



NUMERIČKI UPRAVLJANE MAŠINE U OBRADI DRVETA

B SOLID



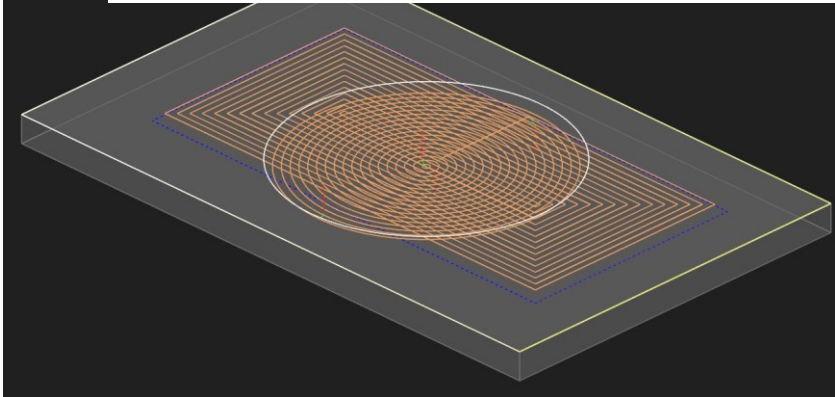
REDOSLED OPERACIJA I ZAHVATA



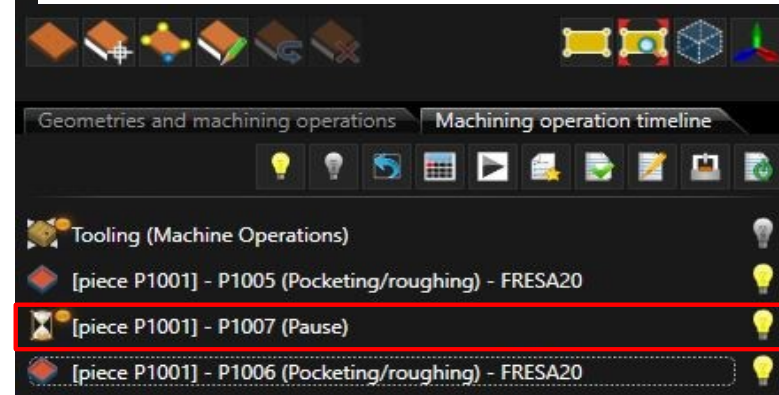
Machining Operation Timeline

Pause

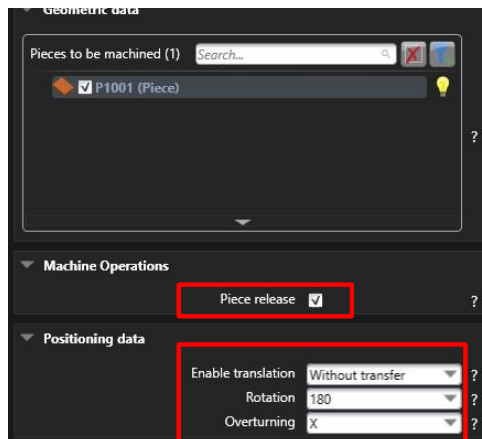
1 - CAD Design: Circle (Face 0) and Rectangle (Face 5)



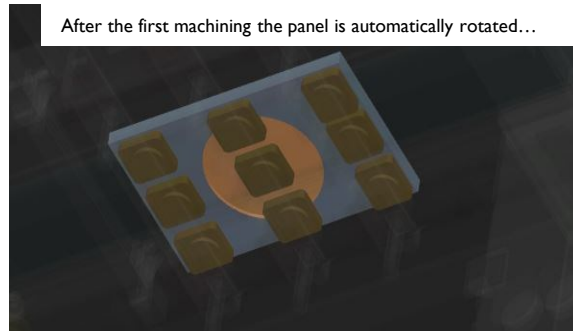
2 – Pause command between each machining operation



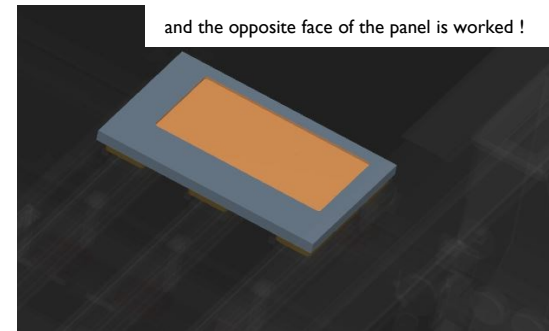
3 - Panel rotation (180) and X overturning



After the first machining the panel is automatically rotated...

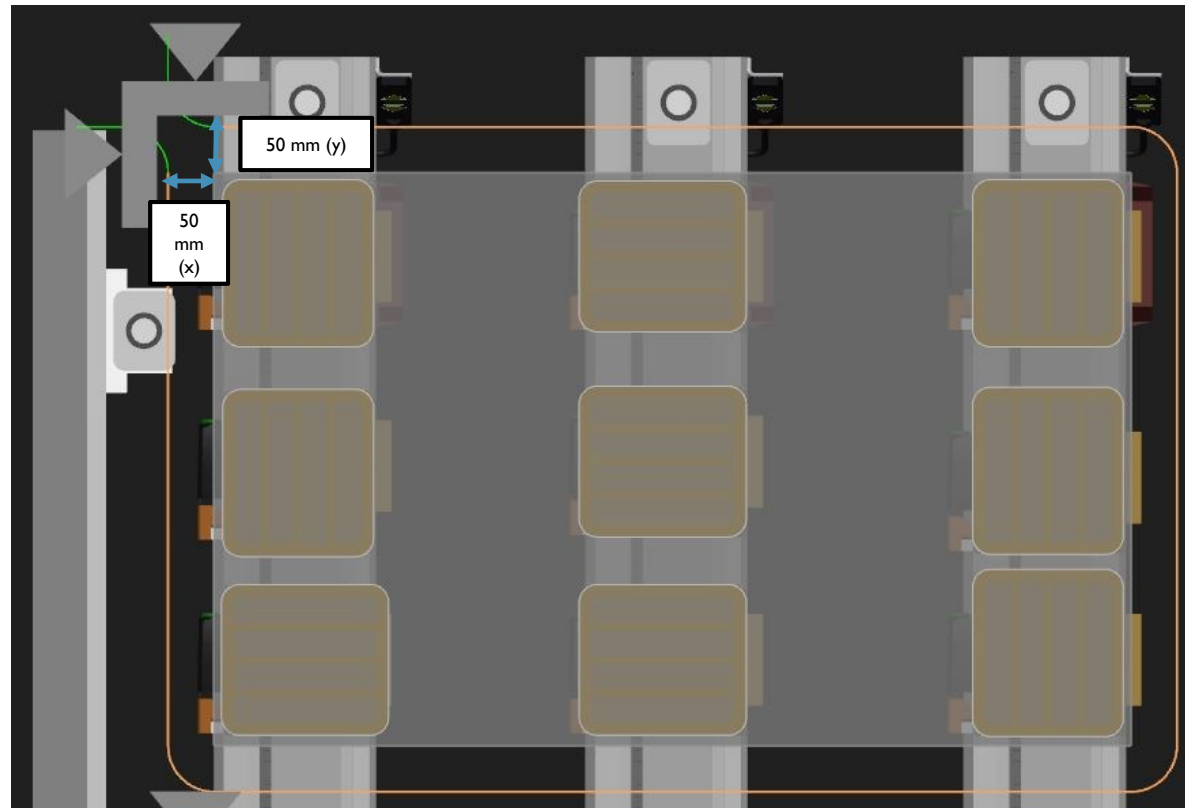
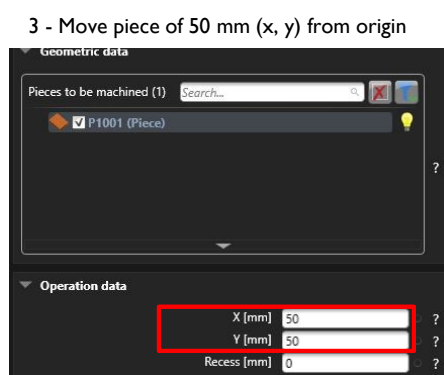
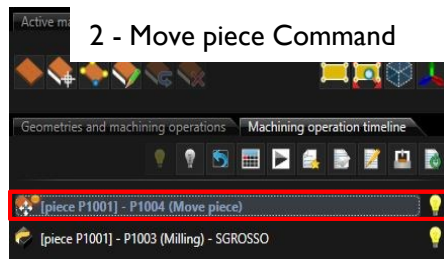
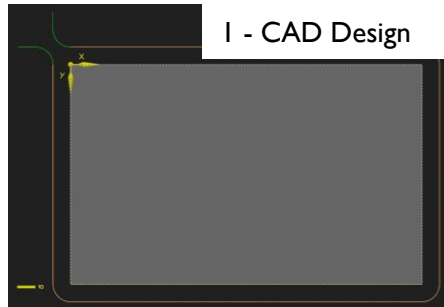


and the opposite face of the panel is worked !



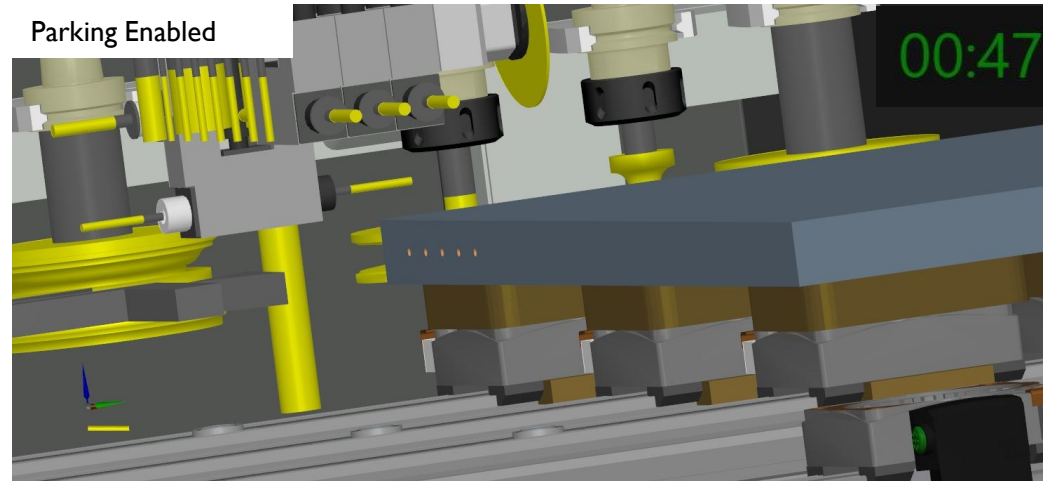
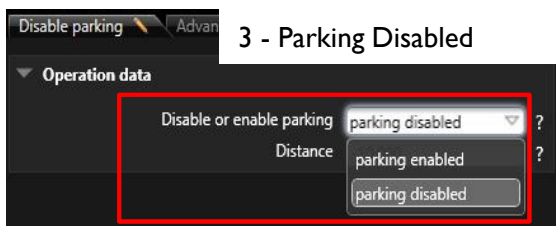
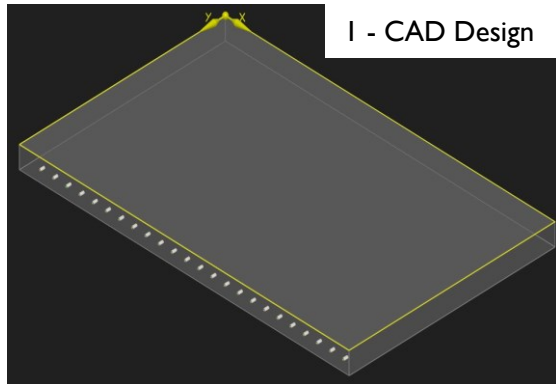
Machining Operation Timeline

Move Piece



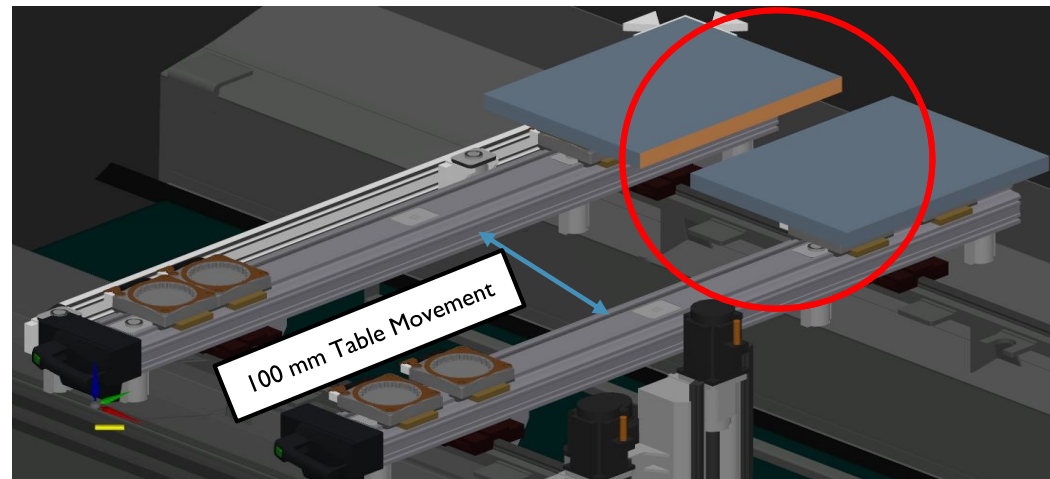
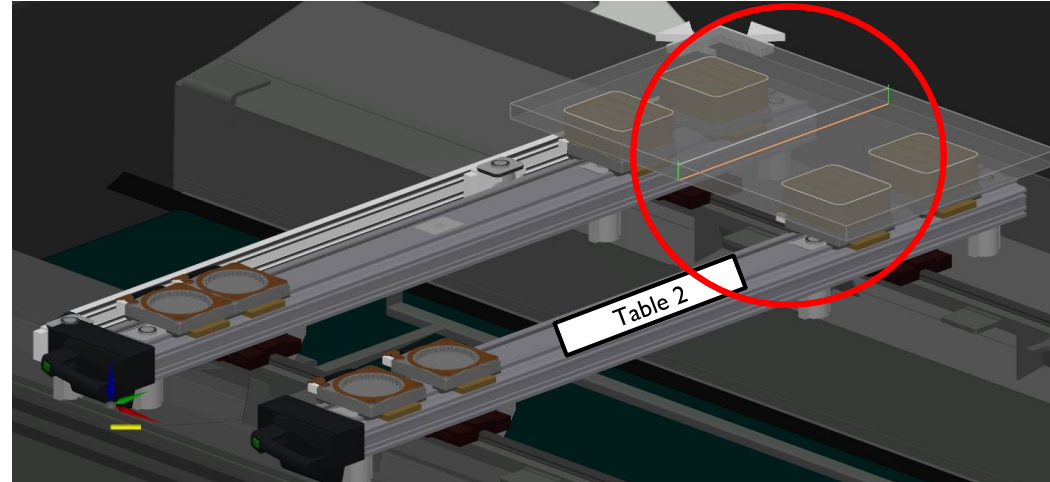
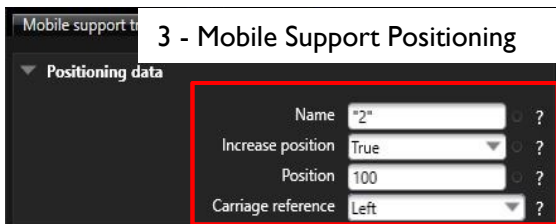
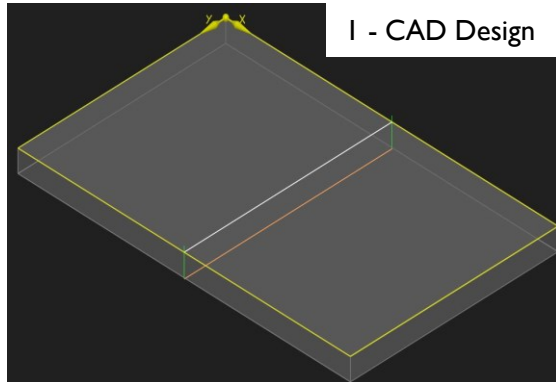
Machining Operation Timeline

Parking



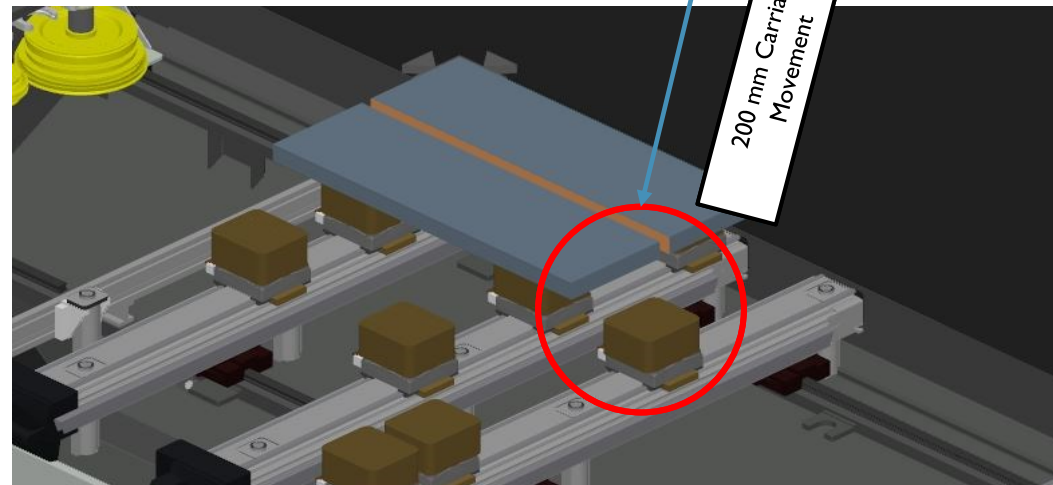
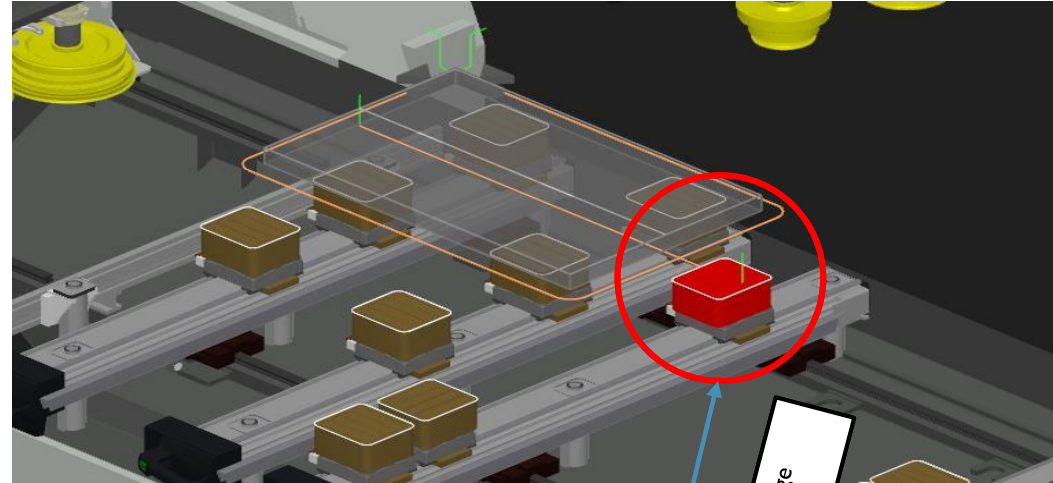
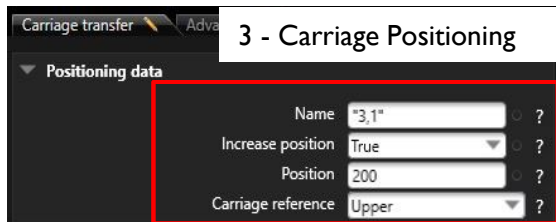
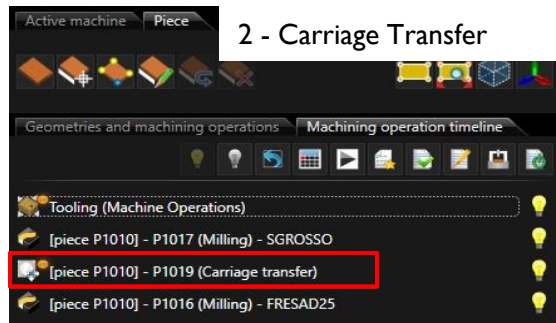
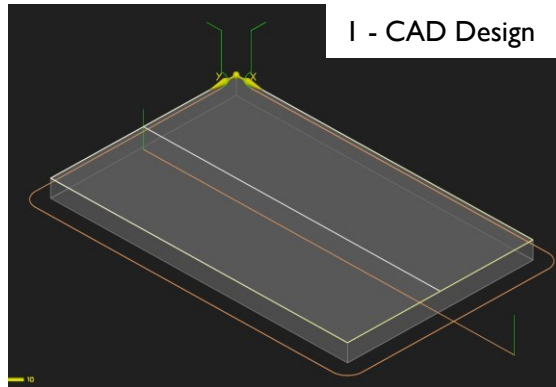
Machining Operation Timeline

Mobile Support Transfer



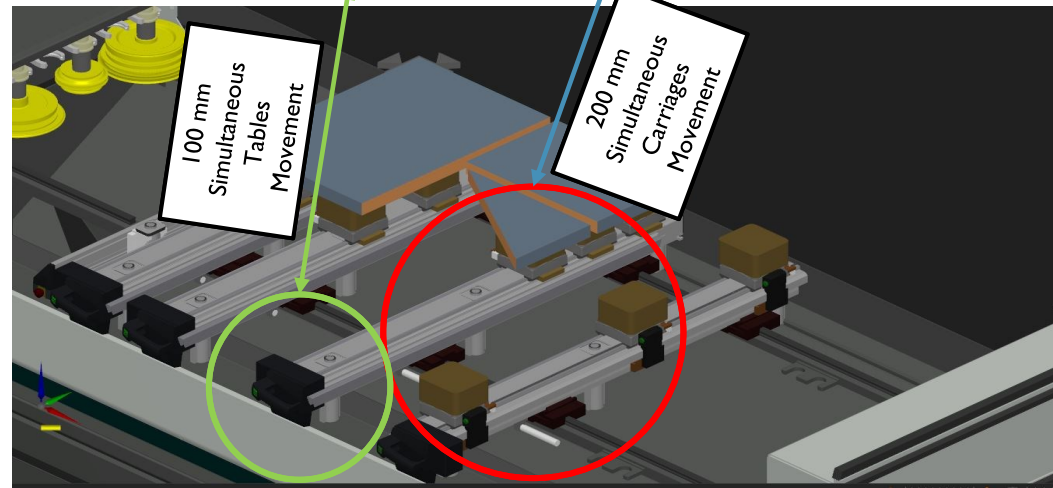
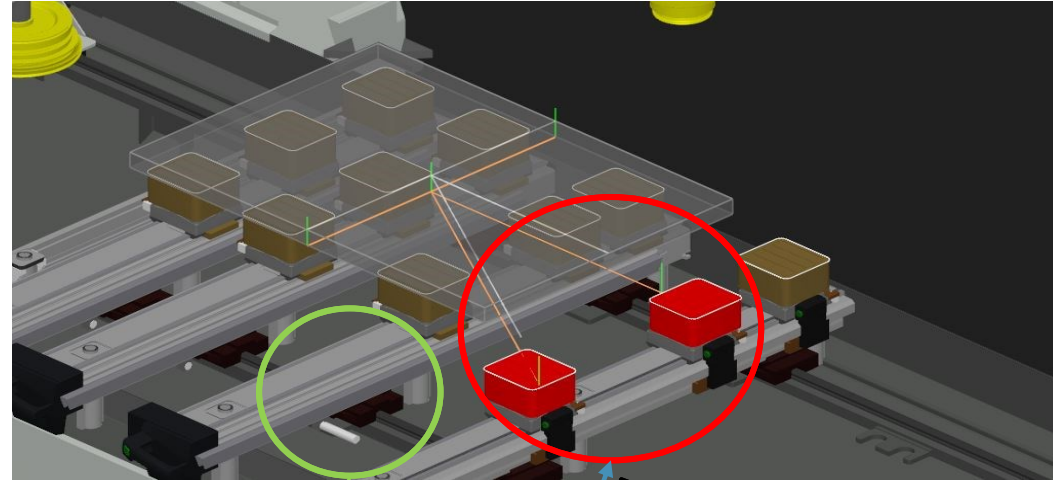
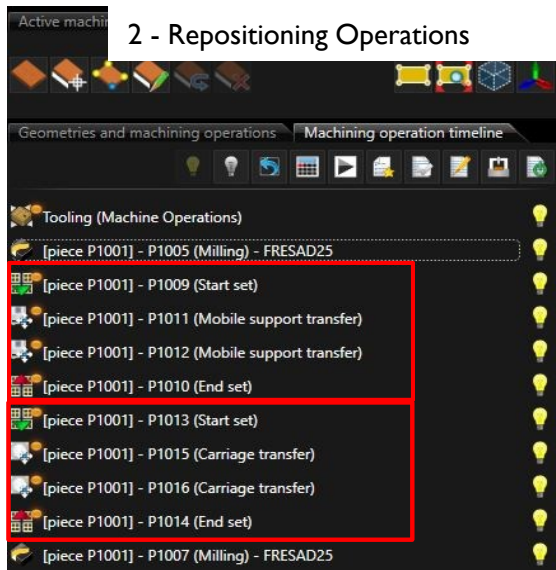
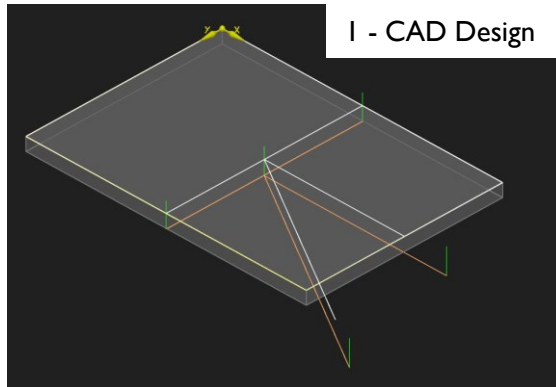
Machining Operation Timeline

Carriage Transfer



Machining Operation Timeline

Start / End Set of Repositioning Operations (Tables / Carriages)

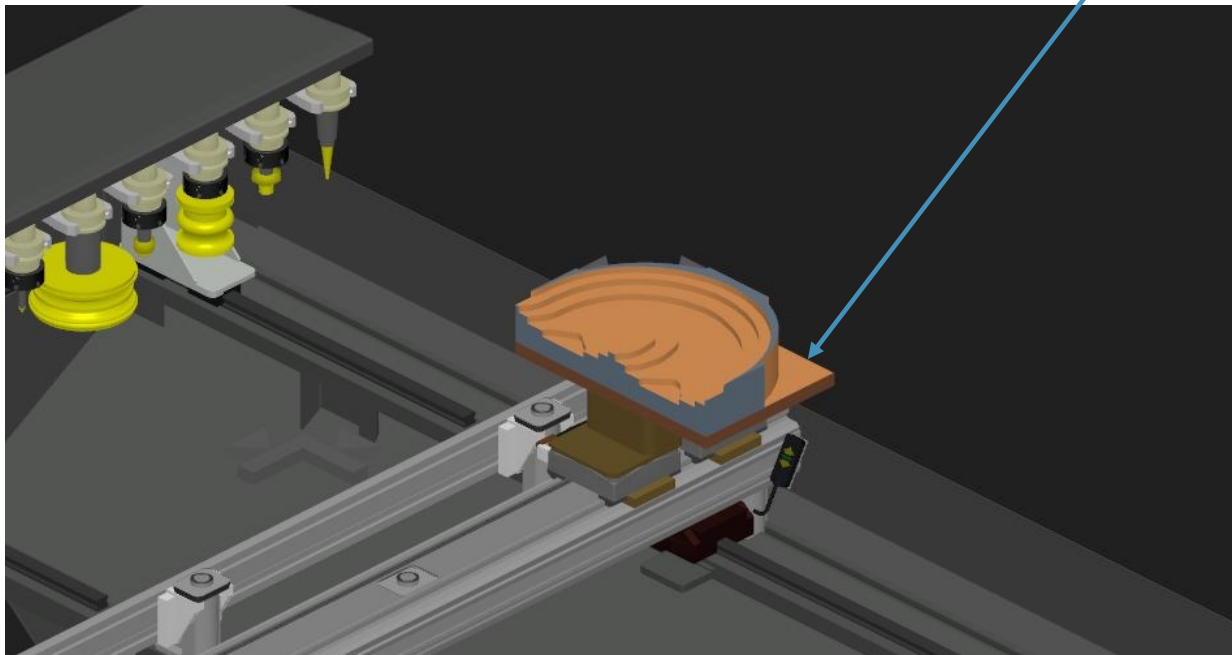
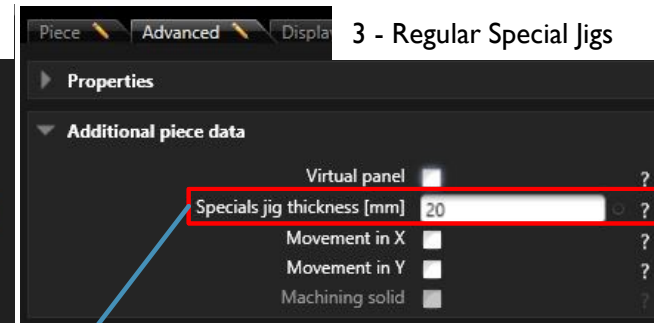
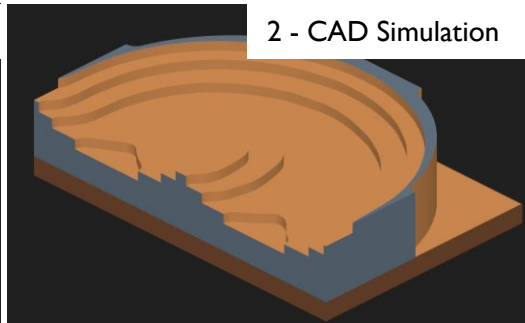
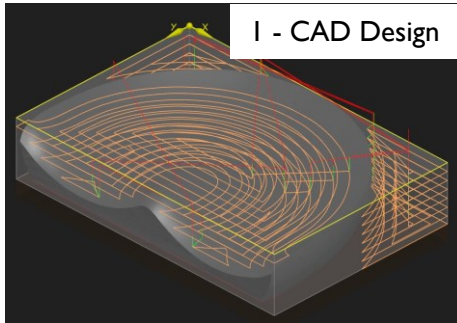


POZICIONIRANJE GREDA I VAKUUM PAPUČA



Special Jigs

“Regular” Special Jigs

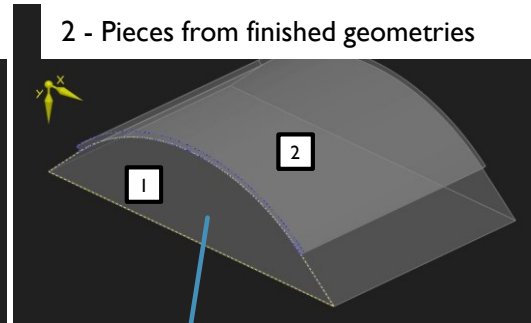
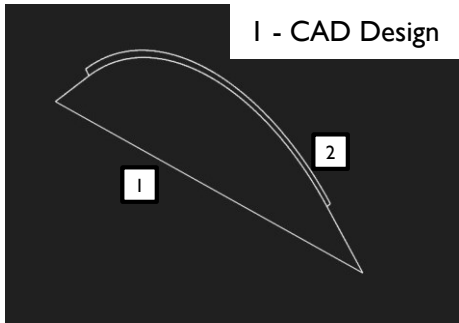


Special Jigs Thickness:

- It allow to specify the thickness of a “special jigs” to be used to keep the piece locked; in this example a panel of 20 mm as been defined as “special jig” to keep the piece locked.

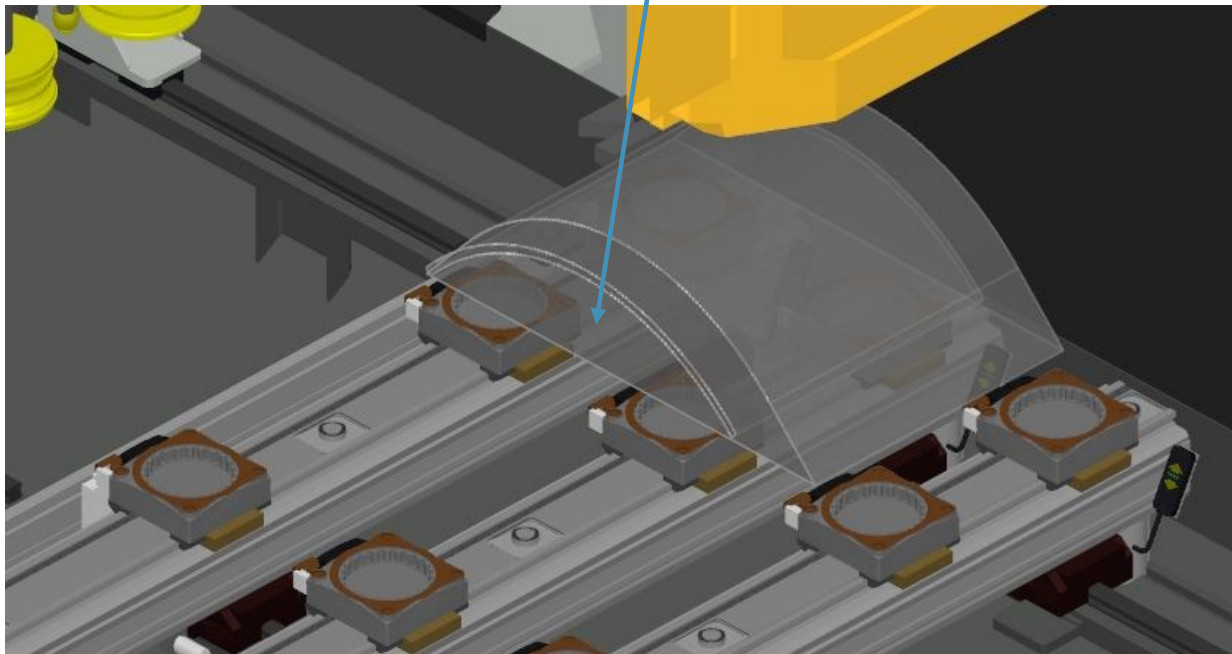
Special Jigs

“Custom” Special Jigs



Custom Jigs:

- In this example two polylines have been created: one represent the special jig (1) and the other one is the piece that lean on it (2).



RAD NA VEĆM BROJ RADNIH POLJA (PODELA RADNOG STOLA NA SEKCIJE)



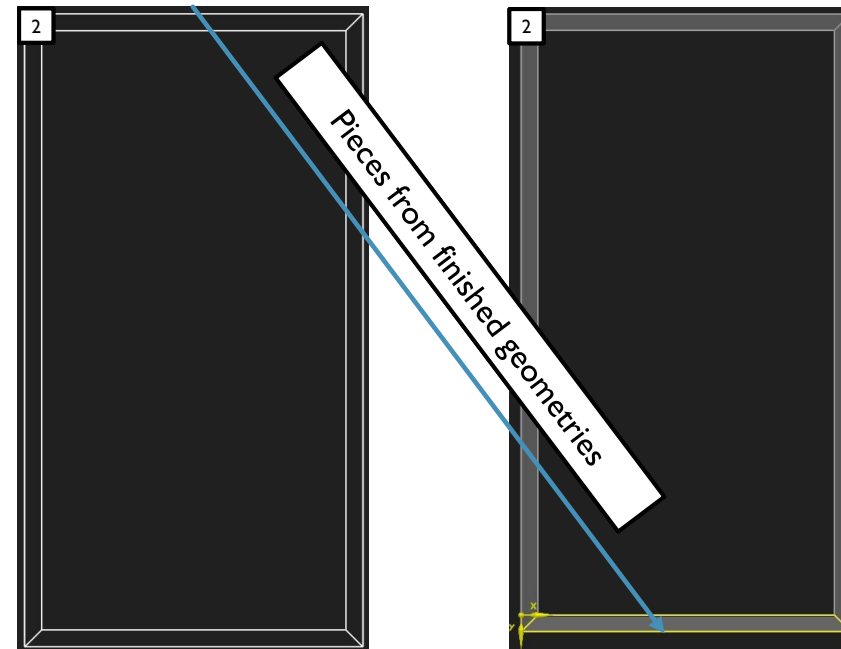
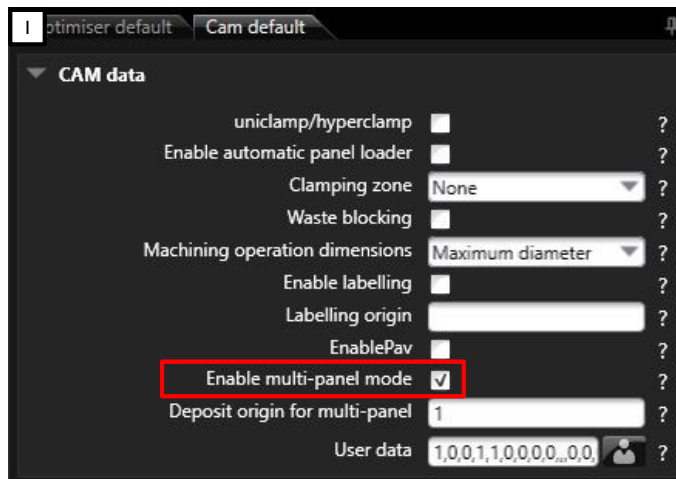
Multipanel

How to create Multipanel projects

bSolid Multipanel allow to machine several pieces within the same program (that means that all the pieces must be loaded on the work table before launching the machining program.).

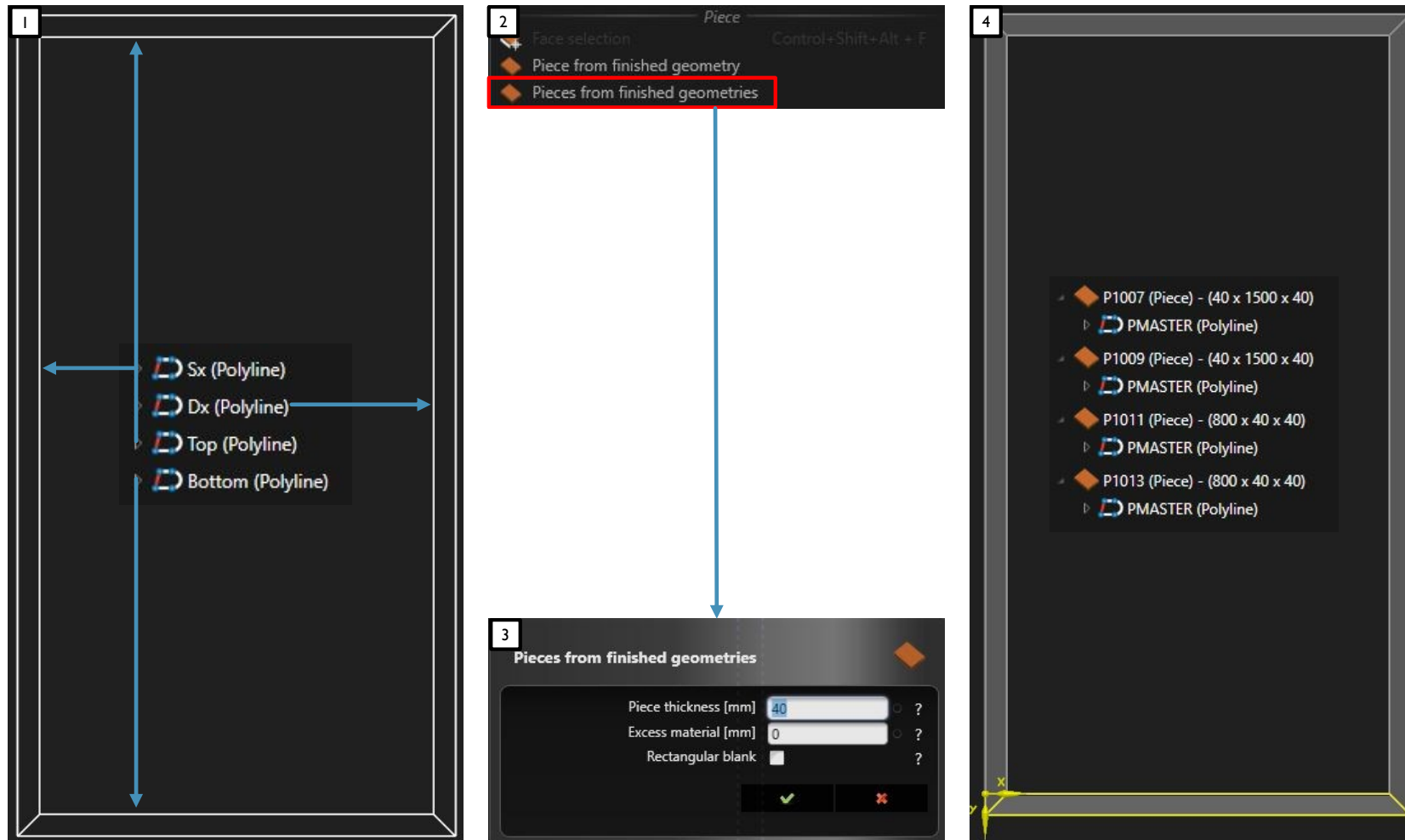
Multipanel projects can be mainly created in two ways:

- **Global Parameters / CAM Defaults (1)**
- **Pieces from finished geometries (2)**



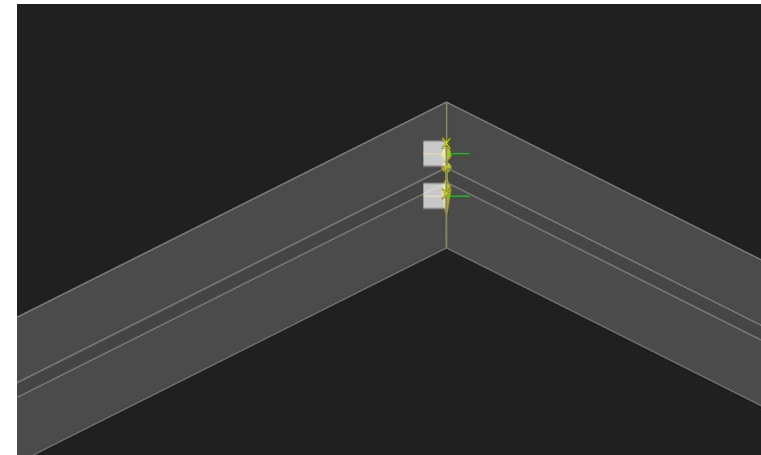
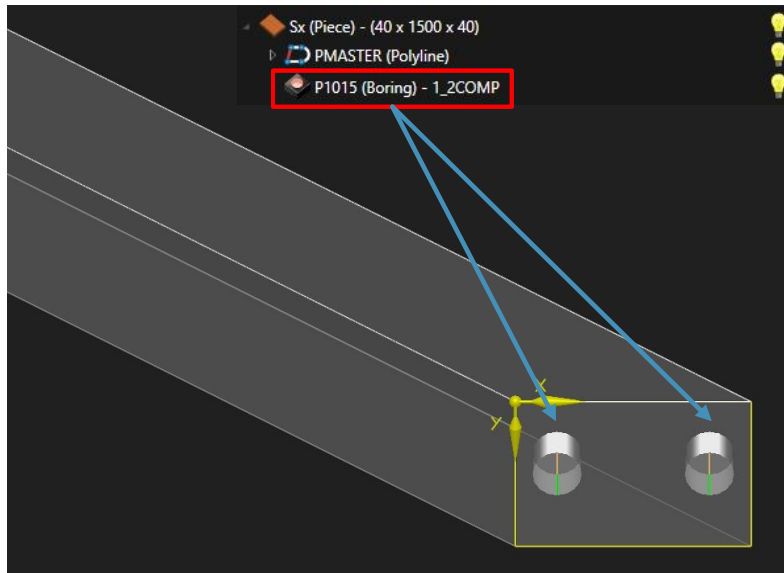
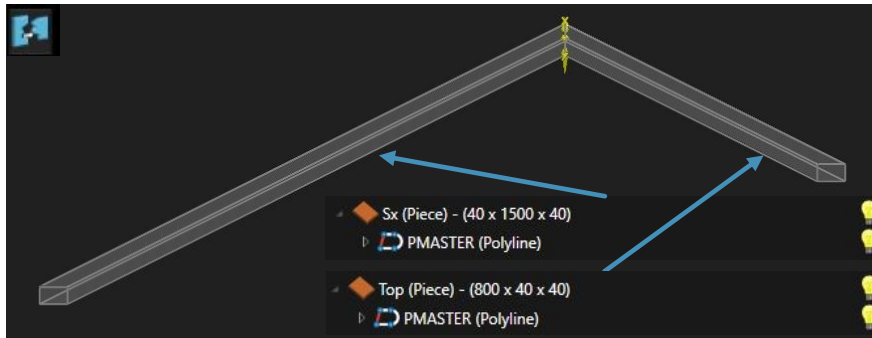
Multipanel

Pieces from finished geometries

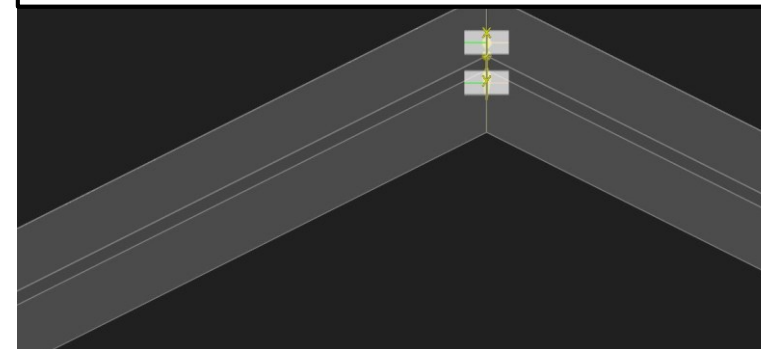


Multipanel

Copy the machining operation in adjacent faces: it's a modify CAD Command which allow to copy a machining operation on an adjacent face (command enabled only in case of Multipanel)



With one click on  command the machining on “Sx” piece will be copied on adjacent face of “Top” piece too.

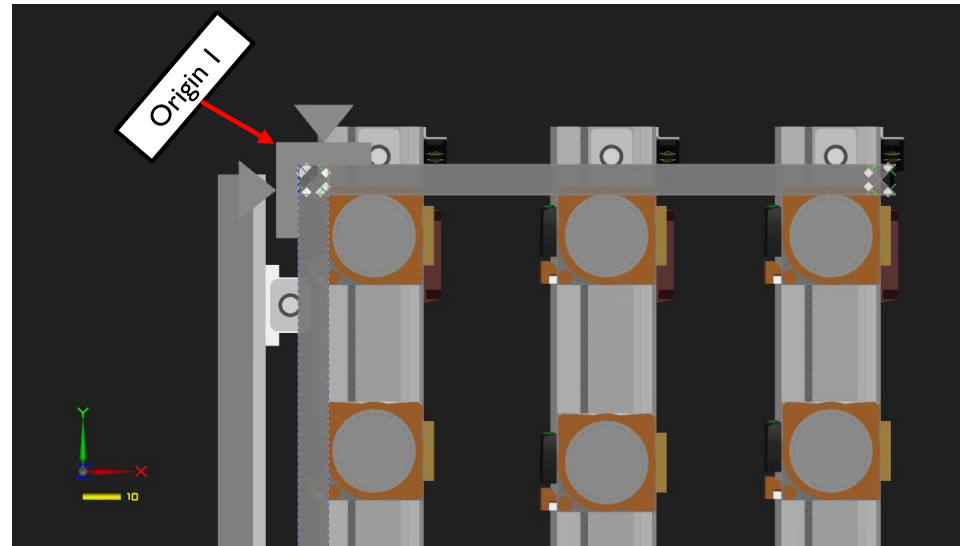
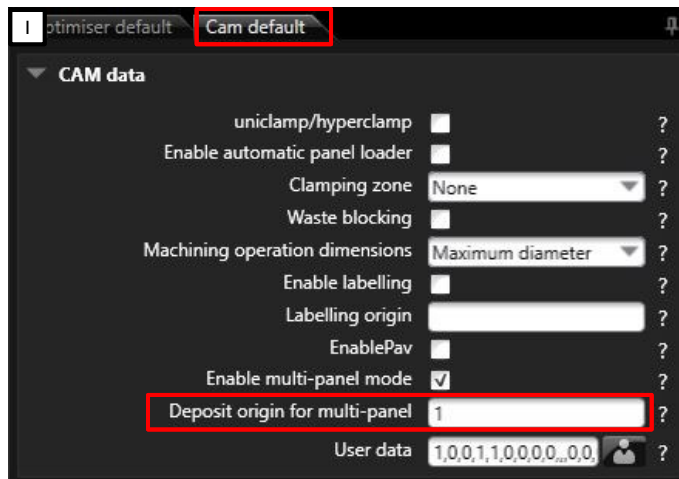


Multipanel

Deposit origin for multi-panel

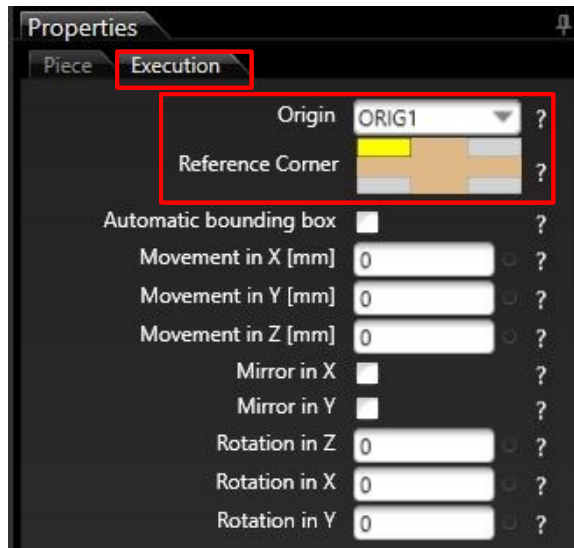
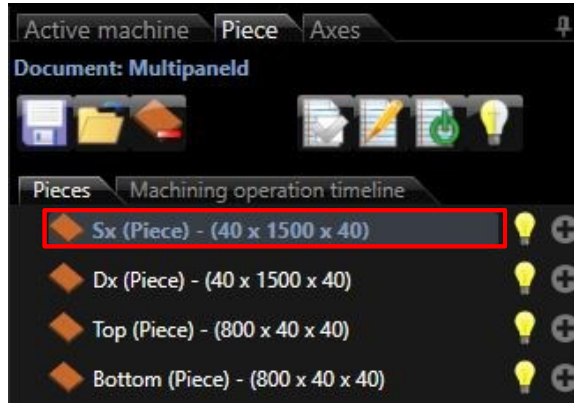
Deposit Origin for multi-panel parameter allow to specify the default origin (in this example, origin 1) in which will be placed all the pieces of the multipanel.

Each piece of a multi-panel project can be assigned to different origins and specific parameters can be set to manipulate each piece position and placement (more details on next slides).



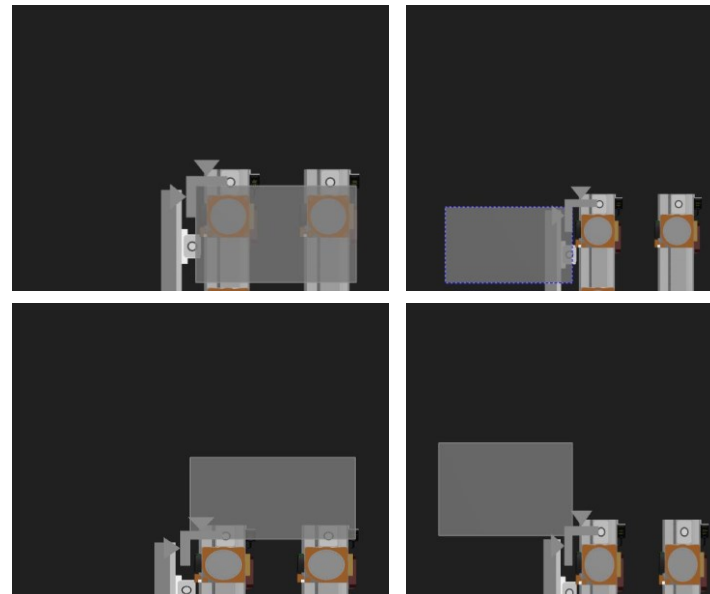
Multipanel

Piece Execution



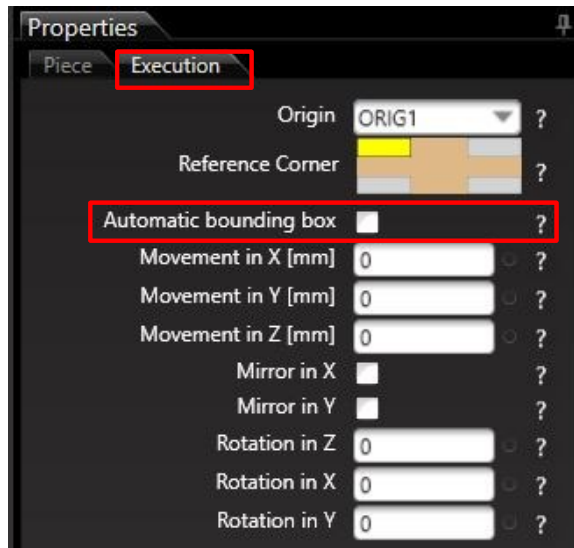
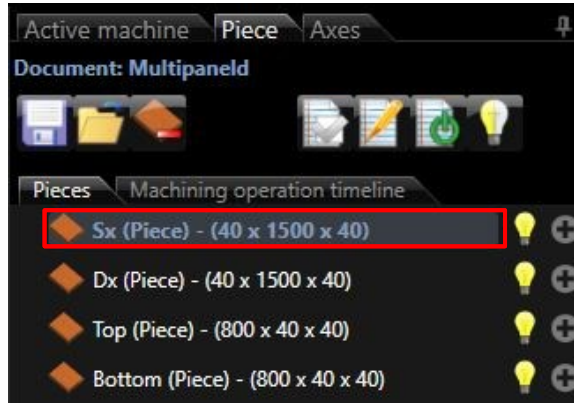
Execution:

- **Origin:** it allow to choose the origin in which to place the panel (the number of available origins depends on the type of machine).
- **Reference Corner:** it allow to specify a reference corner (Top-left, Top-right, Bottom-left, Bottom-right) for place the panel in the chosen origin.



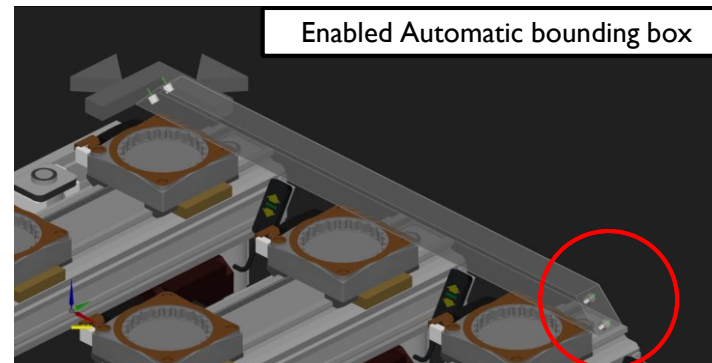
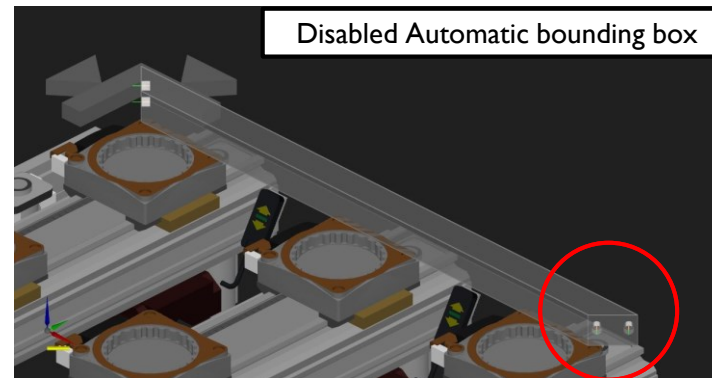
Multipanel

Piece Execution



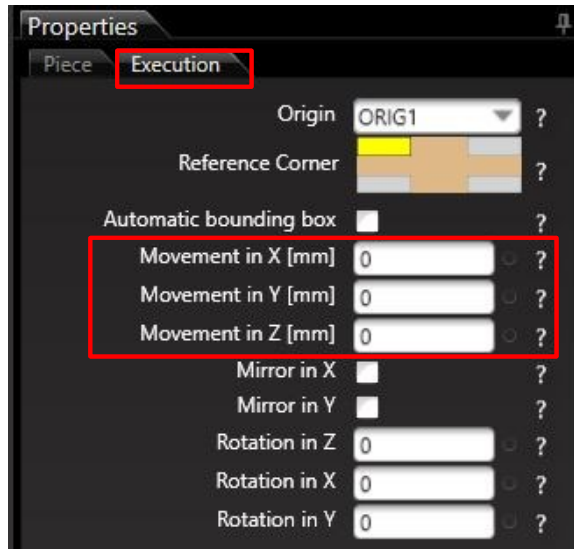
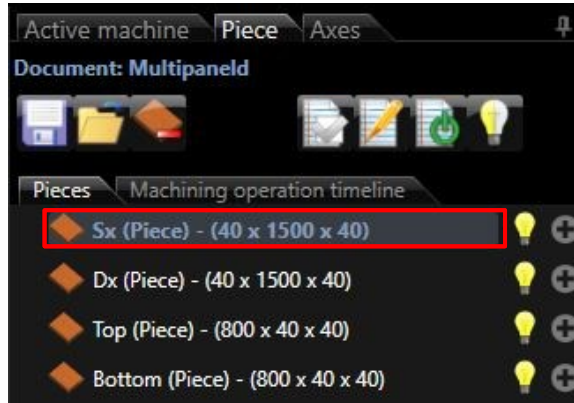
Execution:

- Automatic bounding box:** if checked it allow to rotate the piece in order that its zero face is pointing upwards (vertical machining operations)



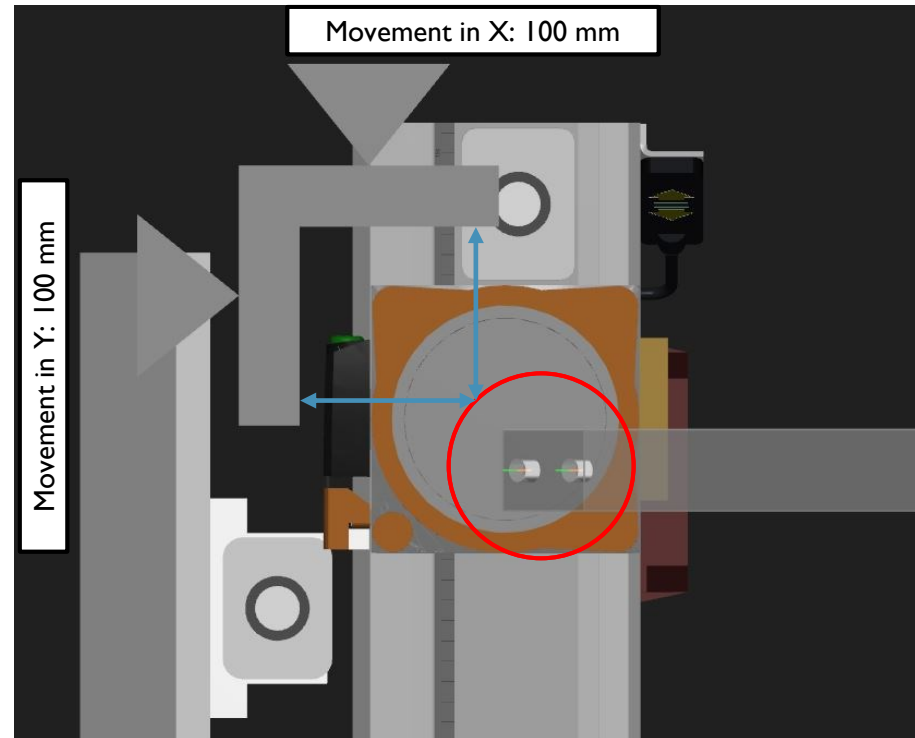
Multipanel

Piece Execution



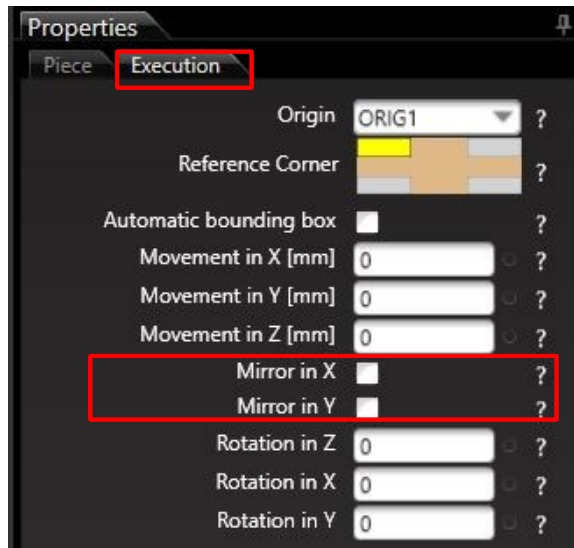
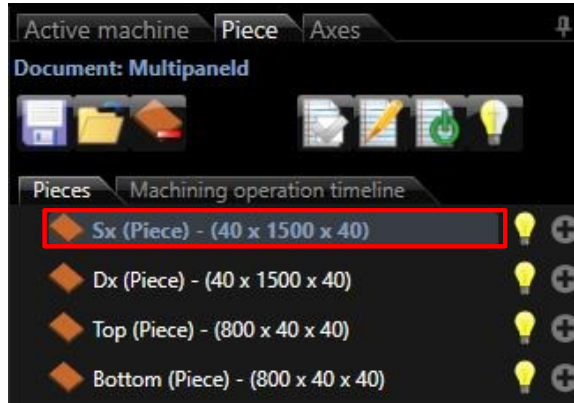
Execution:

- **Movement in X,Y and Z:** is the distance in X,Y and Z between the reference origin (Origin field) and the corner (Reference Corner field), for transferring the piece.



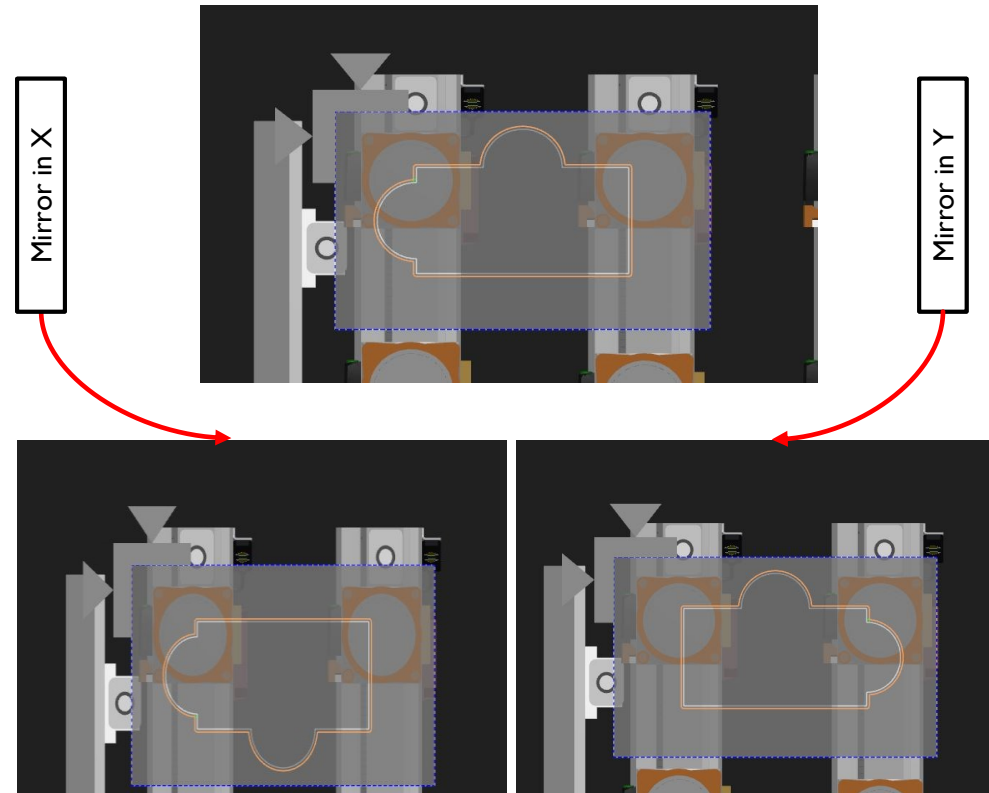
Multipanel

Piece Execution



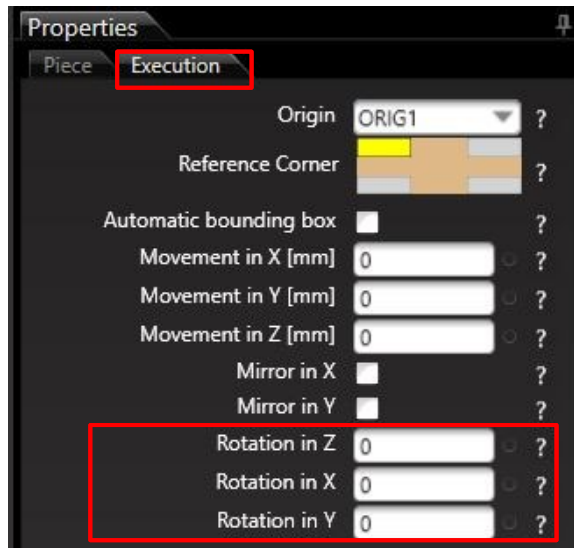
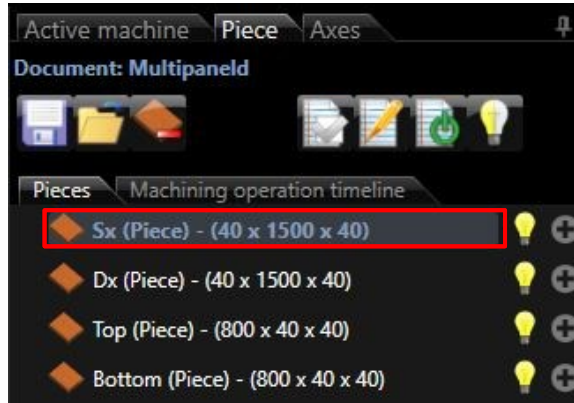
Execution:

- Mirror in X,Y:** Mirror in X is used to flip the piece horizontally while Mirror in Y is used to flip the piece vertically.



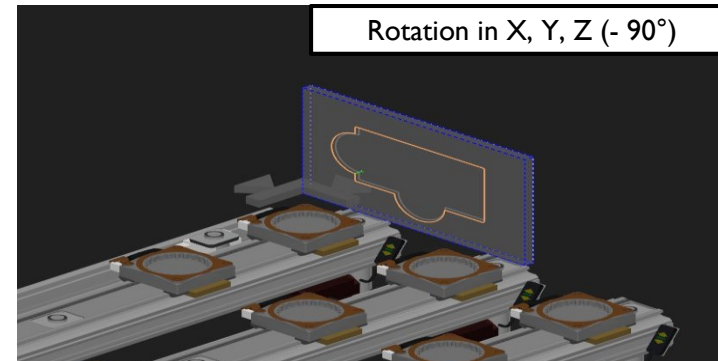
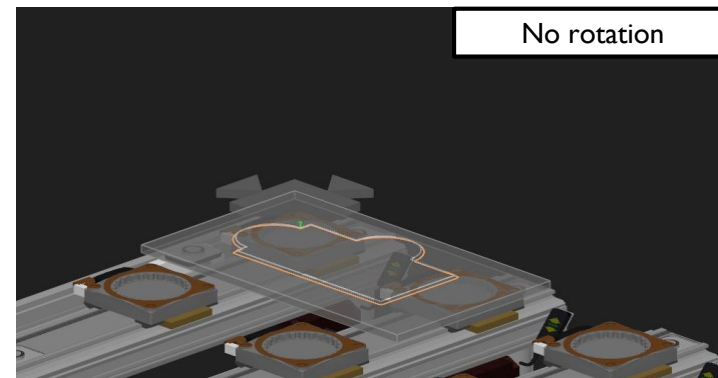
Multipanel

Piece Execution



Execution:

- Rotation in X,Y:** It allows to rotate the piece according to the selected axis.



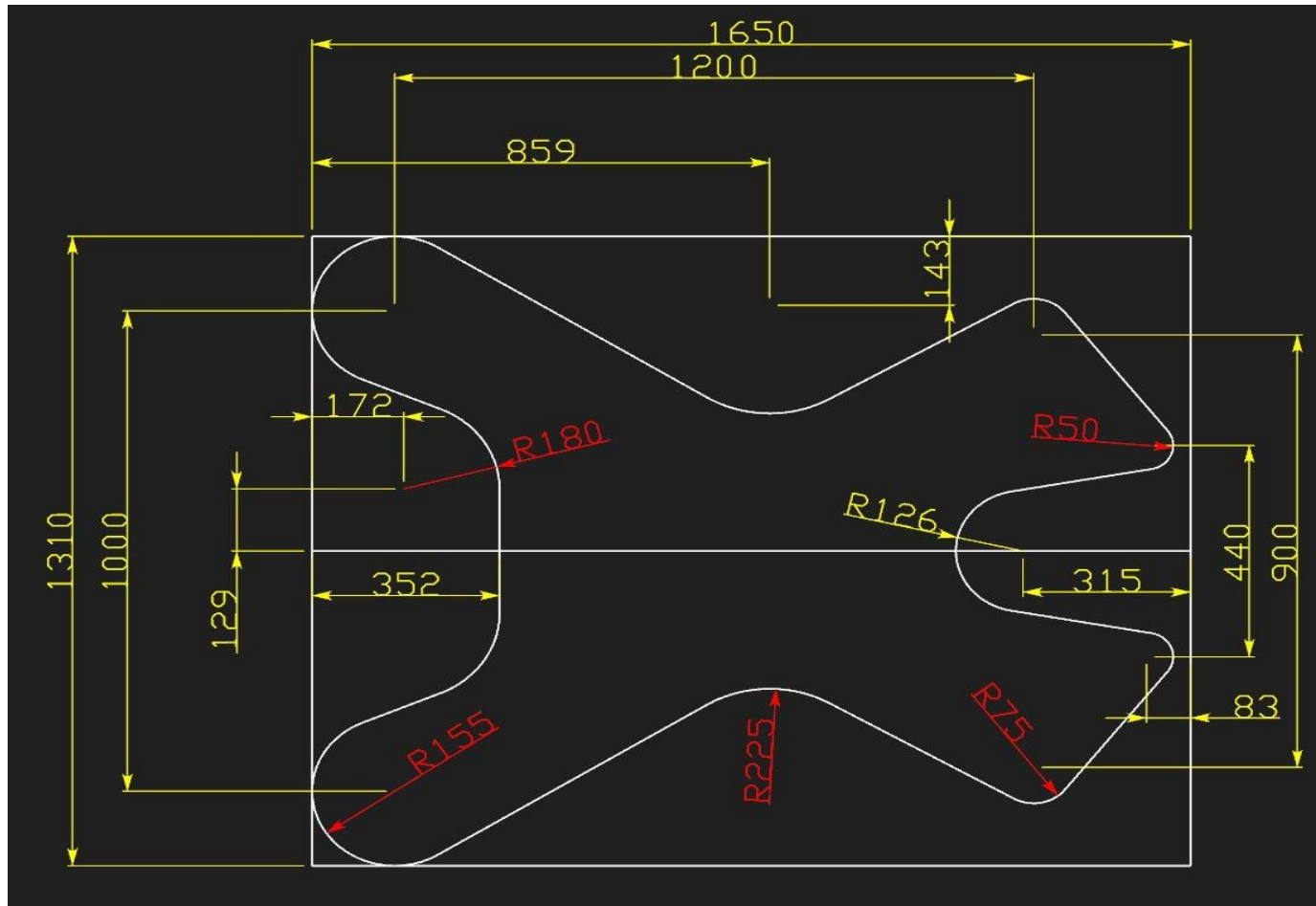


RAD NA PROIZVODIMA KORPUSNE KONSTRUKCIJE



I EGA Profile Drawing

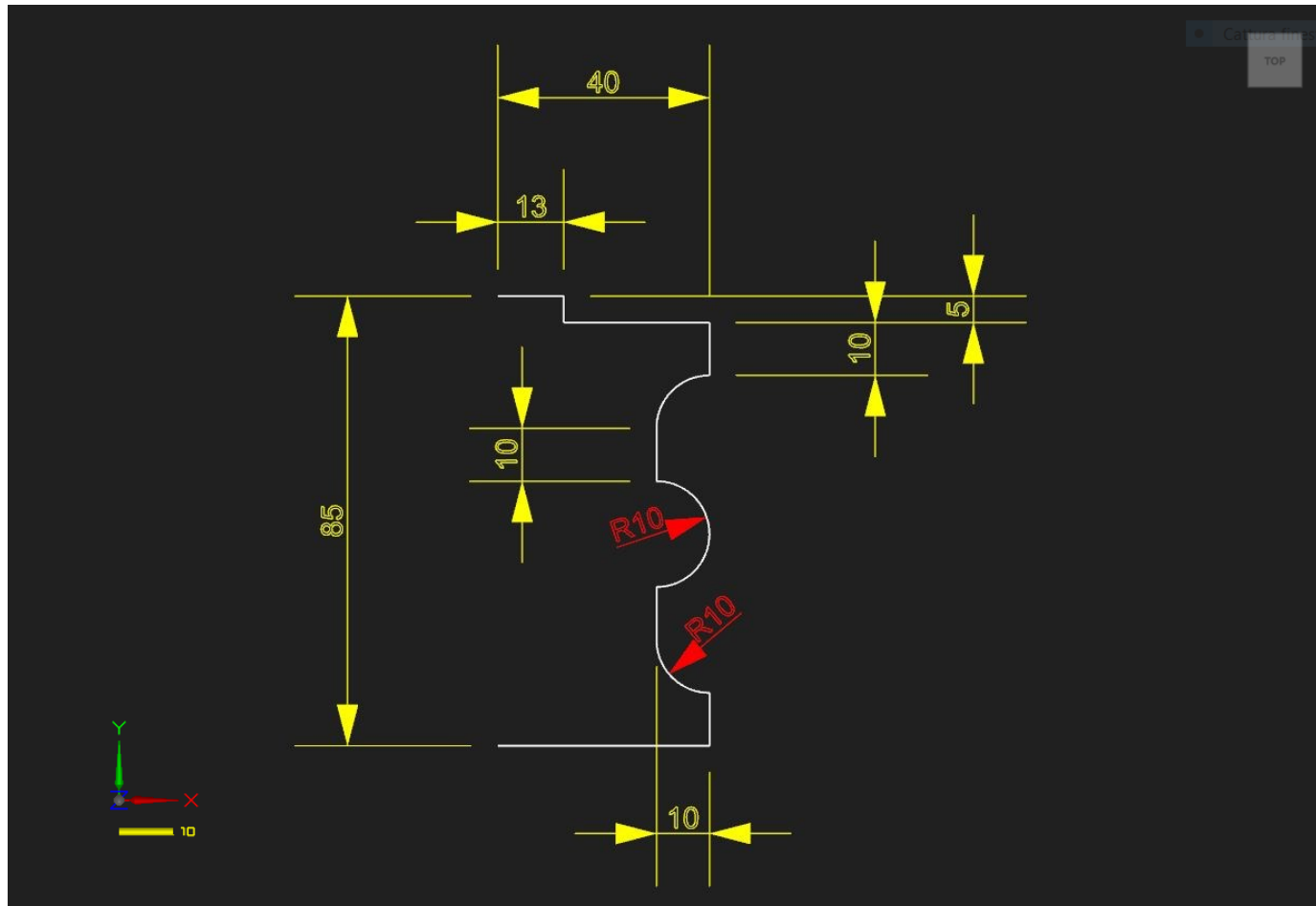
- ✓ **CAD Drawing**
 - ✓ **Estimated time**
- CAD drawing creation
~ 30 min.



2 Tool Profile Drawing

- ✓ **CAD Drawing**
- ✓ **Estimated time**

CAD drawing creation
~ 15 min.



3_Drilling

✓ **Tools required ***

** To be toolled in an appropriate way by the user.*

CERN35
CIECA3

LANCIA5P
CIECA5OR

(DEPTH: 14 mm, FACE: 0)

(DEPTH: 10 mm, MULTIPLE RUNS: 3,

RETURN MODE: 1:Partial Unloading, FACE: 0)

(Through, DEPTH: 2 mm, FACE: 0)

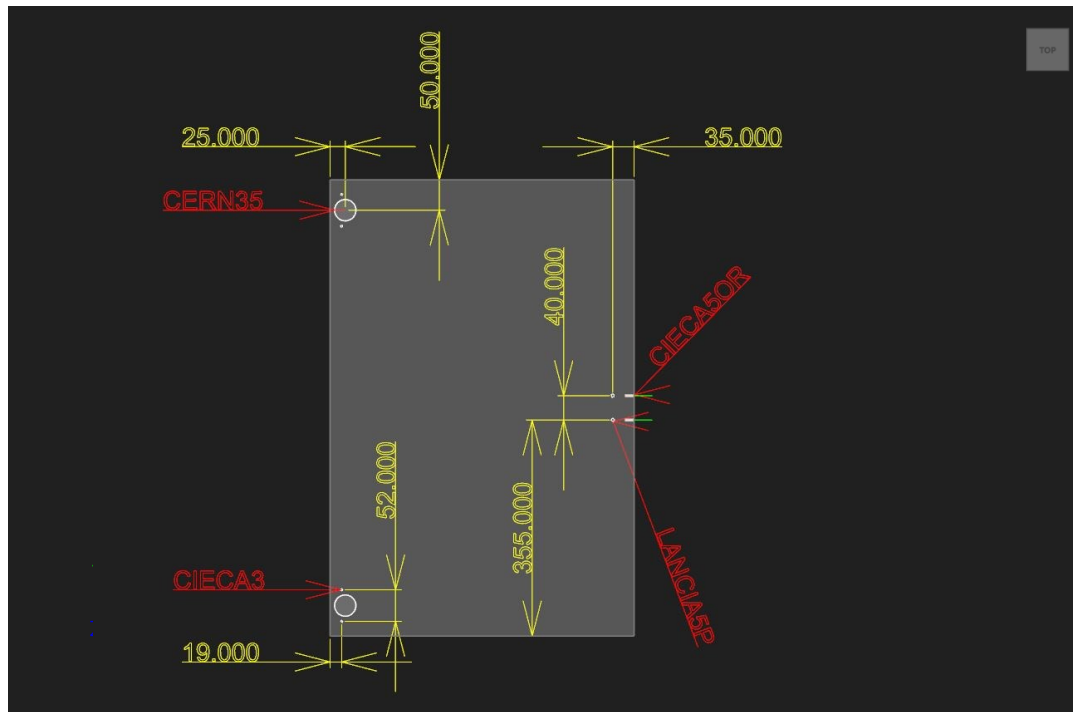
(DEPTH: 5 mm, FACE: 3)

✓ **Piece creation**

500*750*18, ORIG 5

✓ **Estimated time**

~ 15 min.



4_Cutting

✓ **Tools required ***

*100% tooled in an appropriate way by the user.

FRESA300 (1)

(DEPTH: 10 mm, INITIAL/FINAL EXTENSION: mm, FACE: 2)

LAMA120 (2) (DEPTH: 7.5 mm, TOTAL THICKNESS: 10 mm,

FACE: 0, Start/End Y: 20 mm, Start X: 10 mm, End

X: LPX-10, Blade Correction. Tool Radius

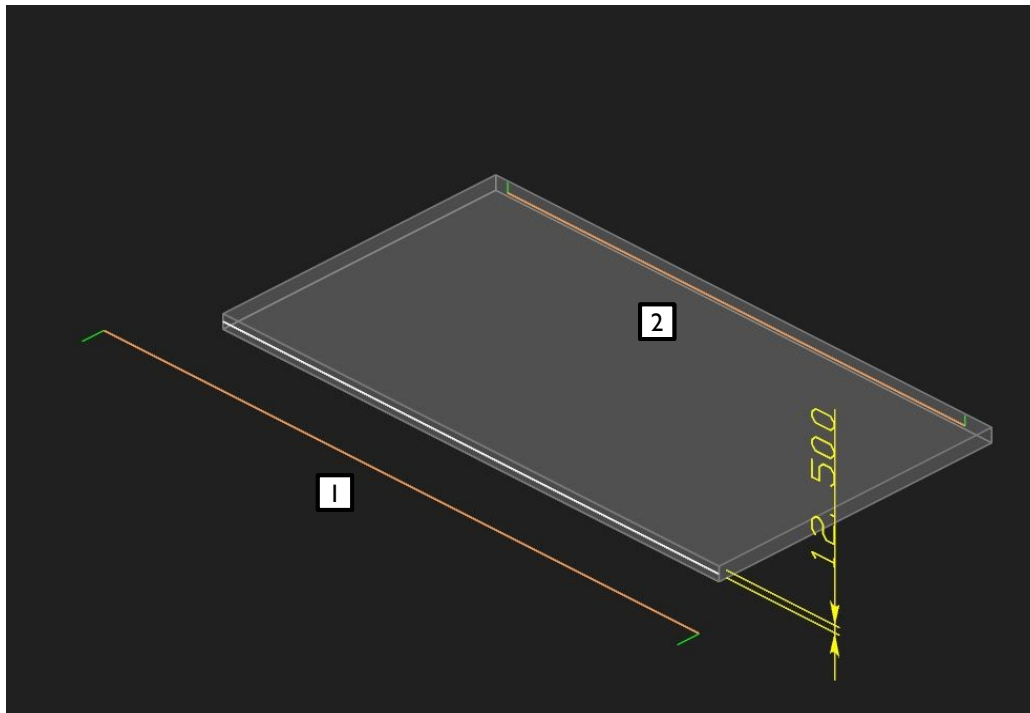
Correction: Left)

✓ **Piece creation**

1000*550*25, ORIG 5

✓ **Estimated time**

~ 15 min.



5 Milling

✓ Tools required *

* To be tooled in an appropriate way by the user.

FRESA20

(Through, **DEPTH**: 1 mm, **Tool radius Correction**:
External, **Lead-in/Lead-out**: 3D Arc, **Angle**: 45,
Percentage radius: 100 mm, **Final extension**: 20
mm)

FRESA16

(Through, **DEPTH**: 5 mm, **Tool radius Correction**:
Internal, **Lead-in/Lead-out**: 3D Arc, **Angle**: 45,

Percentage radius: 100 mm, **Vertical passes**: 3,

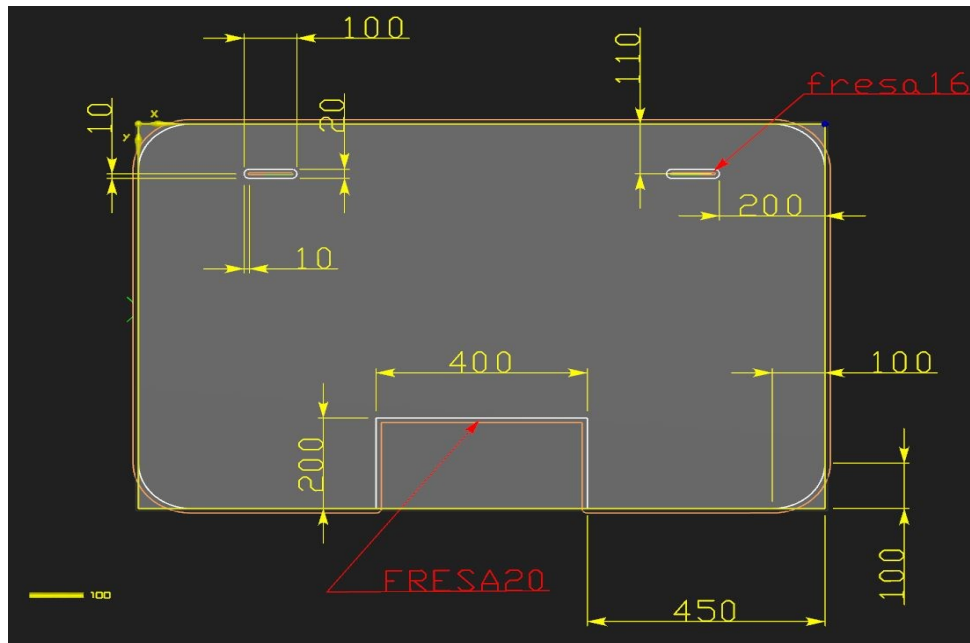
Incremental steps and eliminate lead-outs)

1300*850*30, ORIG 5, **Excess material**: 5 mm.

✓ Piece creation

✓ Estimated time

~ 30 min.



6 Pocketing and Re-working machinings

✓ **Tools required ***

** To be tooled in an appropriate way by the user.*

passes: 8

[mm]:

FRESAD16

131

800*500*20, ORIG 5.

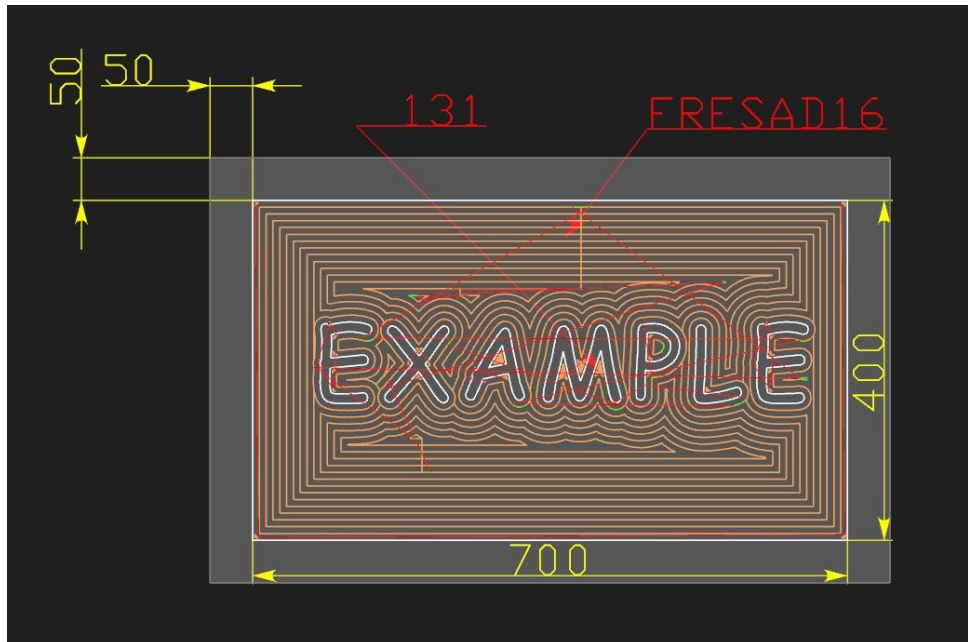
✓ **Piece creation**

✓ **Estimated time**

~ 15 min.

(Incoming concentric, **Working depth [mm]**: 10 mm, **Z step**: 10 mm, **Distance between** mm)

(**Finish type**: Concentric in Z, **Working depth** 10 mm, **Z step [mm]**: 10 mm, **Distance between** **passes**: 1 mm)



7 Custom Faces

✓ Tools required *

** To be tooled in an appropriate way by the user.*

mm)

FRESAD16 (1)

ANUBA (2)

FRESA 300 (4)

(Tool Radius Correction: External, Through, Depth: 1 mm, Lead-in: Arc)

(x position [mm]: 50, y position [mm]: 15, Depth: 15

(Lead-in: Arc, Correction in air, Angle: 10, Percentage Radius: 10)

✓ Piece creation

✓ Geometries creation

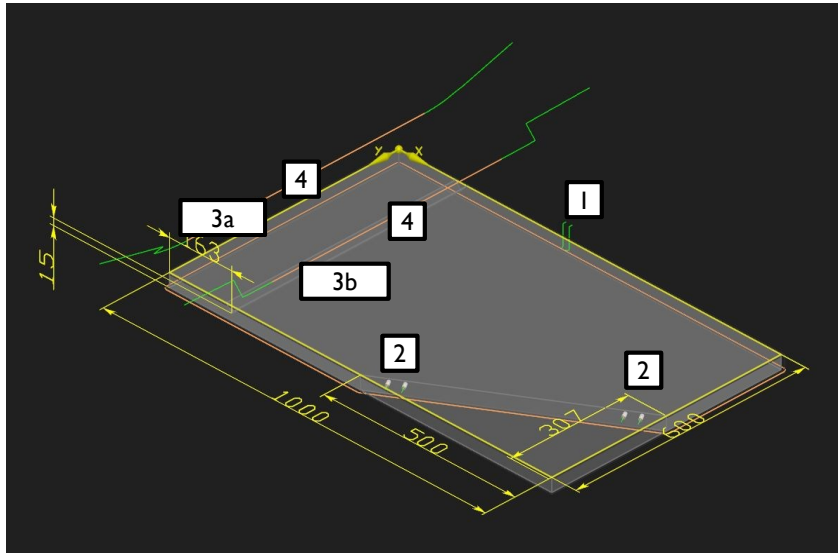
1000*600*30, Excess Material: 5 mm, ORIG 5.

Polyline1 (**3a**): **Angle and Y Coordinates**: 15 (Y) and Rotation Angle (45), Initial Point (x): 148 mm

Polyline2 (**3b**): **Angle and Y Coordinates**: 15 (Y) and Rotation Angle (135), Initial Point (x): 178 mm

✓ Estimated time

~ 15 min.



8 Handrail with Clamp Movement

✓ **Tools required ***

Angle: *to be applied in an appropriate way by the user.*

LAMELLO

(**Depth:** 30 mm, **Type:** Arc, **Correction in air,** 90, **Percentage Radius:** 100, **Excess Material:** -10 mm, **Initial / Final Extension:** 20 mm)

✓ **Piece creation**

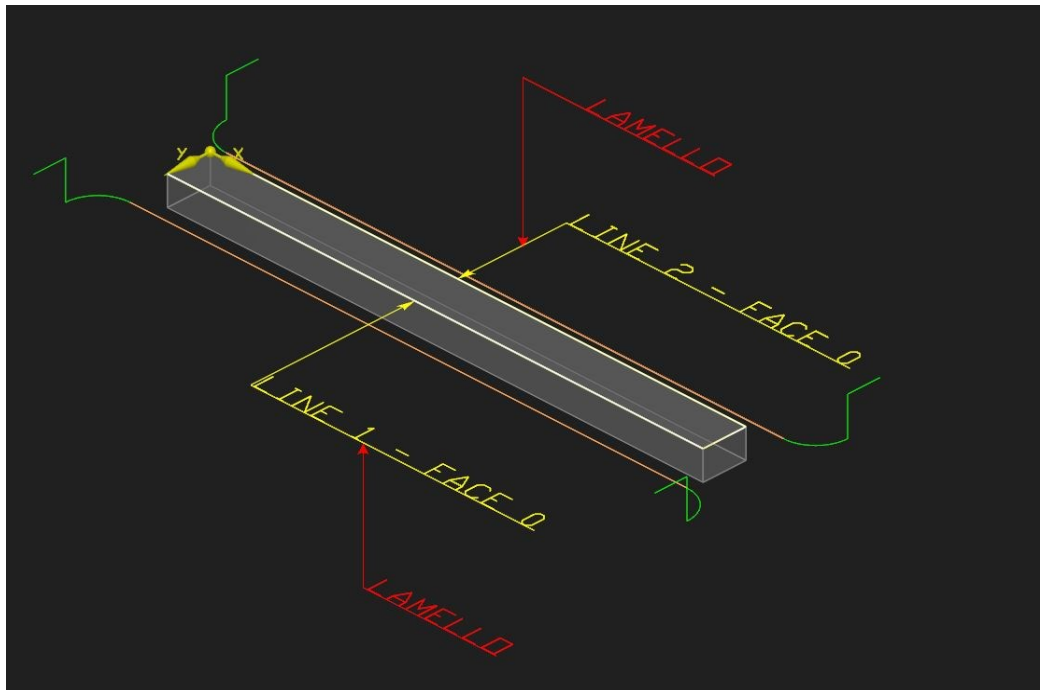
1000*80*60, ORIG 5.

✓ **Creation Steps**

Program proper carriage transfer in order to work the piece on both sides

✓ **Estimated time**

~ 30 min.



9 Panel opening

✓ Tools required *

** To be tooled in an appropriate way by the user.*

L 0973
FORA8 (2)

(Through, **Depth:** 2 mm)
(Drill Unit, Horizontal Spindle, **Depth:** 15,
Force LPZ/2, x position :50 mm)

✓ Piece creation

✓ Creation Steps

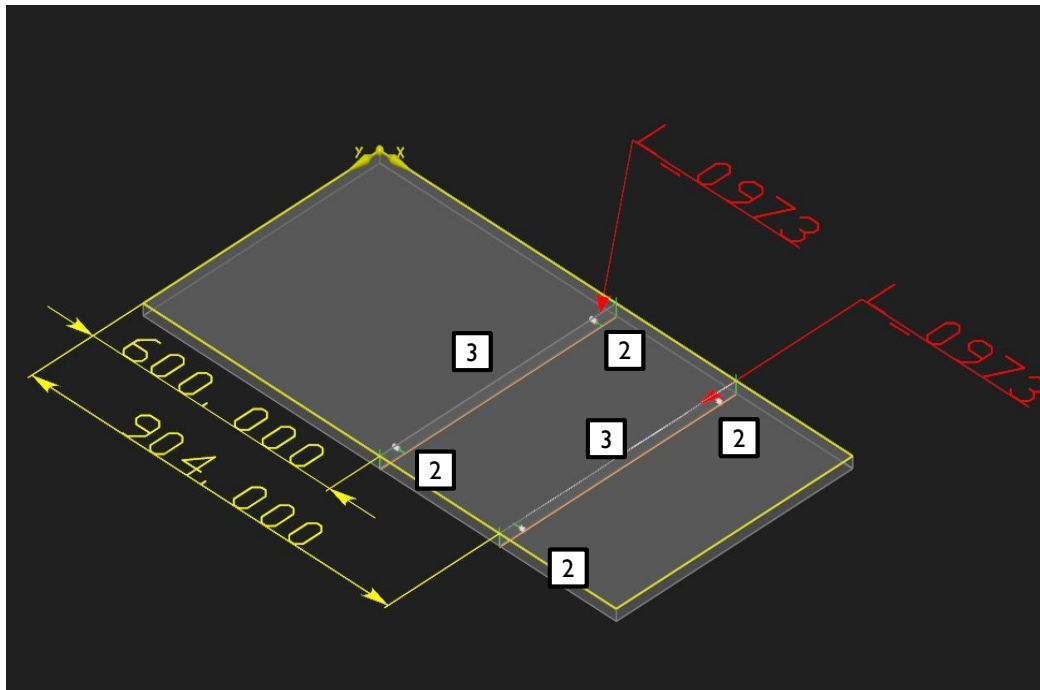
800*500*40, ORIG 5.

Create two Custom Faces in which to add borings (3).

Program proper mobile supports movements in order to separate the two pieces without having collisions with the drill unit **.

✓ Estimated time

~ 15 min.



** The machine simulation will not move also the piece during the mobile support movement

10 Multipanel Cabinet

✓ **Tools required ***

** To be tooled in an appropriate way by the user.*

FORA8 (3)

(Depth [mm]: 15 mm, x position [mm]: 30, y position [mm]: 50, Repetition data: Linear, Number of repetitions: 5, Step [mm]: 110 mm)

✓ **Piece creation**

✓ **Creation Steps**

600*500*30 (1) - 30*500*1140 (2)

Create a Multipanel projects and add indicated machinings.

Program machine tooling in order to block all the four pieces of the cabinet in different machine origins.

Parking Management disabled.

✓ **Estimated time**

~ 30 min.

