machine coordinates and begin our work.

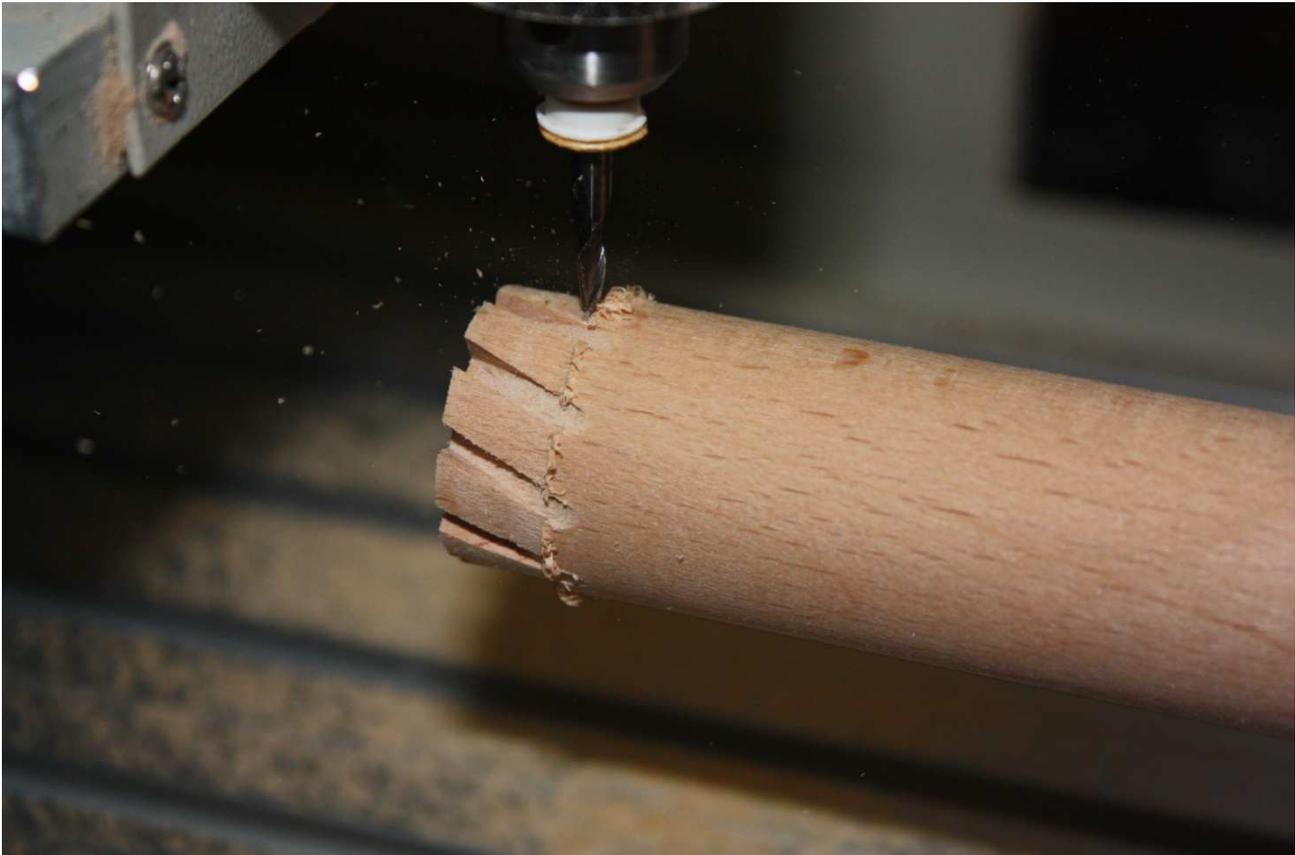
Here is the result:







Start job of cleaning and grinding:





An example of “Bottle cap”



HELICAL CUT WITH INVERSE EXPOSURE

Open the software and click on the XYZA button:



Set the cutting parameters:

Descrizione	U.M.	Dato	Esito
Raggio Esterno (NO SCALA)	mm	12,500	NO Fattore Scala!
Profondità di Intaglio (NO SCALA)	mm	4,000	NO Fattore Scala!
Numero Intagli XYZA - su Cilindro	nr	10	
Profondità di Taglio (per Steep)	mm	0,500	
Lucce libera traslazione utensile	mm	3,000	
Velocità Profondità Z	F	200,000	
Velocità Intaglio	F	600,000	
CNC-Sistema Gradi Asse "A"	Gradi	360,000	
Fattore di Scala X->A	1X	1,000	
Fattore di Scala X	1X	2,000	
Fattore di Scala Y	1X	1,000	
Fattore di Scala Z	1X	1,000	
Traslazione Origine X	mm	0,000	
Traslazione Origine Y	mm	0,000	
Traslazione Origine Z	mm	0,000	
Traslazione Origine A	Gradi	0,000	

Descrizione	U.M.	Dato	Esito
Numero passate (Steep)	nr	8	Nr. Passate Ok
Profondità di Taglio - calcolato	mm	0,500000	
Lunghezza Asse "Y"	mm	15,000	
Raggio Interno	mm	8,500	
Diametro esterno	mm	25,000000	
Circonferenza Esterna	mm	78,539816	
Diametro interno	mm	17,000000	
Circonferenza Interna	mm	53,407075	
Interesse Intagli	mm	7,853982	
Interesse intagli	Gradi	36	

As we can see, we will make a cut 4 mm deep, removing 0,5 mm per step and will perform on the cylinder 10 cuts.

The free light was set to 3 mm (the light between the tool tip and the workpiece).

Now let's check the codes "CNC base codes":

RIGA	Codice
1	G0 G49 G40 G17 G80 G50 G90
2	
3	M3 S20000
4	
5	
6	
7	
8	
9	
10	

RIGA	Codice
1	G0 Y2 A0
2	G0 Z12
3	G01 A28800 Y-20 F10000
4	
5	G0 Z15
6	G0 X0 Y0
7	
8	
9	M5
10	M30

We can see that in the final part of the program we manually entered some "G-Codes": these codes will be executed at the end of the program.

The codes are placed there for a final cleaning and adjustment of our work.

In detail we wrote:

G0 Y2 A0

- G0 (rapid positioning)
- Y2 (go to the coordinated Y2)
- A0 (bring the A-axis to zero degrees)

G0 Z12

- G0 (rapid positioning)
- Z12 (bring the Z-axis to quota 12)
 - o Note: we set dimension “Z” equal to 12 so our adjusted diameter will be 24 mm.

G01 A28800 Y-20 F10000

- G01 (linear interpolation)
- A28800 (turn A-axis of 28800 degrees, or rather, turn the A-axis for 80 laps)
- Y-20 (go to the coordinated Y-20)
- F10000 (hold a feed of 10000)
 - o Note: we calculated a pass of 0,25 mm per devolution, then for clearing 20 mm we have to perform 80 laps ($20\text{mm} \cdot 4\text{laps/mm} \cdot 360\text{ degrees} = 28800\text{ degrees}$)

G0 Z15

- G0 (rapid positioning)
- Z15 (bring Z-axis to quota 15)

G0 X0 Y0

- G0 (rapid positioning)
- X0 (go to the coordinated X0)
- Y0 (go to the coordinated Y0)

Then we insert the data:

Coordinate						
Coordinate piane mm						
NR	Linea nr	X -> A	Y	Correzione Z	Correzione X	Correzione Y
1	1	0,000	0,000	0,000	0,000	0,000
2	1	8,000	-15,000	-2,000	8,000	0,000
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

As we can see, we wrote only two lines:

- starting point;
- ending point.

In this case we set the axis “X → A” to 8mm: which means that the axis “A” will make a counterclockwise rotation for a number of degrees equal to the extent of the arc of the outer circumference for 8 mm (in this case we have as base for the outer circumference a radius of 12,5 mm or a diameter of 25 mm).

At the same time the Y-axis will step back of 15 mm (“-“ sign).

This time we used a “Z correction” on the second line of -2 mm: which means that, for every step, the tool will start at the indicated quota but, going to the second line and for interpolation, it will be lowered of 2 mm.

We have also set an “X correction” of 8 mm: which means that, for every step, the tool will start from the X-axis at zero but, going to the second line and for interpolation, it will move to the right for 8 mm.

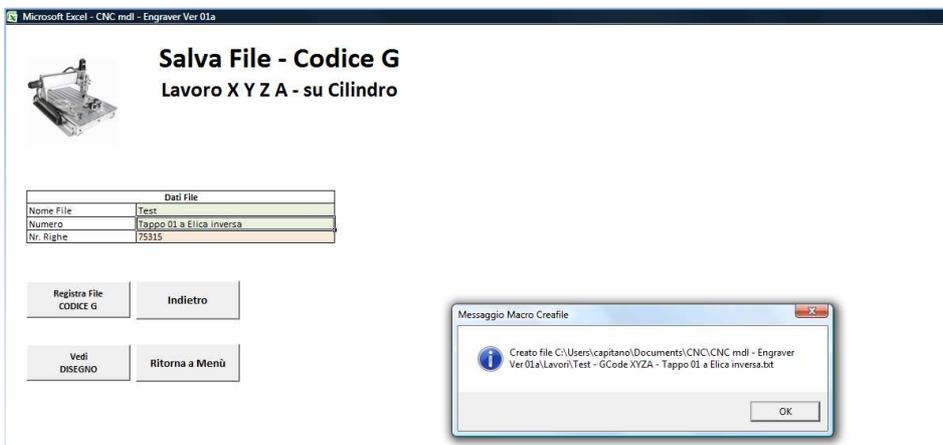
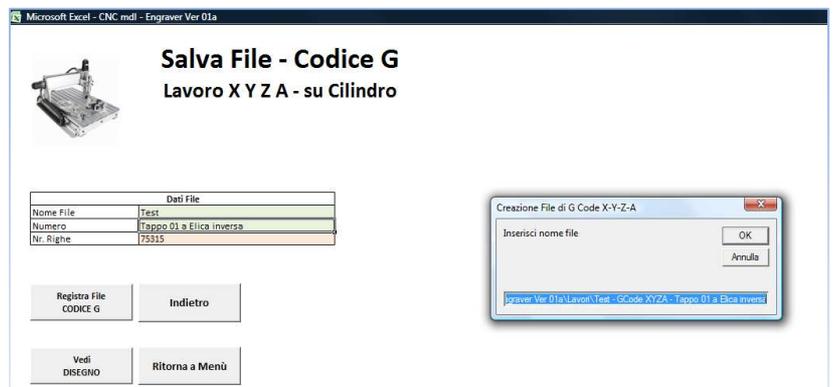
The two corrections (the “Z correction” and the “X correction”) are automatically added together and for interpolation, the tool will catch up the settled point.

In the pictures we will see the result.

Let’s check the work development: will be shown the cuts and the related measures.



Now we save our G-Code file:



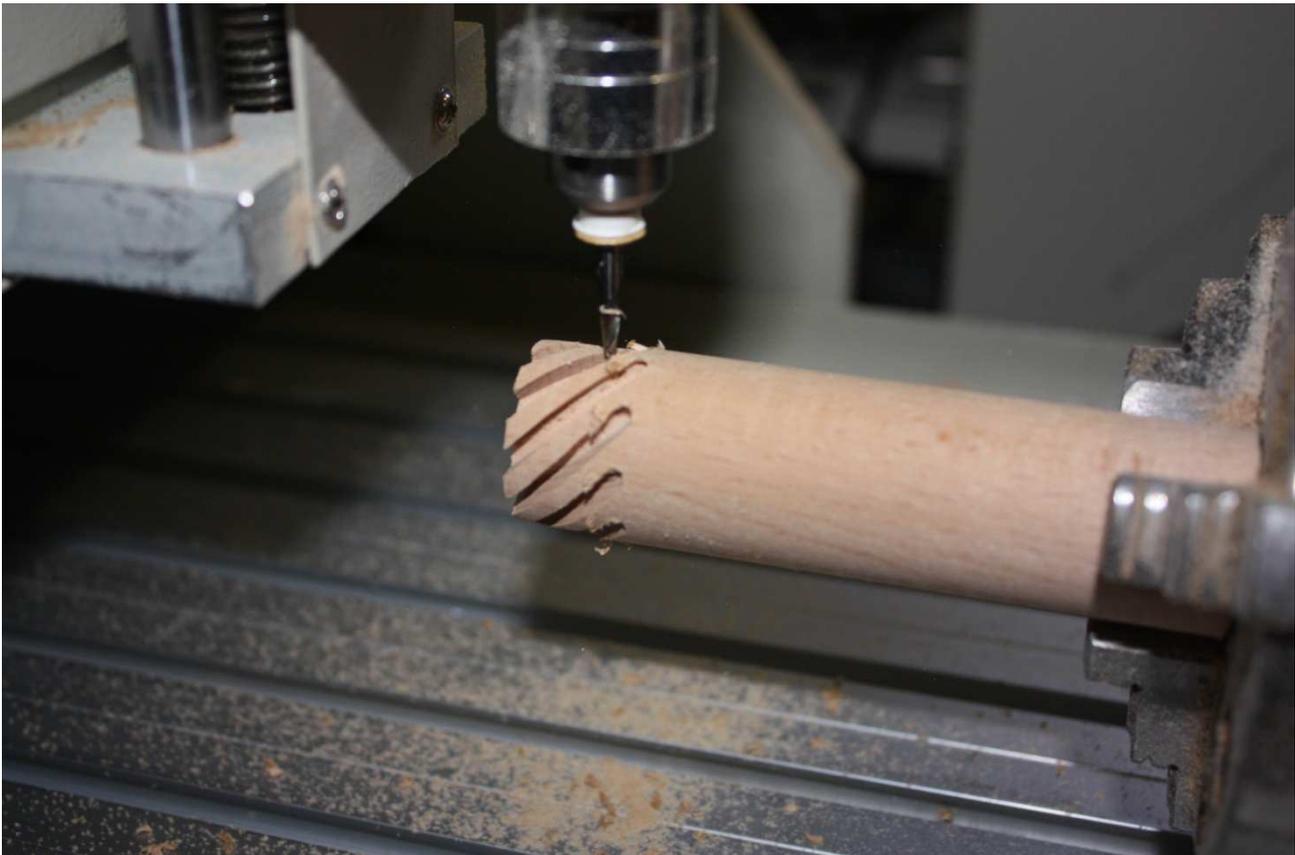
We have finished.

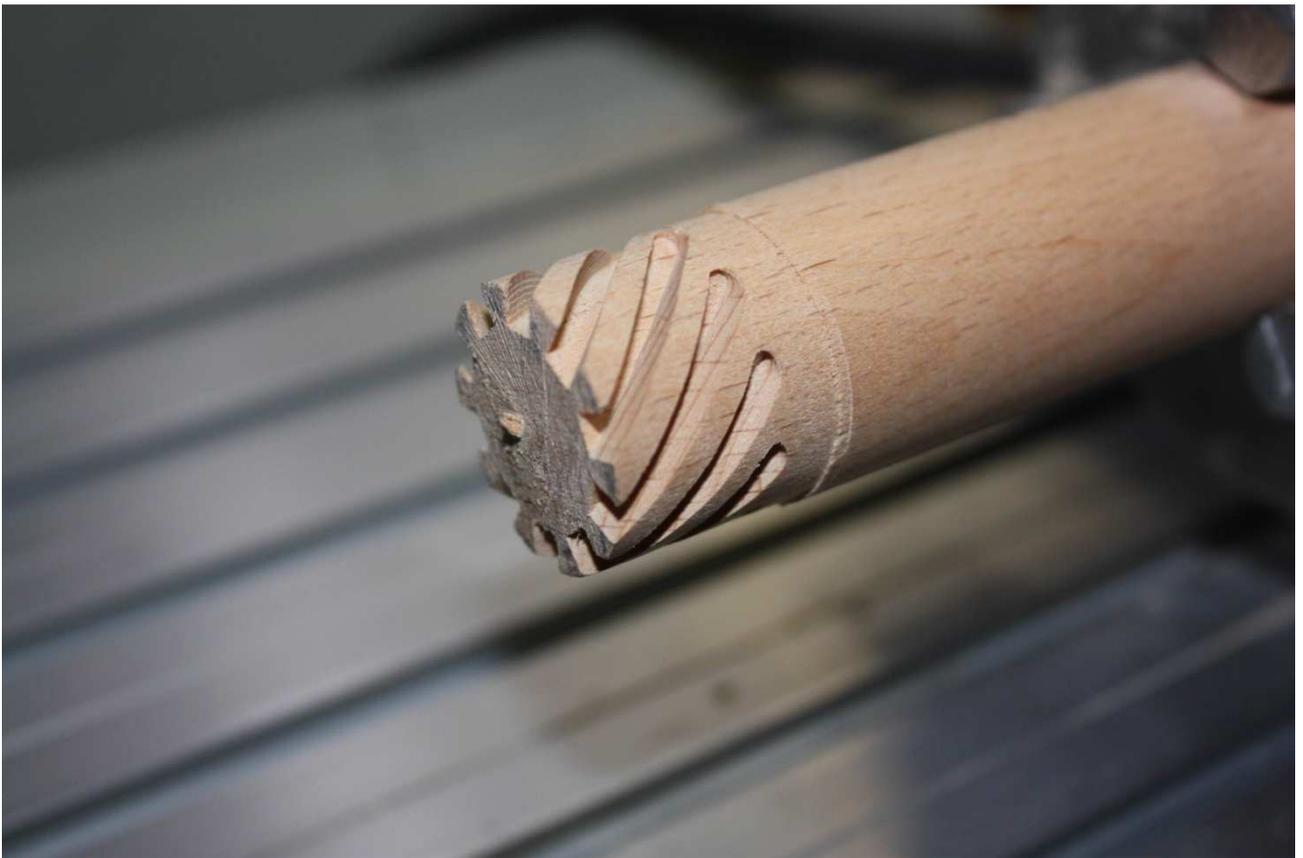
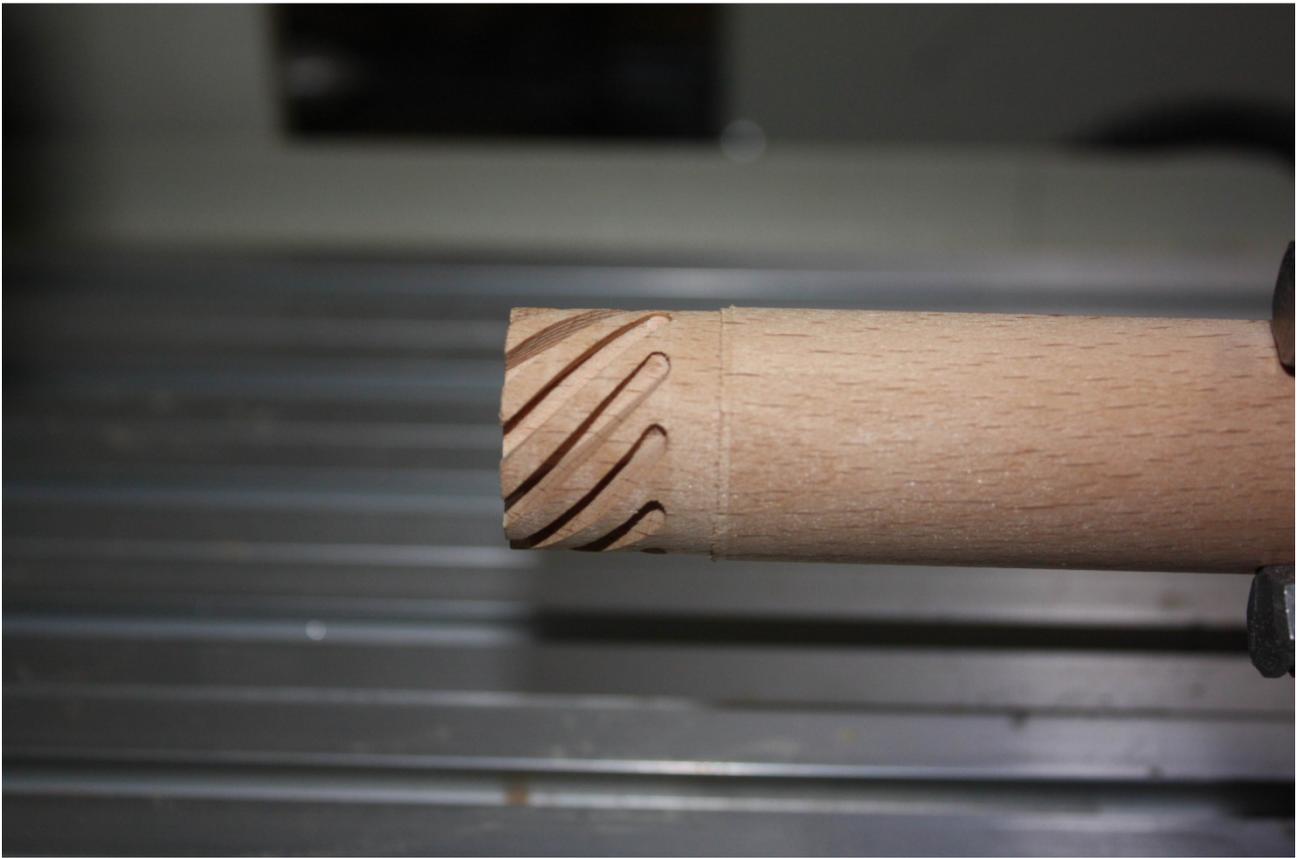
Now we upload our files on our CNC, we set the machine coordinates and begin our work.

Here is the result:



Start job of cleaning and grinding:







An example of “Bottle cap”



Some bottle caps done during the experimental tests.

I would like to insist on the fact that this software runs automatically only the engravings; the correction was performed by manually entering the codes, as in the examples above.



Notes: