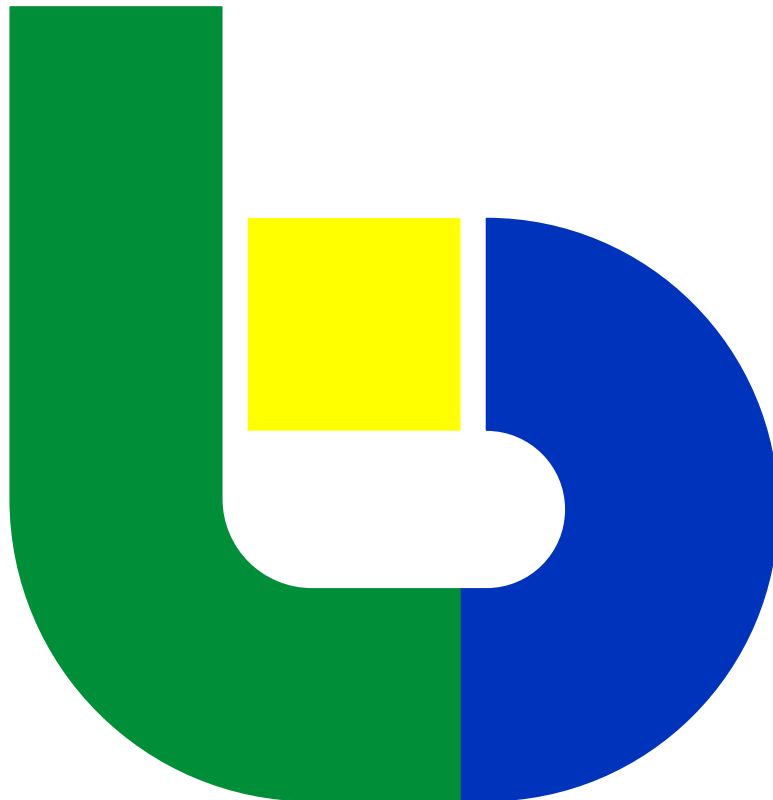


design2machine

BTLx interface description

Version: BTLx 2.3

Last modified: 08.07.2025



Common Data Interface for Wood Working Machines

The following interface description is designed for the structured representation of the data relevant to the manufacturing process.

It does not contain any machine specific data. This allows the interface to be used as a common data interface.

If there is a need to prepare the data stored in this interface for some special wood working machine or some special control, then these data should be imported by a suitable CAM system and then properly processed.

This documentation is a graphical appendix to the BTLX schema. You can find this schema at

https://www.design2machine.com/btlx/BTLx_2_3_0.xsd

BTLx files are identified by the ".btlx" file extension.

A BTLx file contains general data related to the project, information about the building elements as well as the relationship between them and parametric descriptions of the processings of each building element.

In order to minimize storage space requirements, the specification defines compressed BTLx files which are identified by the ".btlz" file extension. Such a file has to be a standard zip file and may only contain a single BTLx file.

For more information or questions regarding the BTLx format, please contact:

www.design2machine.com
info@design2machine.com

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History

You can find the history of the BTLx schema here:

https://www.design2machine.com/btlx/documentation/BTLx_10.html
https://www.design2machine.com/btlx/documentation/BTLx_11.html
https://www.design2machine.com/btlx/BTLx_2_0_0.xsd
https://www.design2machine.com/btlx/BTLx_2_1_0.xsd
https://www.design2machine.com/btlx/BTLx_2_2_0.xsd
https://www.design2machine.com/btlx/BTLx_2_3_0.xsd

Modifications in the graphical documentation for 2.3.0:

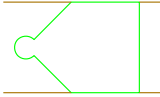
Date	Modification	Build	Page
22.11.2024	Contour: description of FaceLimited	2.3.0	105
08.01.2025	New processing PatternContour	2.3.0	109
08.01.2025	New processing Connector	2.3.0	110
12.03.2025	Add <ConnectorParameter> to processing Connector	2.3.0	110
08.07.2025	Slot: Description of MachiningLimits	2.3.0	21

General

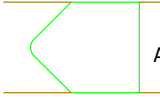
These drawings are a graphical appendix to the description in the XML schema.

Recess

Recess = automatic



Recess = manual

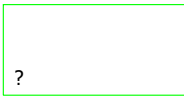


Additional manual work is necessary.

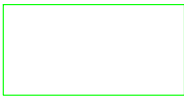
Presentation is schematic / exemplarily

RecessAdvType

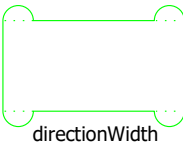
Primarily for:
Lap
Pocket
Mortise

enumeration value =

automatic

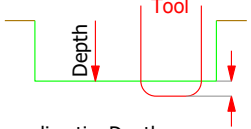
manual


exact

directionLength

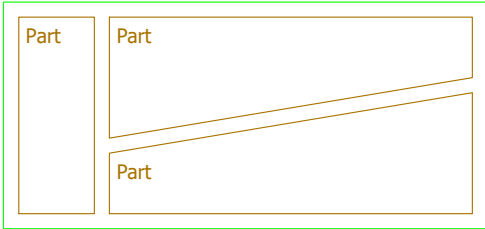

directionWidth

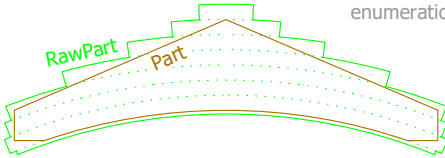
directionDiagonal


directionDepth

Presentation is schematic / exemplarily

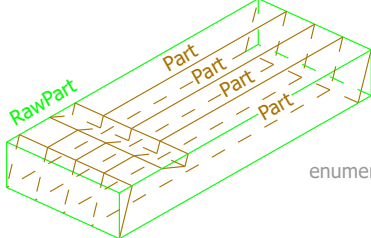
PartType

RawPart

enumeration value = nesting


enumeration value = blank

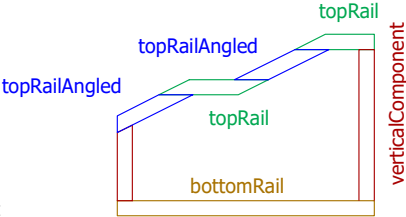
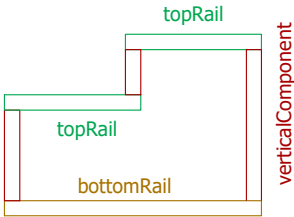
RawPart

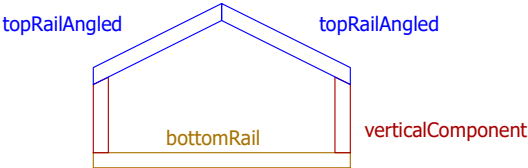
enumeration value = beam


enumeration value = package

AlignType

LocationType
= bottomRail
or topRail
or bottomRailAngled
or topRailAngled
or horizontalComponent
or verticalComponent
or angledComponent

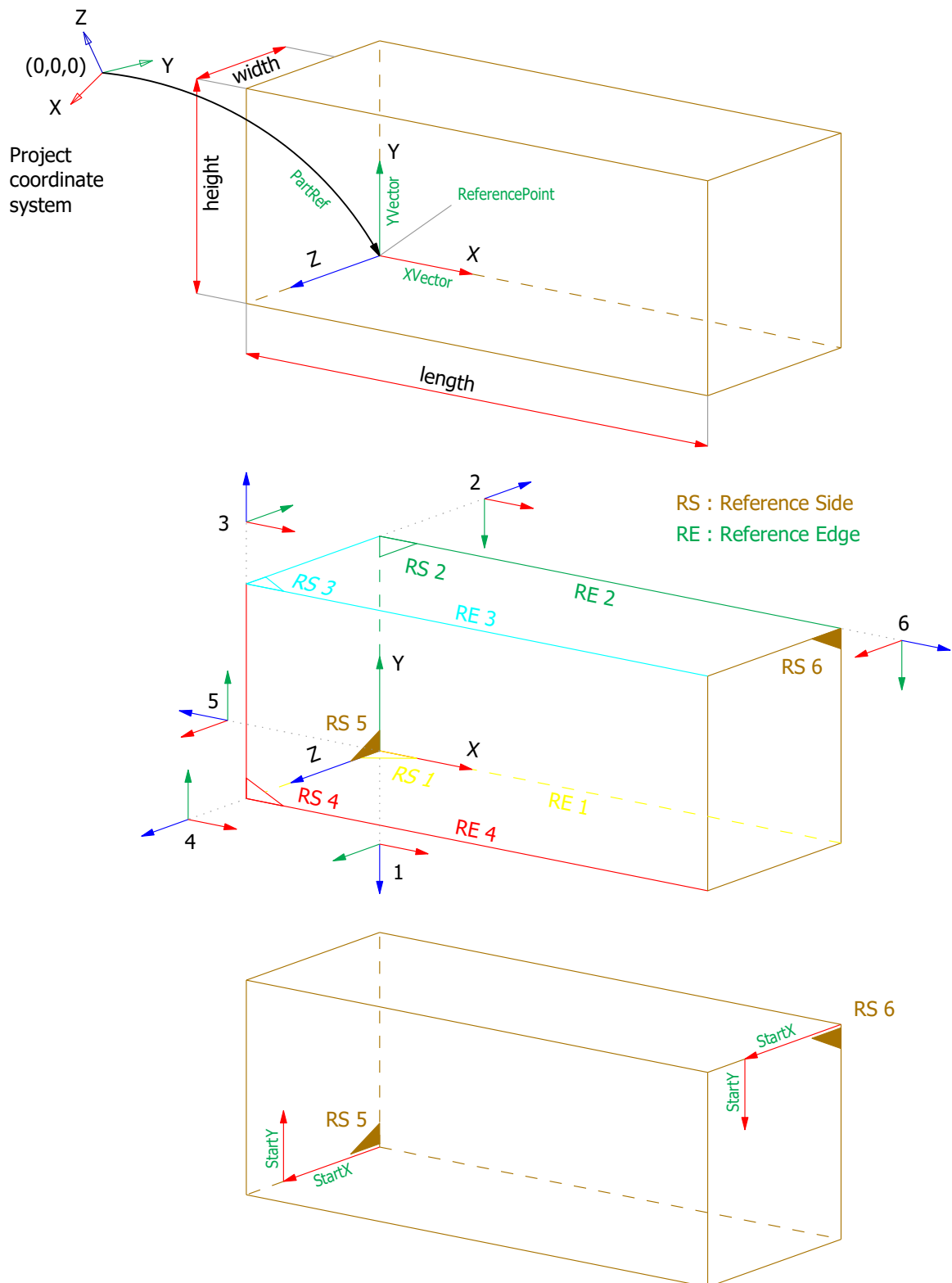


Part attributes "Count" and "Transformations"

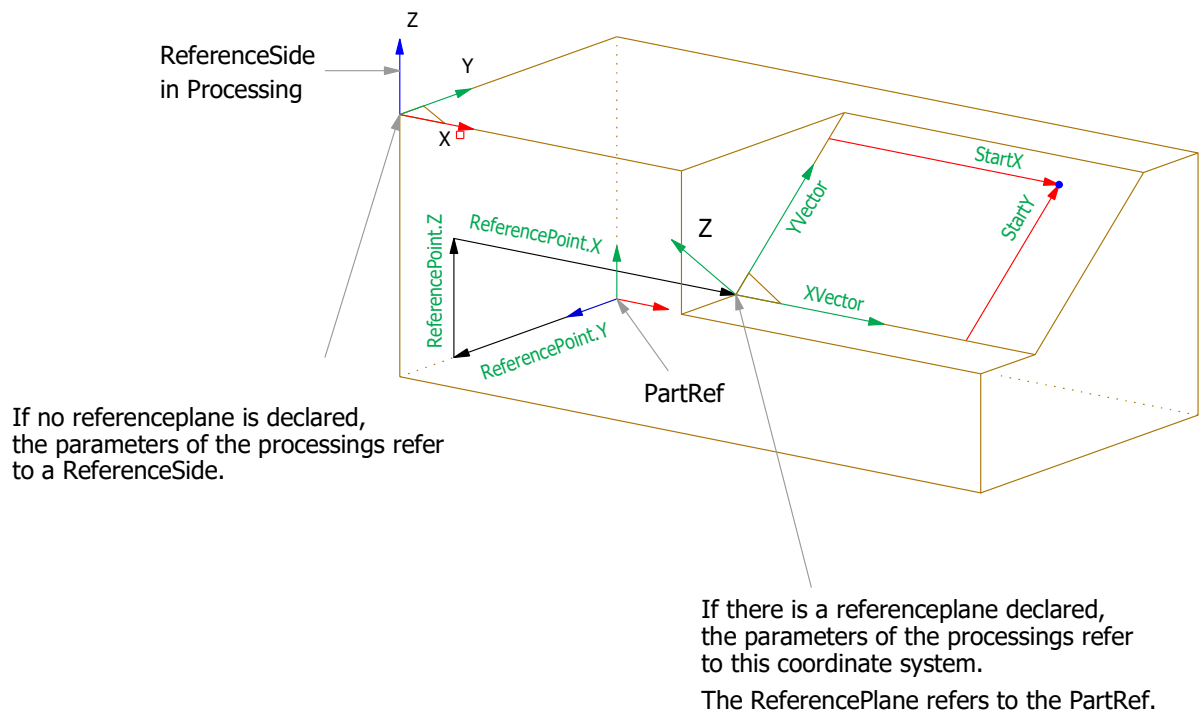
If Count > 1 for a part, there have to be Count Transformations.
Each Transformation must have an own GUID.
GUID must be unique.

This condition is **not** controlled by the XML schema.
This condition is controlled by the XML schema.
This condition is **not** controlled by the XML schema.

ReferenceSide

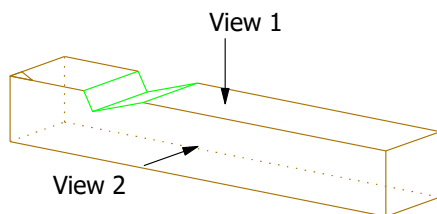


Referenceplane



View

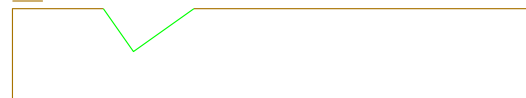
Most of the processings are drawn by a view orthogonal to the reference side. Otherwise the zeropoint of the reference side is displayed with a brown line.



View 1

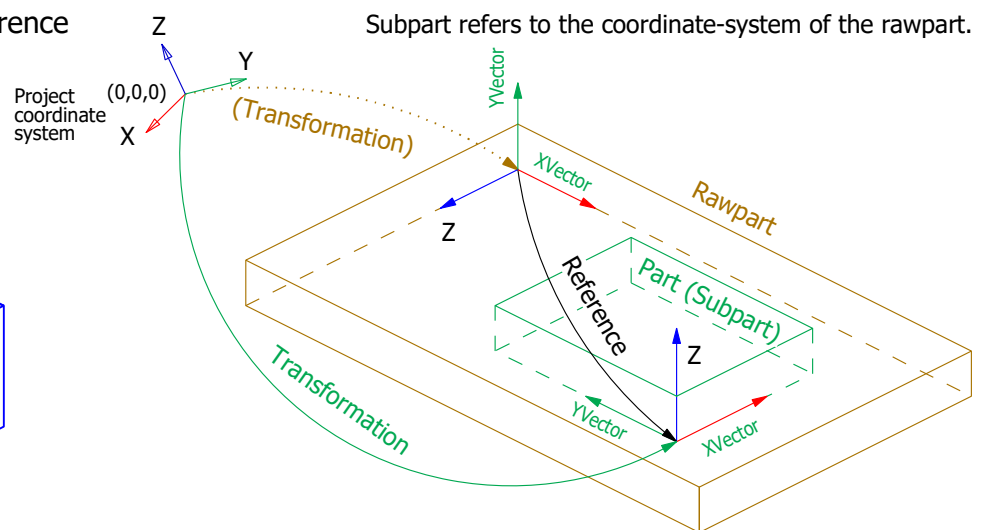
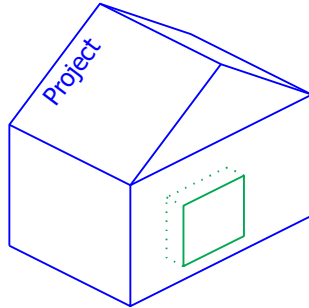


View 2



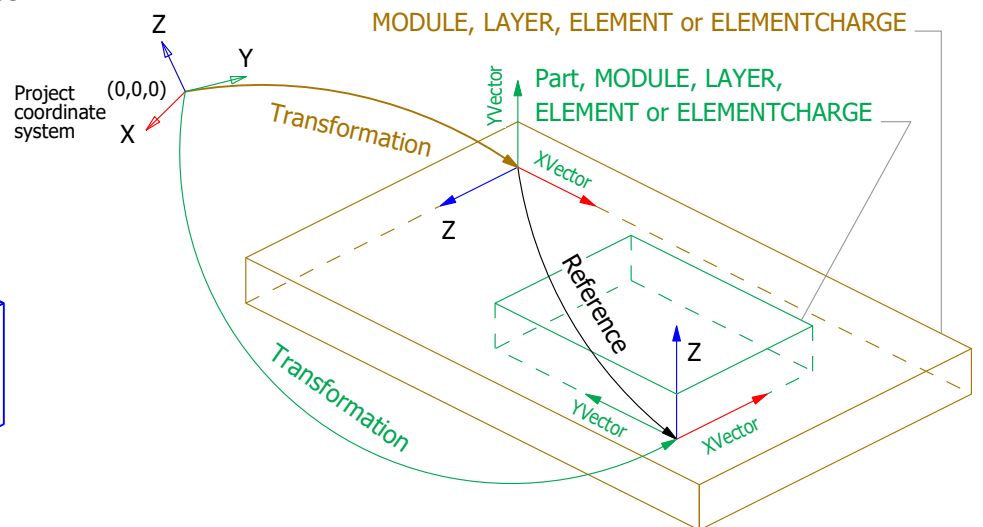
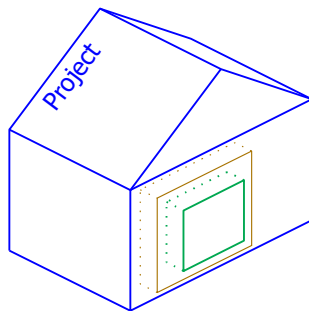
Transformation and Reference at Rawparts

*Rawpart belongs mostly not to the project.
It is for manufacture.*

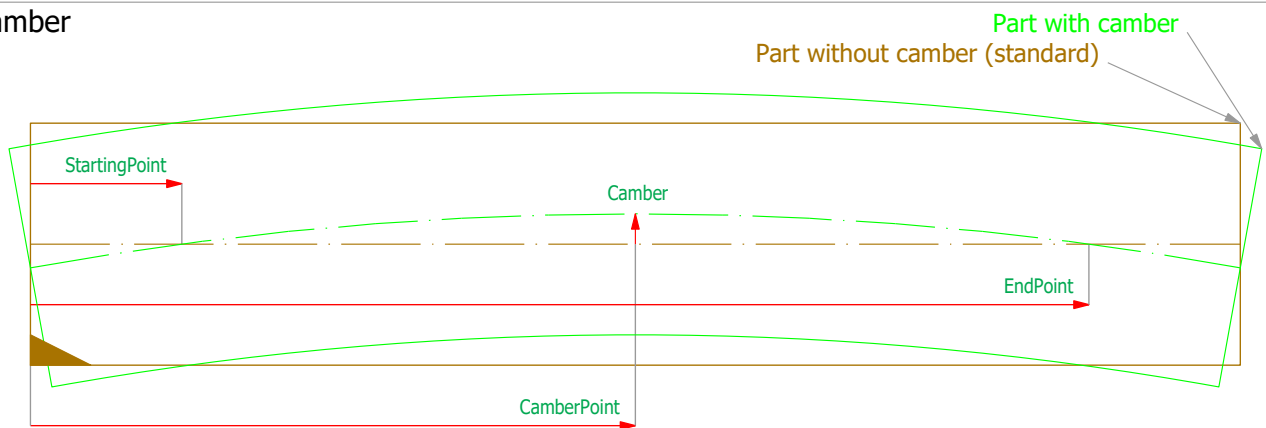


Transformation, Reference at Composites

MODULE, LAYER, ELEMENT belong to the project.



Camber



All processings are defined in the part without camber.

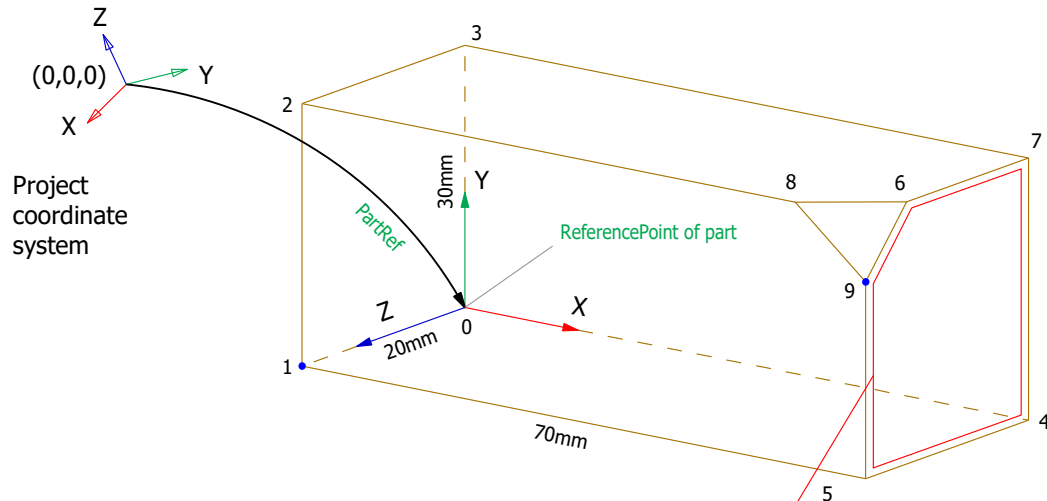
X3D Shape

With the Element <Shape> you can define the geometry of a part.

A part is build with several faces. The volume is closed.

All points of a face are coplanar and counterclockwise.

The coordinates of the points refer to the ReferencePoint of the part.



```
<?xml version="1.0" encoding="utf-8" standalone="yes"?>
```

```
<X3D profile="CADInterchange" version="3.3" xmlns:xsd="http://www.w3.org/2001/XMLSchema-instance" xsd:noNamespaceSchemaLocation="http://www.web3d.org/specifications/x3d-3.3.xsd">
```

```
<head/>
```

```
<Scene>
```

```
<Shape>
```

```
<Appearance>
```

```
<Material diffuseColor="0.6 0.6 0.6" emissiveColor="0.4 0.4 0.4"/>
```

```
</Appearance>
```

```
<IndexedFaceSet convex="false" coordIndex="0 1 2 3 -1 4 7 6 9 5 -1 1 5 9 8 2 -1 2 8 6 7 3 -1 3 7 4 0 -1 0 4 5 1 -1 9 6 8 -1">
```

```
<Coordinate point="0.0 0.0 0.0 0.0 0.0 20.0 0.0 30.0 20.0 0.0 30.0 0.0 70.0 0.0 0.0 70.0 0.0 20.0 70.0 30.0 15.0 70.0 30.0 0.0 61.25 30.020 70.0 22.5 20"/>
```

```
</IndexedFaceSet>
```

```
</Shape>
```

```
</Scene>
```

```
</head>
```

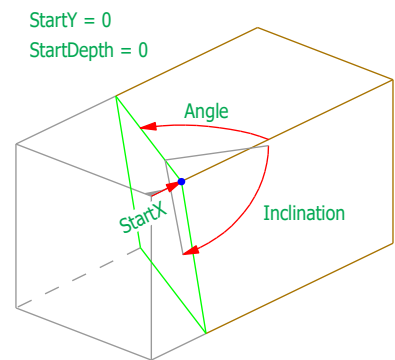
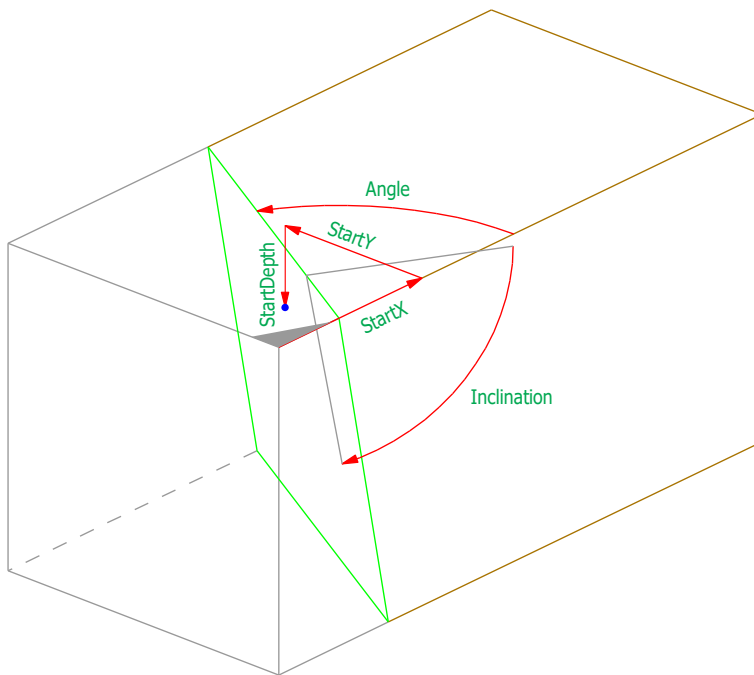
```
</X3D>
```


List of Processings

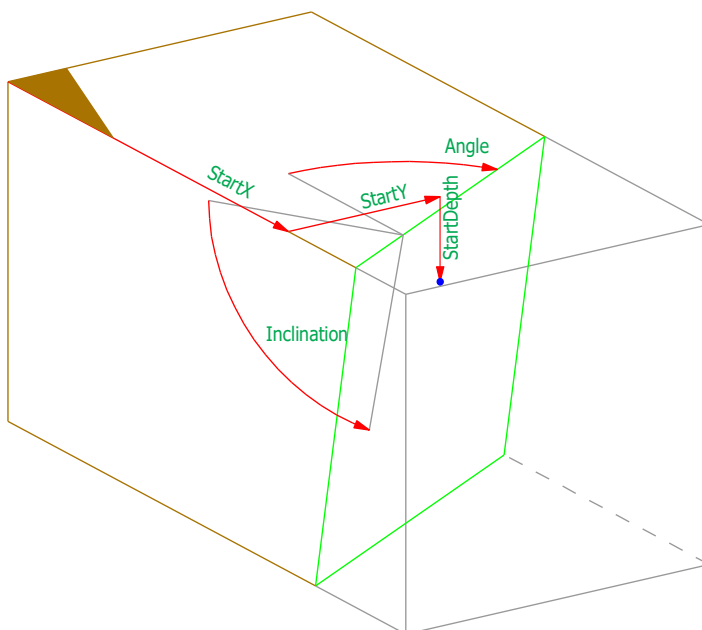
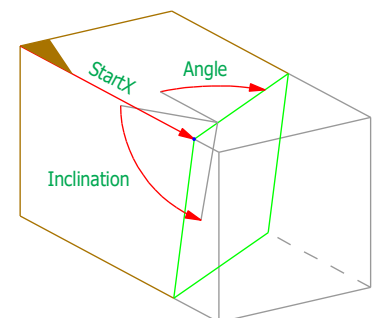
Processing	Page
JackRafterCut	10
LongitudinalCut	12
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RidgeValleyCut	16
SawCut	18
Slot	20
BirdsMouth	24
HipValleyRafterNotch	29
Lap	31
LogHouseHalfLap	35
FrenchRidgeLap	37
Chamfer	39
LogHouseJoint	41
LogHouseFront	44
Pocket	46
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Tenon	50
Mortise	52
House	54
HouseMortise	56
DovetailTenon	58
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JackRafterCut

Orientation = start



Orientation = end

StartY = 0
StartDepth = 0

Parameters JackRafterCut

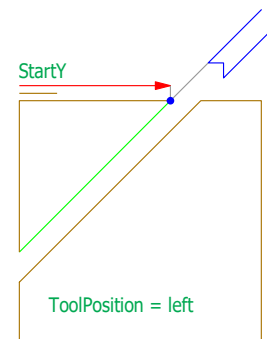
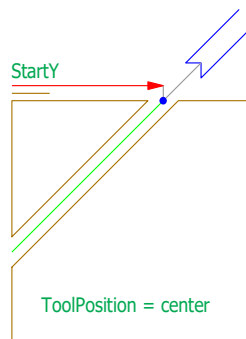
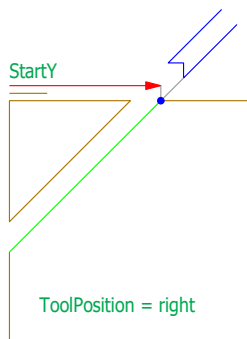
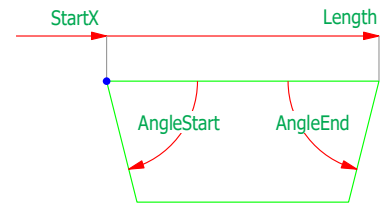
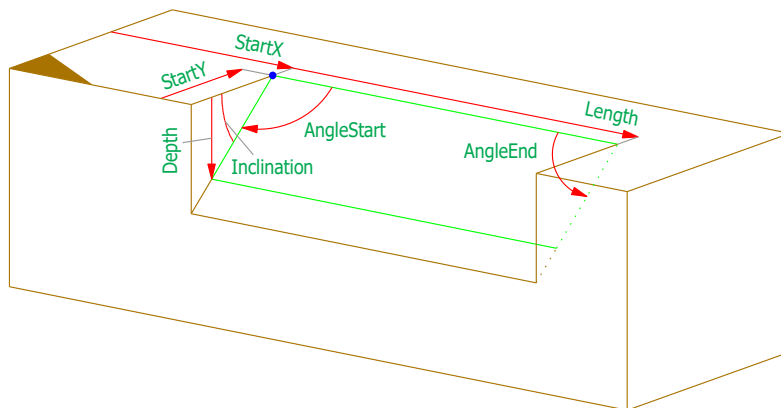
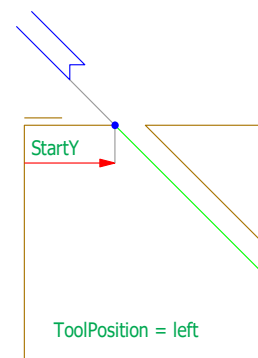
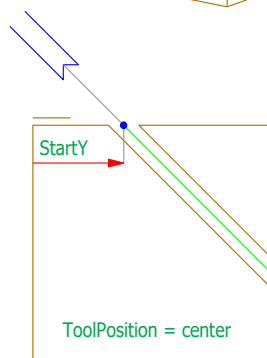
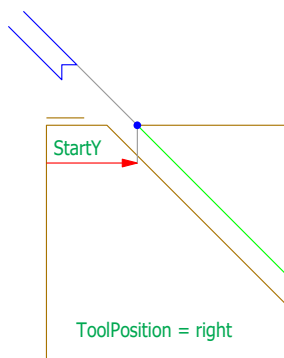
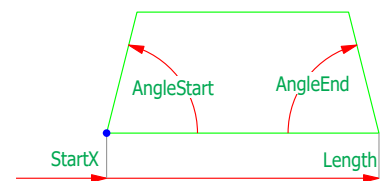
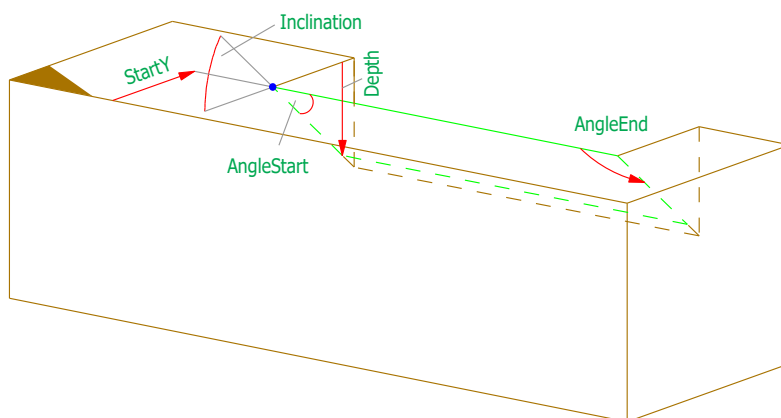
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthType	0.0	0.0	50000.0
StartDepth	WidthType	0.0	0.0	50000.0
Angle	AngleType	90.0	0.1	179.9
Inclination	AngleType	90.0	0.1	179.9

This processing trims the part, even it is on a ReferencePlane

Examples:

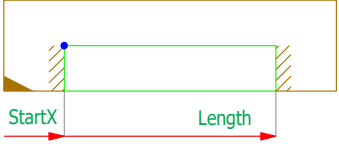
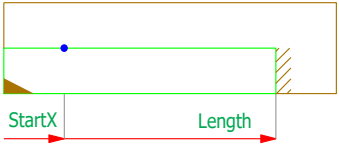
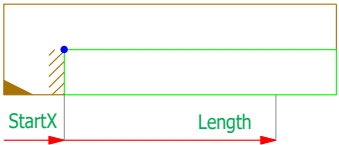
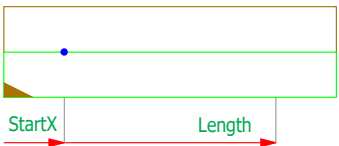


LongitudinalCut

Inclination > 0 Inclination < 0 

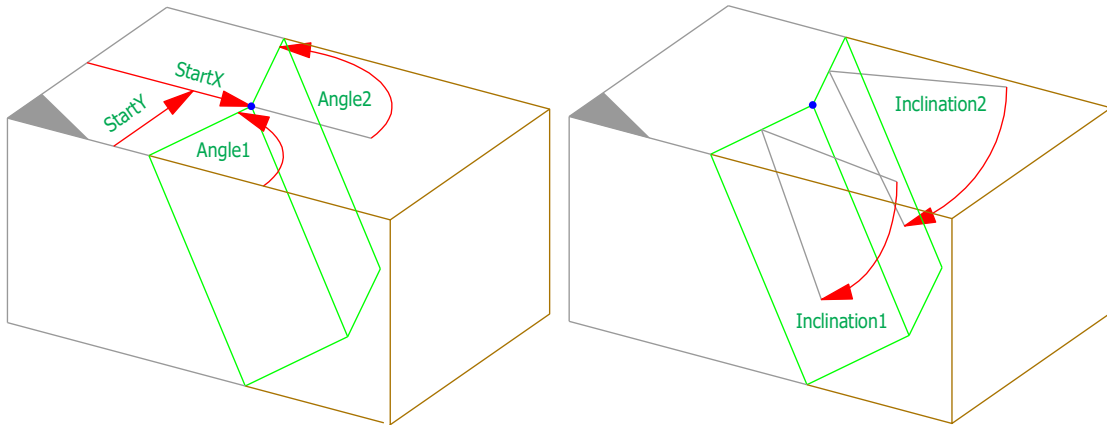
Parameters Longitudinal Cut

Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthType	0.0	0.0	50000.0
Inclination	Inclination2Type	45.0	-90.0	90.0
StartLimited	BooleanType	no	no	yes
EndLimited	BooleanType	no	no	yes
Length	LengthType	0.0	0.0	100000.0
DepthLimited	BooleanType	no	no	yes
Depth	WidthType	0.0	0.0	50000.0
AngleStart	AngleType	90.0	0.1	179.9
AngleEnd	AngleType	90.0	0.1	179.0
ToolPosition	ToolPositionType	left	left/center/right	

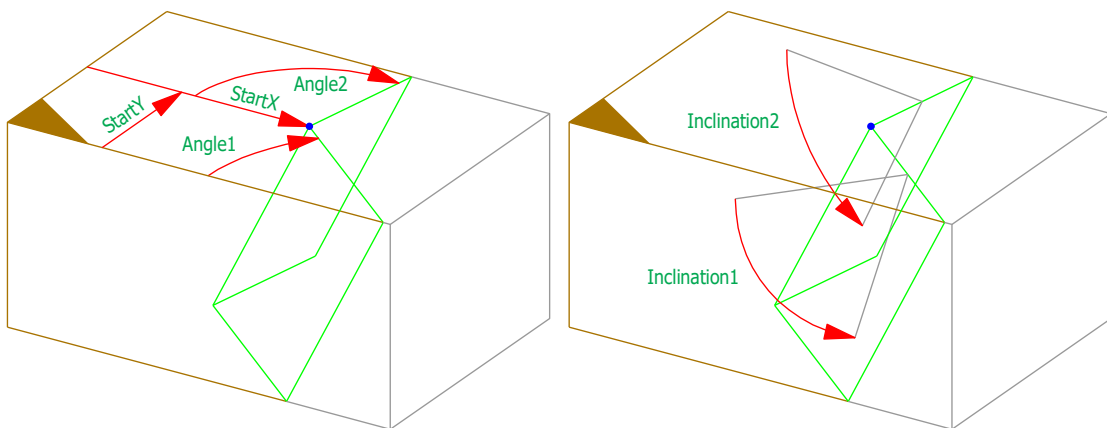
StartLimited	EndLimited	
yes	yes	
no	yes	
yes	no	
no	no	

DoubleCut

Orientation = start



Orientation = end



This processing trims the part, even it is on a ReferencePlane

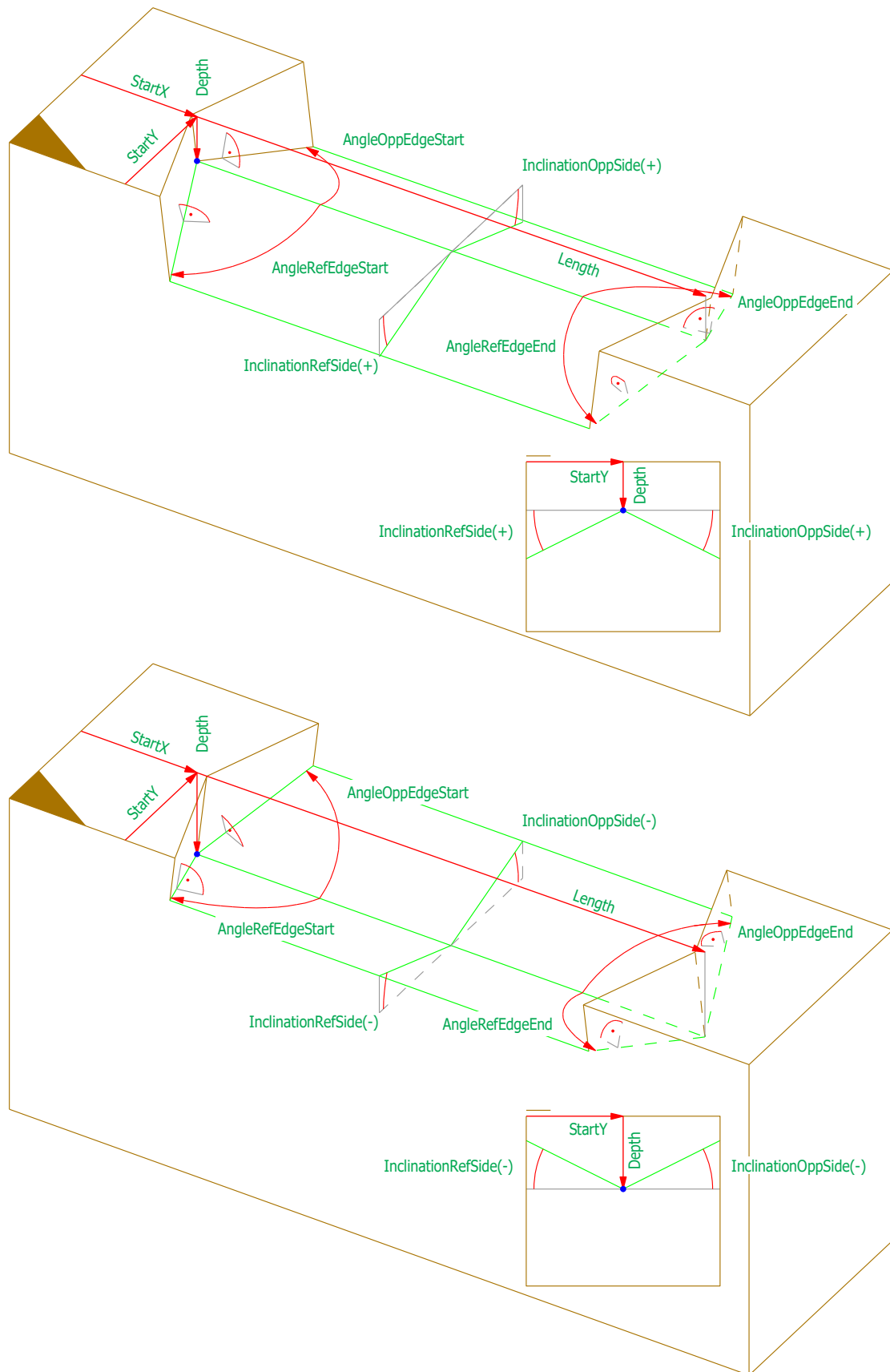
Examples:



Parameters Double Cut

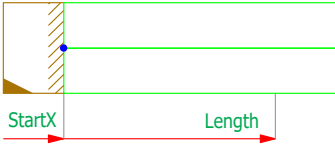
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	50.0	-50000.0	50000.0
Angle1	AngleType	45.0	0.1	179.9
Inclination1	AngleType	90.0	0.1	179.9
Angle2	AngleType	90.0	0.1	179.9
Inclination2	AngleType	90.0	0.1	179.9

RidgeValleyCut

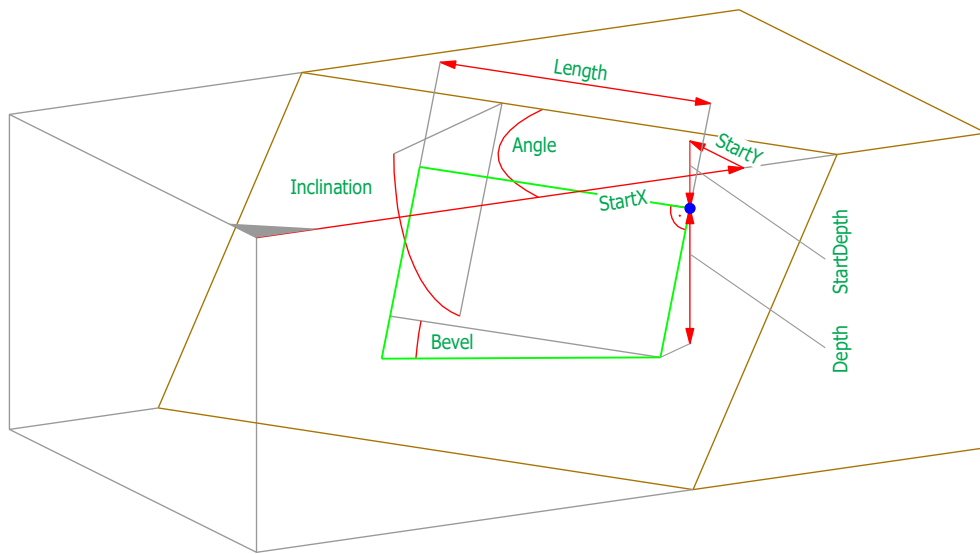


Parameters RidgeValleyCut

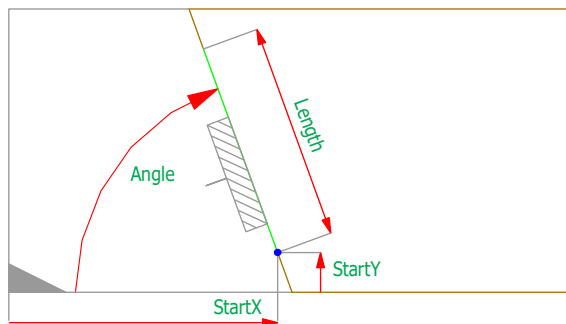
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthType	50.0	0.0	50000.0
StartDepth	WidthNType	0.0	-50000.0	50000.0
InclinationRefSide	InclinationType	45.0	-89.9	89.9
InclinationOppSide	InclinationType	45.0	-89.9	89.9
StartLimited	BooleanType	no	no	yes
EndLimited	BooleanType	no	no	yes
Length	LengthType	0.0	0.0	100000.0
AngleRefEdgeStart	AngleType	90.0	0.1	179.9
AngleRefEdgeEnd	AngleType	90.0	0.1	179.9
AngleOppEdgeStart	AngleType	90.0	0.1	179.9
AngleOppEdgeEnd	AngleType	90.0	0.1	179.9

StartLimited	EndLimited	
yes	yes	
no	yes	
yes	no	
no	no	

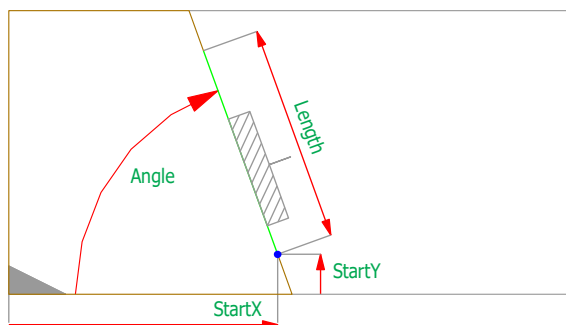
SawCut



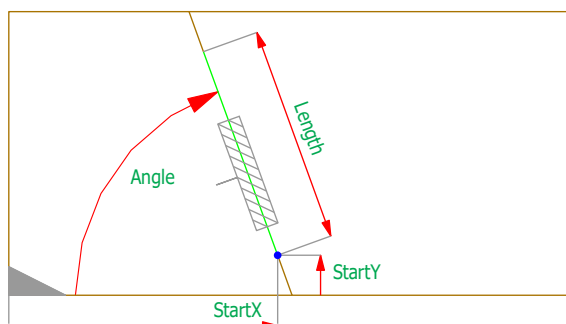
ToolPosition = left



ToolPosition = right

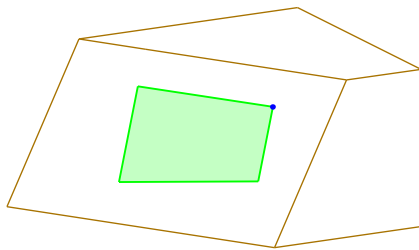


ToolPosition = center

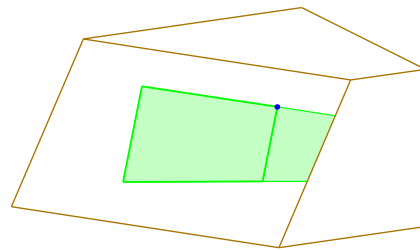


Parameters SawCut

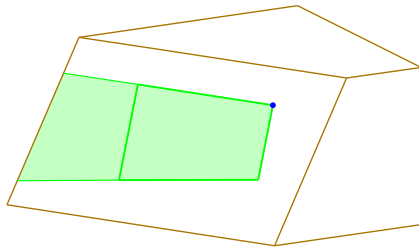
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	0.0	-50000.0	50000.0
StartDepth	WidthNType	0.0	-50000.0	50000.0
Angle	Angle2Type	90.0	-180.0	180.0
Inclination	AngleType	90.0	0.1	179.9
Bevel	InclinationType	0.0	-89.9	89.9
Length	LengthType	0.0	0.0	100000.0
Depth	WidthType	50.0	0.0	50000.0
ToolPosition	ToolPositionType	left	left/center/right	
MachiningLimits	MachiningLimitType	yes	no	yes



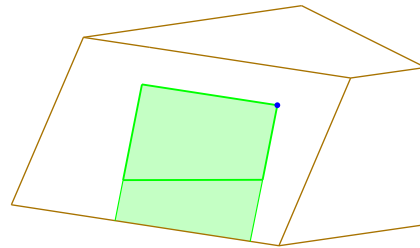
FaceLimitedStart =yes
FaceLimitedEnd =yes
FaceLimitedBottom =yes



FaceLimitedStart =no
FaceLimitedEnd =yes
FaceLimitedBottom =yes



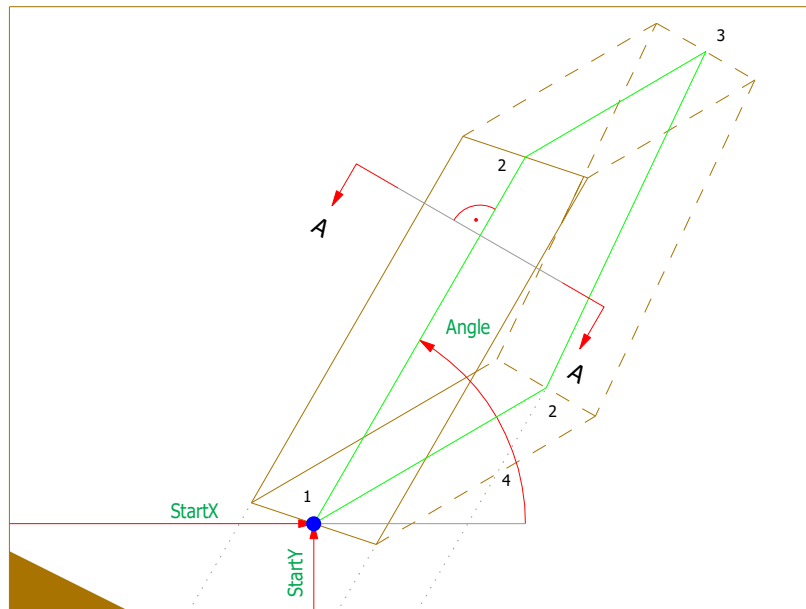
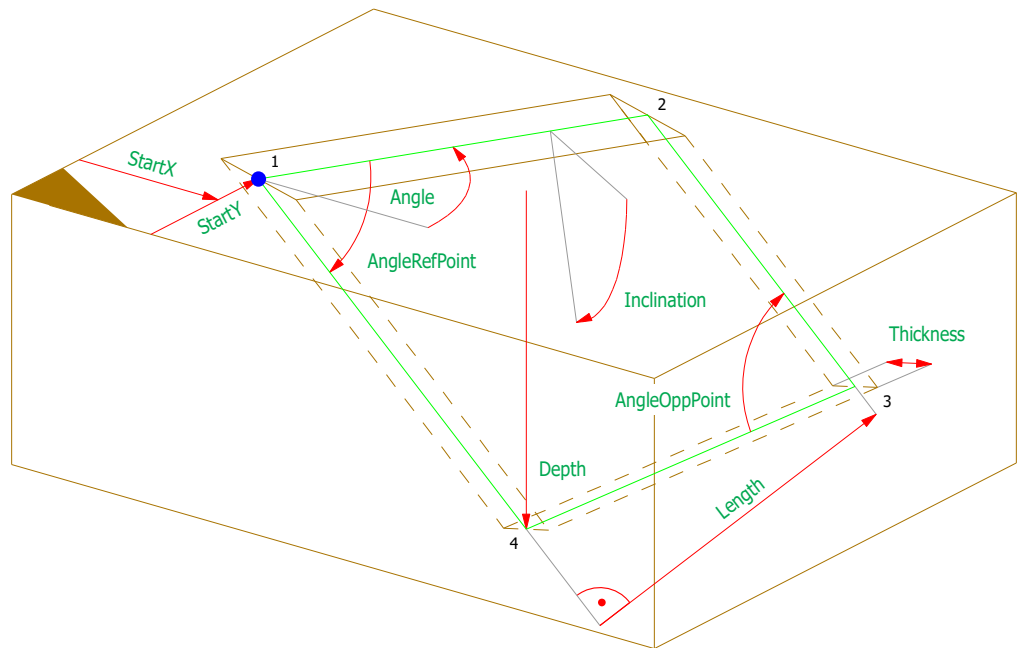
FaceLimitedStart =yes
FaceLimitedEnd =no
FaceLimitedBottom =yes



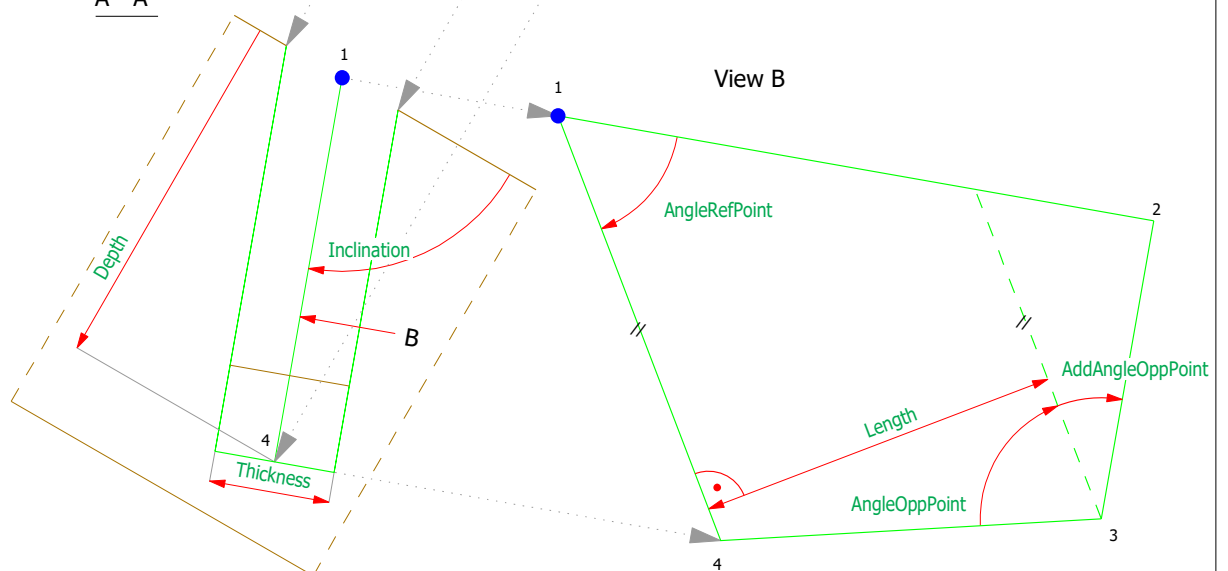
FaceLimitedStart =yes
FaceLimitedEnd =yes
FaceLimitedBottom =no

Slot

StartDepth = 0

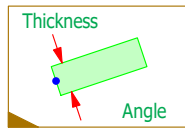


A - A

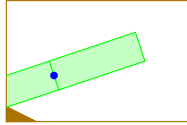


MachiningLimits

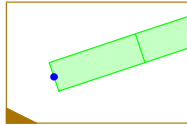
StartDepth = 0



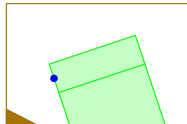
FaceLimitedStart = yes
 FaceLimitedEnd = yes
 FaceLimitedFront = yes
 FaceLimitedBack = yes



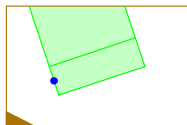
FaceLimitedStart = no



FaceLimitedEnd = no

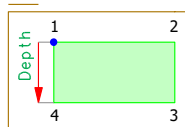
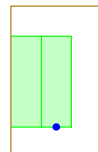
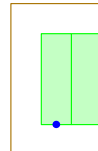
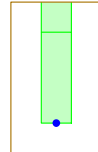
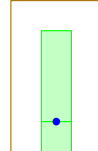
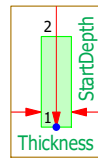


FaceLimitedFront = no



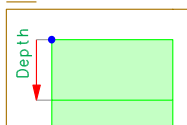
FaceLimitedBack = no

StartDepth <> 0



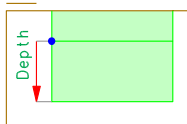
FaceLimitedTop = yes

FaceLimitedBottom = yes



FaceLimitedTop = yes

FaceLimitedBottom = no

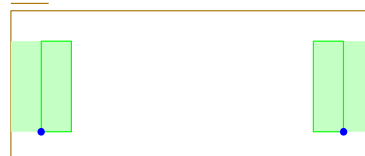
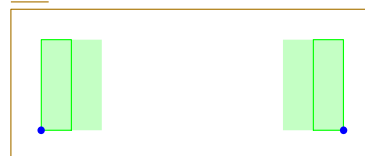
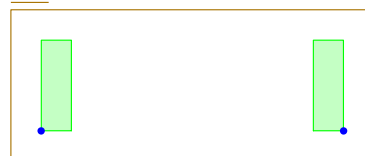


FaceLimitedTop = no

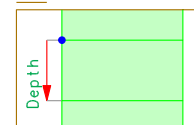
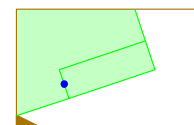
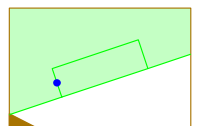
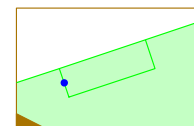
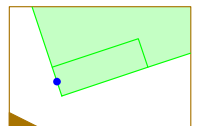
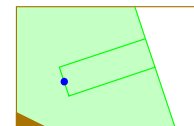
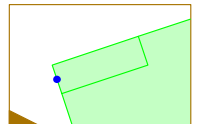
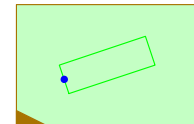
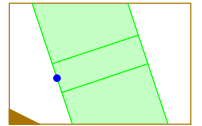
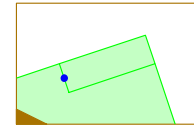
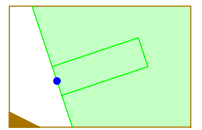
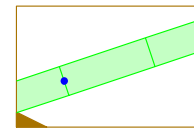
FaceLimitedBottom = yes

Orientation = start

Orientation = end

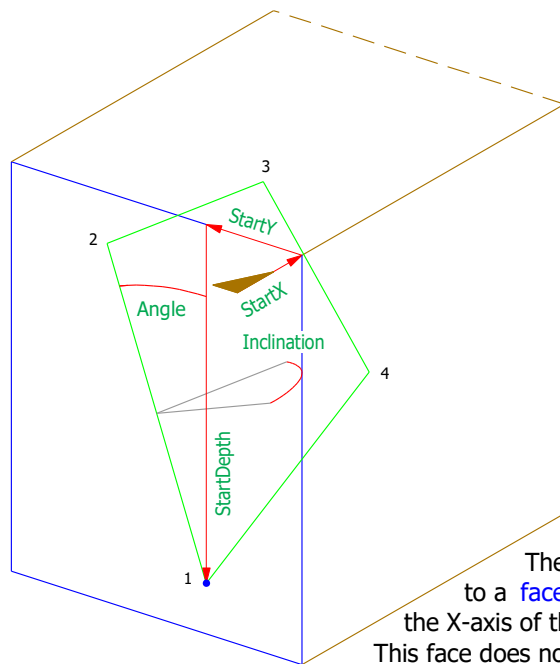


Other combinations :

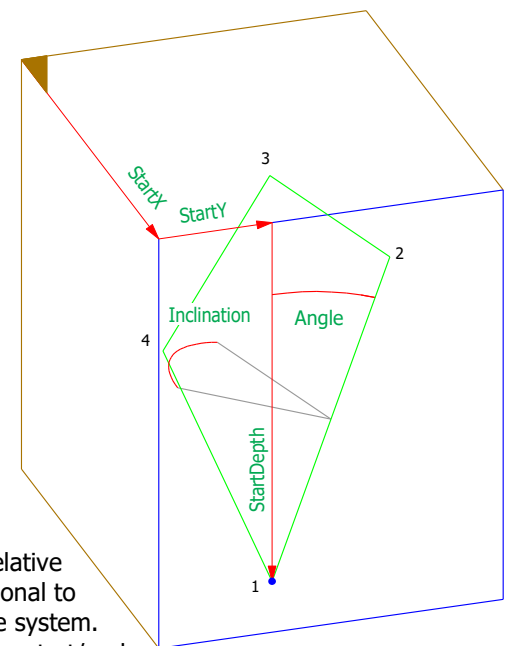


StartDepth $\neq$ 0

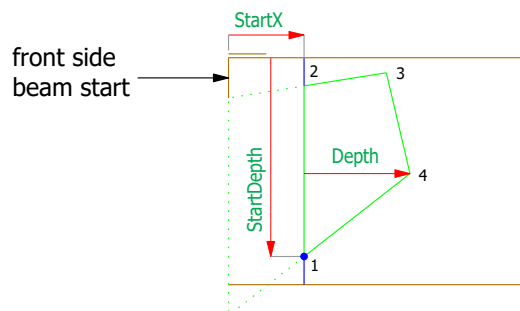
Orientation = start



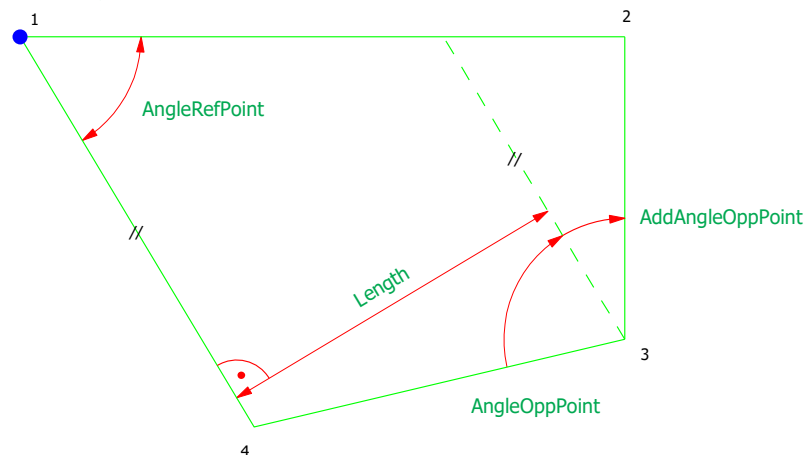
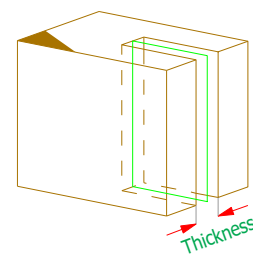
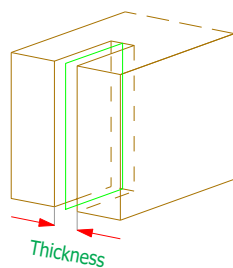
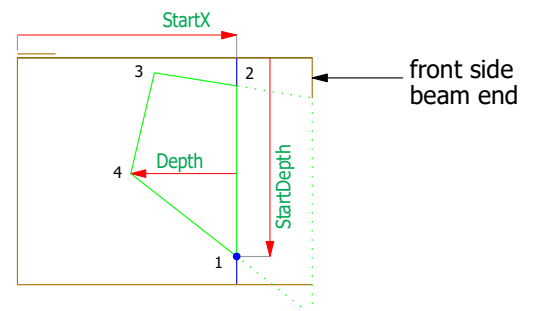
Orientation = end



The slot is defined relative to a **face**, which is orthogonal to the X-axis of the part coordinate system. This face does not have to be at the start/end of the beam.



The slot is not limited towards the front sides when StartDepth $\neq$ 0.



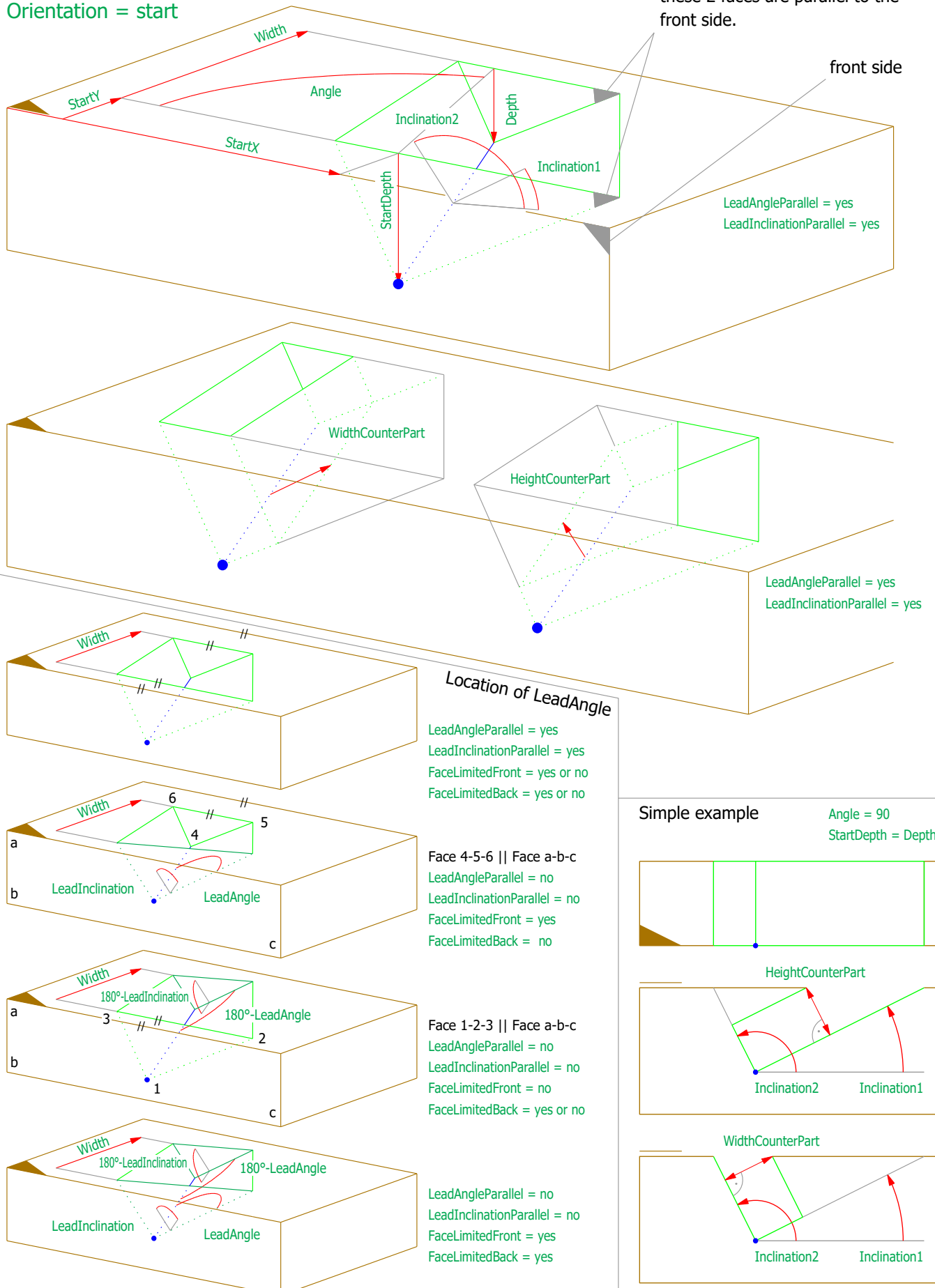
Parameters Slot

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	0.0	-50000.0	50000.0
StartDepth	WidthType	0.0	0.0	50000.0
Angle	Inclination2Type	0.0	-90.0	90.0
Inclination	AngleType	90.0	0.1	179.9
Length	LengthType	200.0	0.0	100000.0
Depth	WidthType	10.0	0.0	50000.0
Thickness	WidthType	10.0	0.0	50000.0
AngleRefPoint	AngleType	90.0	0.1	179.9
AngleOppPoint	AngleType	90.0	0.1	179.9
AddAngleOppPoint	AngleNType	0.0	-179.9	179.9
MachiningLimits	MachiningLimitType			

BirdsMouth

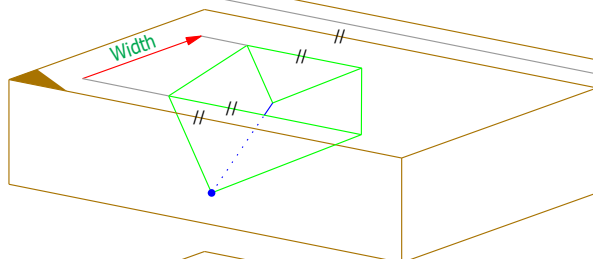
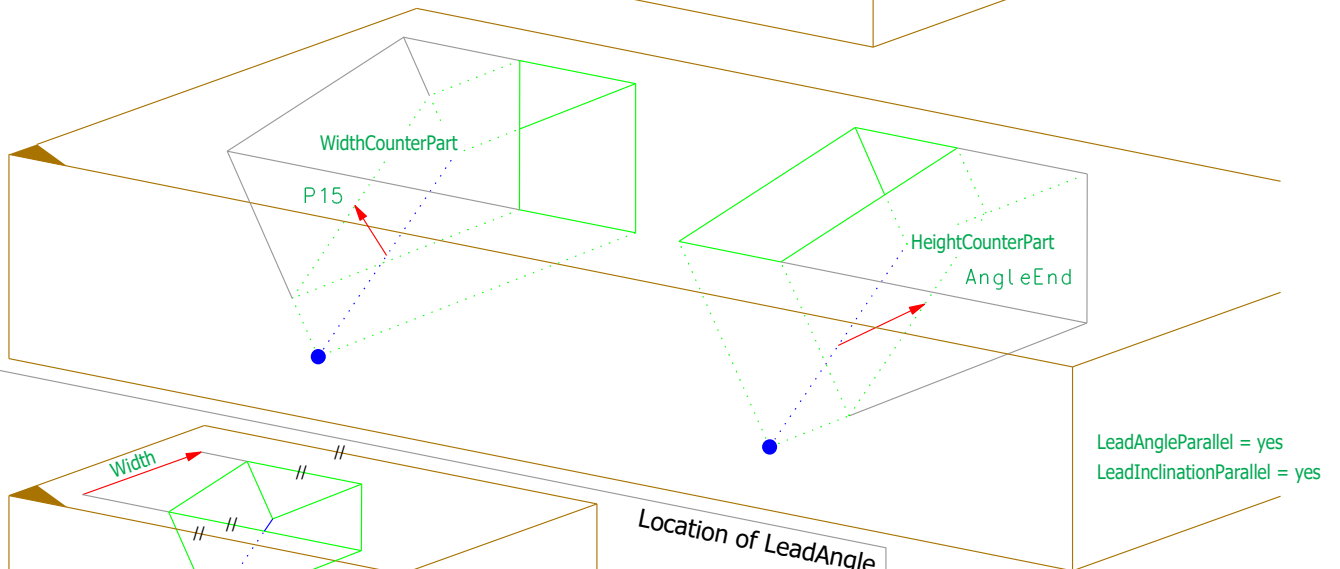
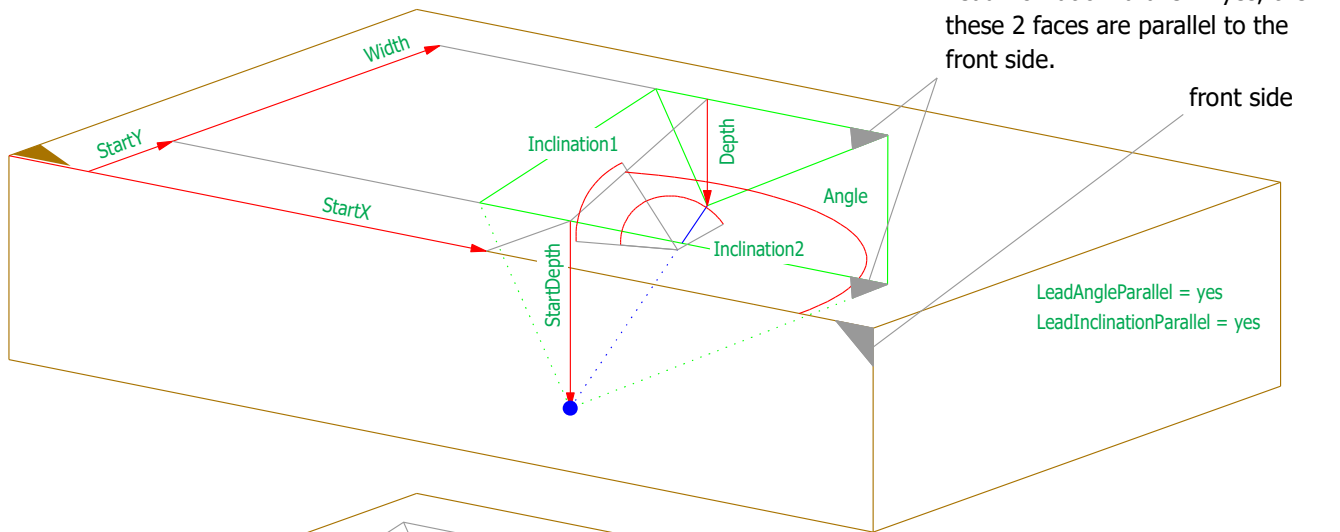
Orientation = start

If LeadAngleParallel = yes and LeadInclinationParallel = yes, then these 2 faces are parallel to the front side.



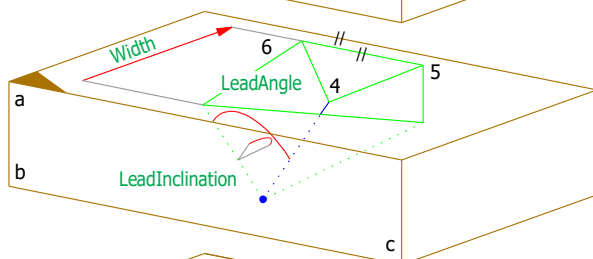
Orientation = end

If LeadAngleParallel = yes and LeadInclinationParallel = yes, then these 2 faces are parallel to the front side.

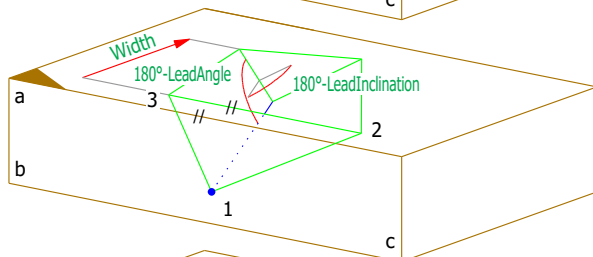


Location of LeadAngle

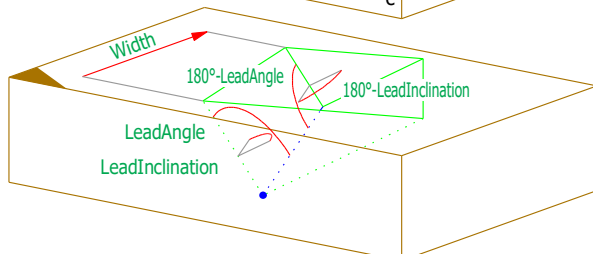
LeadAngleParallel = yes
LeadInclinationParallel = yes
FaceLimitedFront = yes or no
FaceLimitedBack = yes or no



Face 4-5-6 || Face a-b-c
LeadAngleParallel = no
LeadInclinationParallel = no
FaceLimitedFront = yes
FaceLimitedBack = no



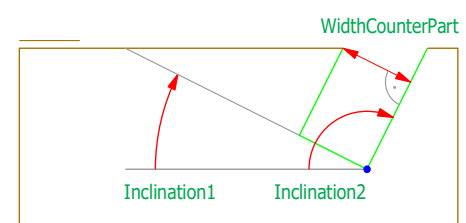
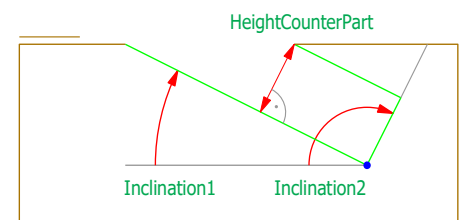
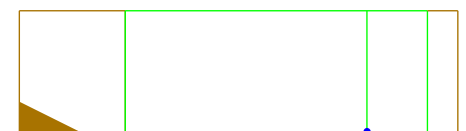
Face 1-2-3 || Face a-b-c
LeadAngleParallel = no
LeadInclinationParallel = no
FaceLimitedFront = no
FaceLimitedBack = yes or no



LeadAngleParallel = no
LeadInclinationParallel = no
FaceLimitedFront = yes
FaceLimitedBack = yes

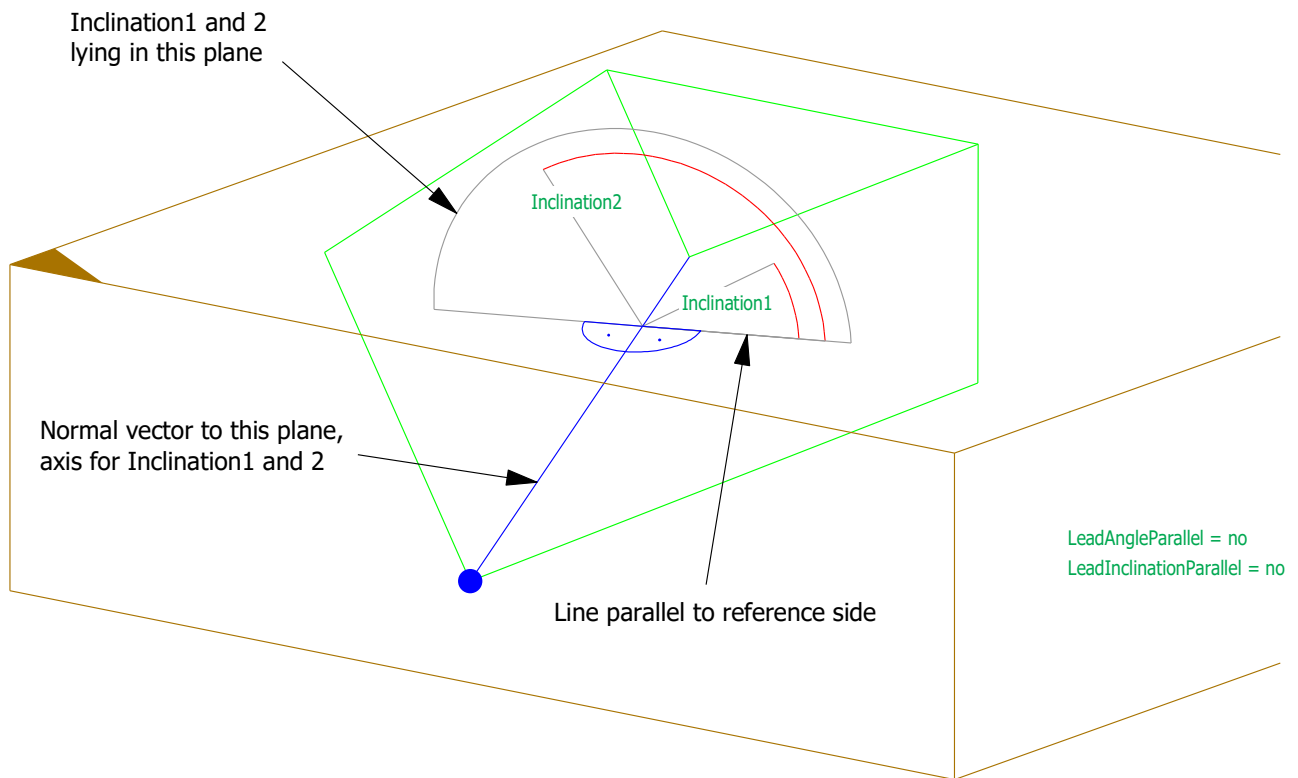
Simple example

Angle = 90
StartDepth = Depth



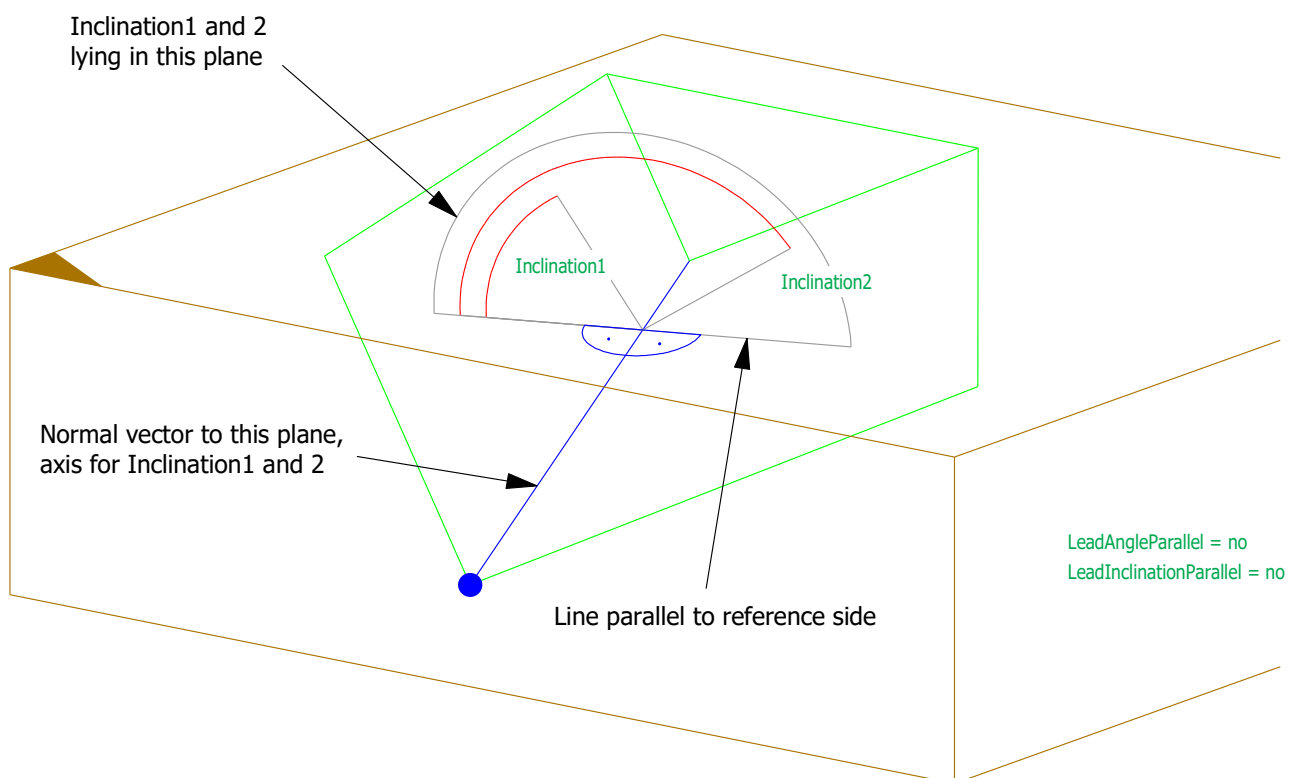
Orientation = start

Another presentation of Inclination1 and Inclination2



Orientation = end

Another presentation of Inclination1 and Inclination2

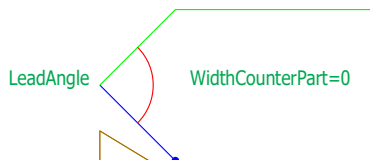


Orientation = start

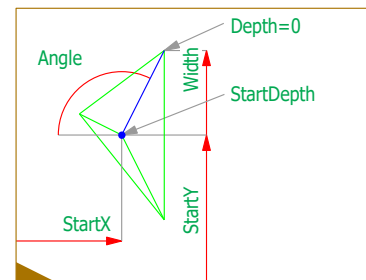
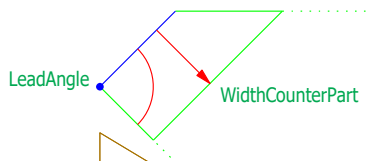
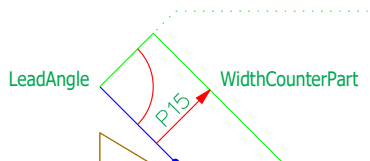
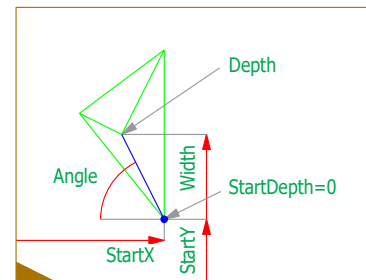
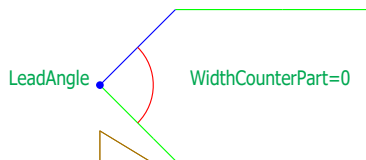
Another presentation of parameters

View orthogonal to face "Inclination1"

The counterpart enters at the reference edge.



The counterpart enters at opposite of the reference edge.

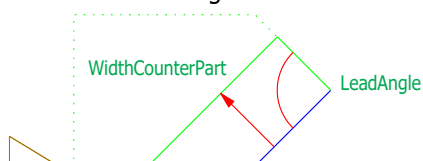


Orientation = end

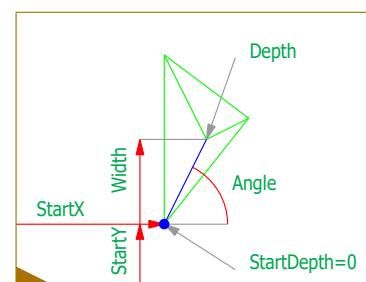
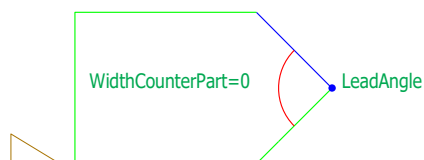
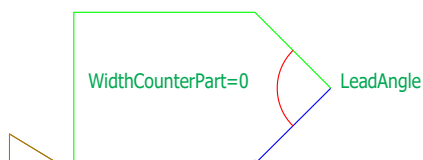
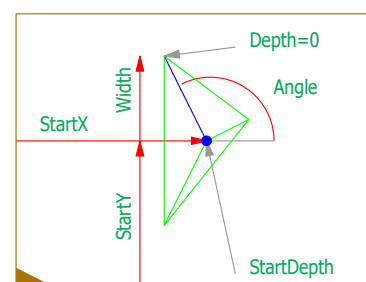
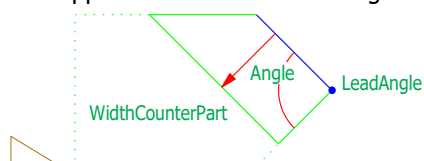
Another presentation of parameters

View orthogonal to face "Inclination1"

The counterpart enters at the reference edge.



The counterpart enters at opposite of the reference edge.

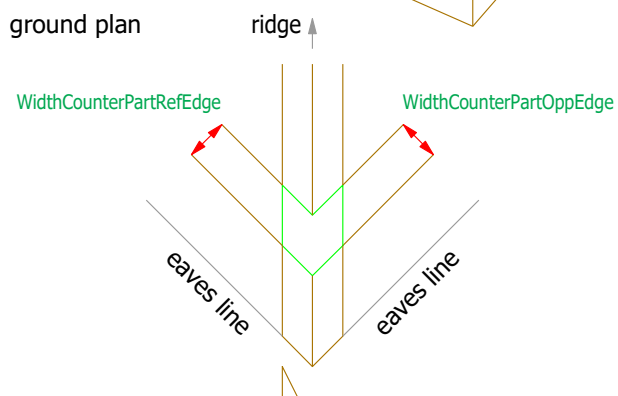
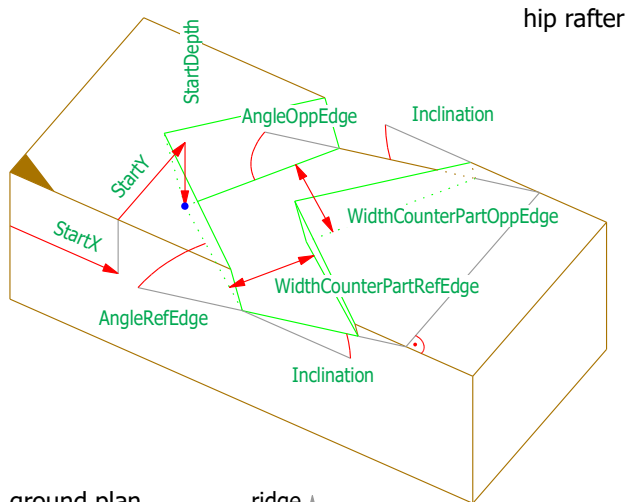


Parameters BirdsMouth

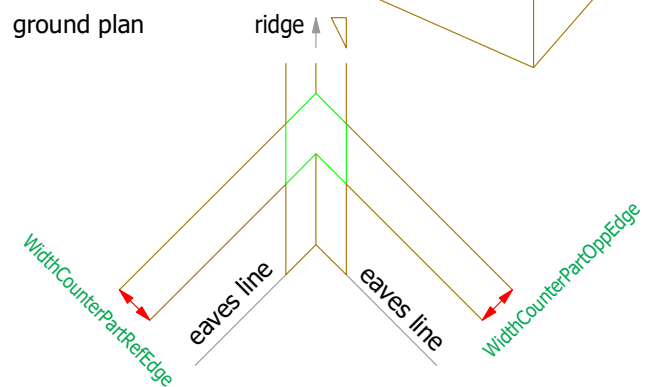
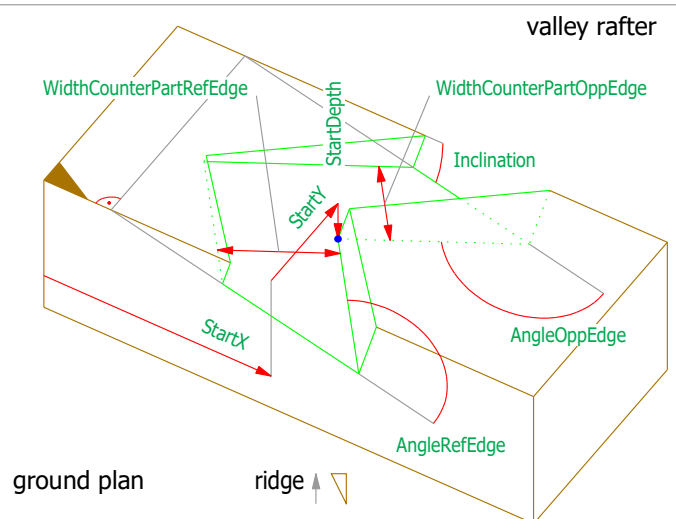
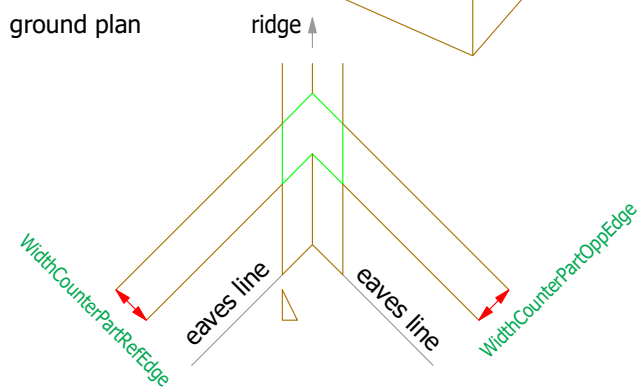
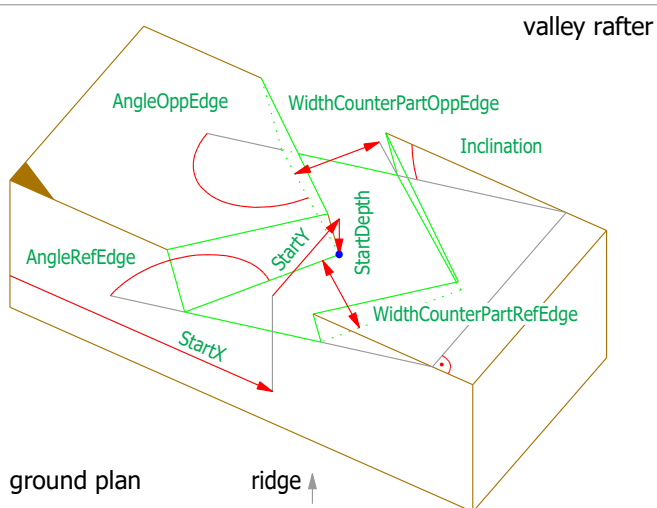
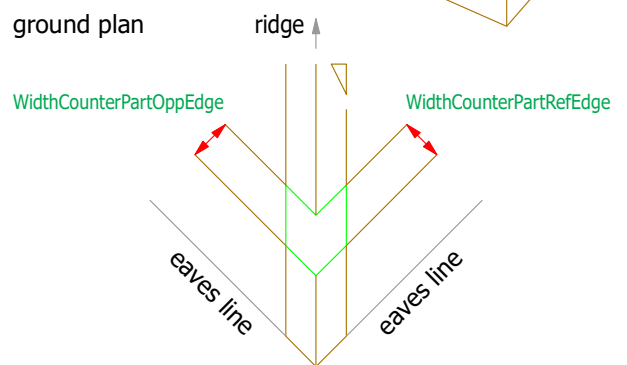
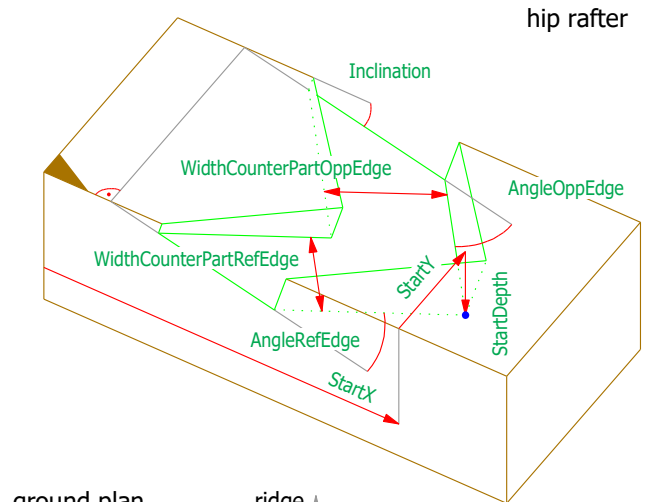
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	0.0	-50000.0	50000.0
StartDepth	WidthType	20.0	0.0	50000.0
Angle	AngleType	90.0	0.1	179.9
Inclination1	Angle2Type	45.0	0.0	180.0
Inclination2	Angle2Type	135.0	0.0	180.0
Depth	WidthType	20.0	0.0	50000.0
Width	WidthType	0.0	0.0	50000.0
WidthCounterPartLimited	BooleanType	no	no	yes
WidthCounterPart	WidthType	120.0	0.0	50000.0
HeightCounterPartLimited	BooleanType	no	no	yes
HeightCounterPart	WidthType	120.0	0.0	50000.0
FaceLimitedFront	BooleanType	no	no	yes
FaceLimitedBack	BooleanType	no	no	yes
LeadAngleParallel	BooleanType	yes	no	yes
LeadAngle	AngleType	90.0	0.1	179.9
LeadInclinationParallel	BooleanType	yes	no	yes
LeadInclination	AngleType	90.0	0.1	179.9
RafterNailHole	BooleanType	no	no	yes

HipValleyRafterNotch

Orientation = start



Orientation = end

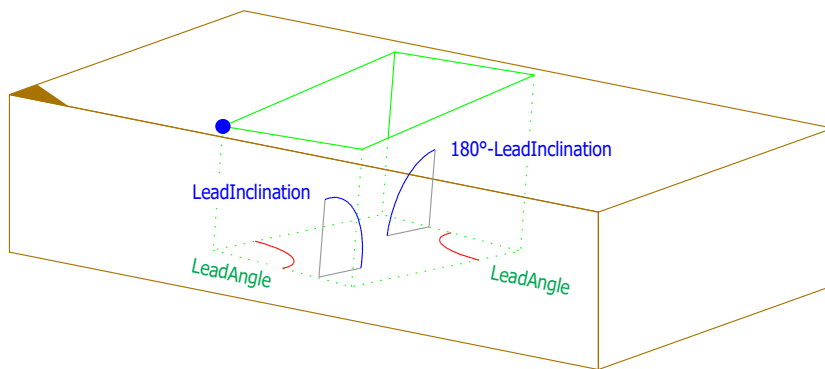
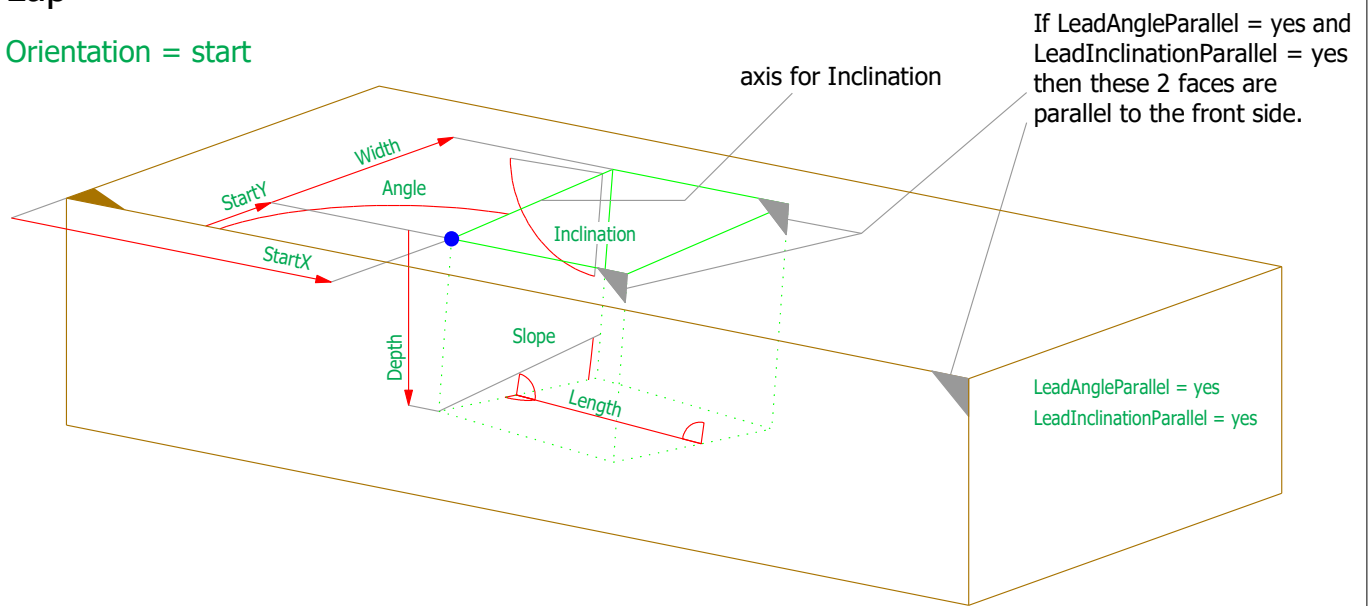


Parameters HipValleyRafterNotch

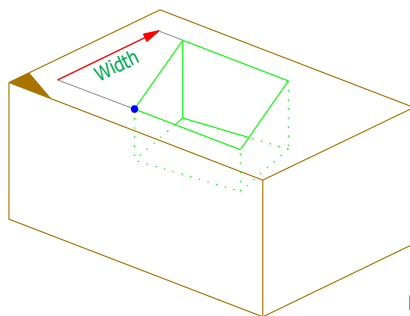
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000	100000
StartY	WidthNType	0.0	-50000	50000
StartDepth	WidthType	20.0	0.0	50000
AngleRefEdge	AngleType	45.0	0.1	179.9
AngleOppEdge	AngleType	45.0	0.1	179.9
Inclination	Angle2Type	30.0	0.0	180.0
WidthCounterPartRefEdgeLimited	BooleanType	no	no	yes
WidthCounterPartRefEdge	WidthType	0.0	0.0	50000
WidthCounterPartOppEdgeLimited	BooleanType	no	no	yes
WidthCounterPartOppEdge	WidthType	0.0	0.0	50000
RafterNailHole	BooleanType	no	no	yes

Lap

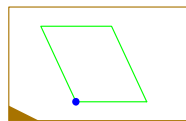
Orientation = start



Location of LeadAngle:

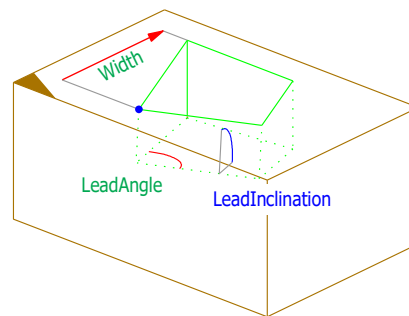


LeadAngleParallel = yes

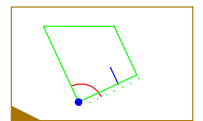


LeadInclinationParallel = yes

LeadAngleParallel and
LeadInclinationParallel are yes

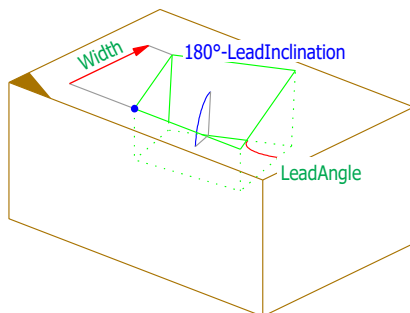


FaceLimitedBack = no

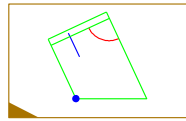


FaceLimitedFront = yes

LeadAngleParallel = no
LeadInclinationParallel = no

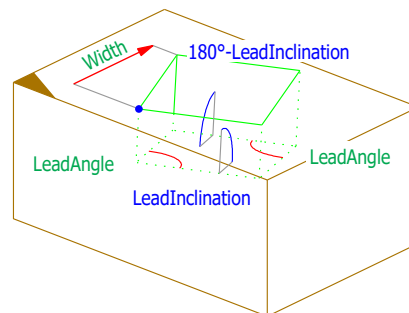


FaceLimitedBack = yes or no

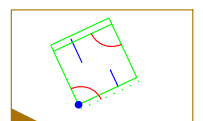


FaceLimitedFront = no

LeadAngleParallel = no
LeadInclinationParallel = no



FaceLimitedBack = yes

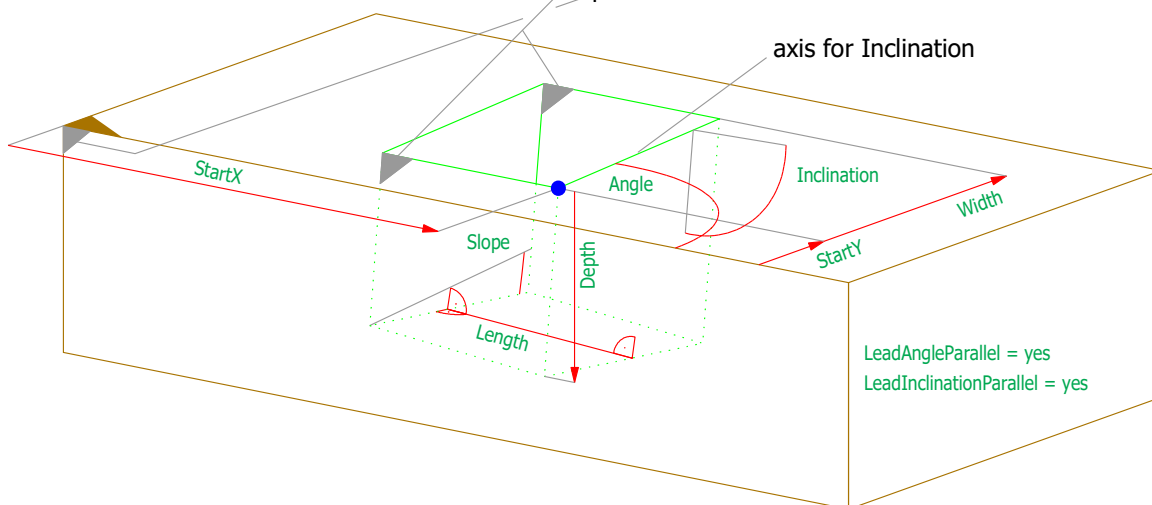


FaceLimitedFront = yes

LeadAngleParallel = no
LeadInclinationParallel = no

Orientation = end

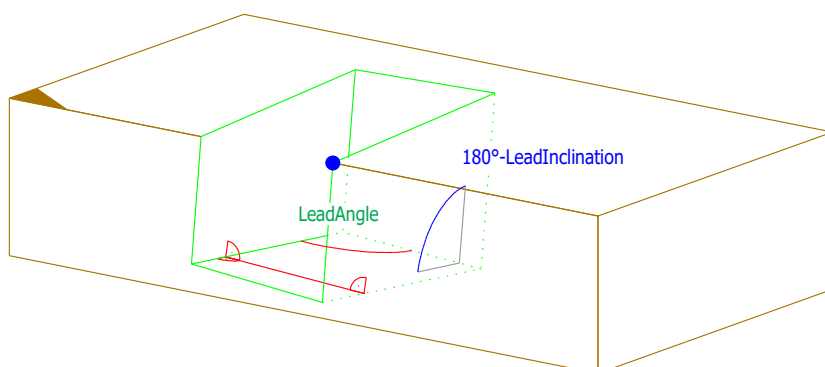
If LeadAngleParallel = yes and
LeadInclinationParallel = yes
then these 2 faces are
parallel to the front side.



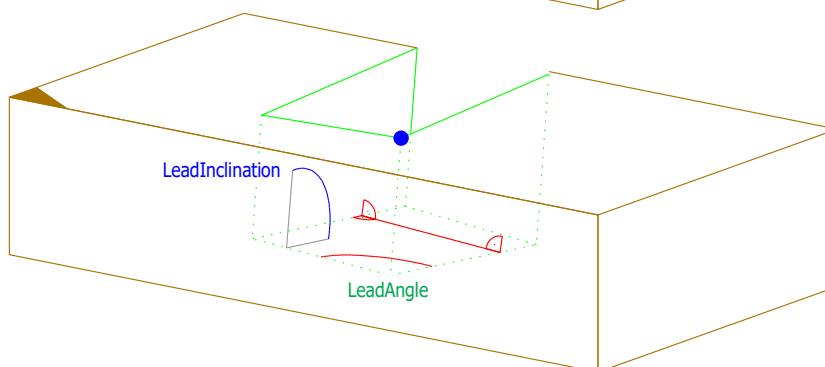
Location of LeadAngle:

LeadAngleParallel = no

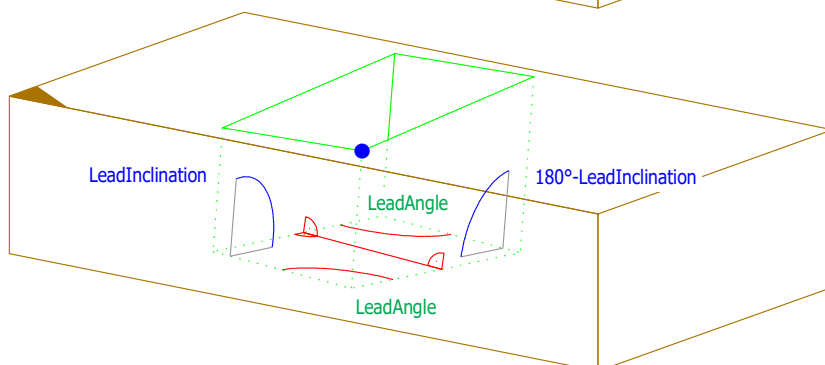
LeadInclinationParallel = no



FaceLimitedBack = yes or no
FaceLimitedFront = no



FaceLimitedBack = no
FaceLimitedFront = yes



FaceLimitedBack = yes
FaceLimitedFront = yes

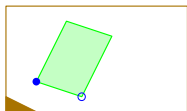
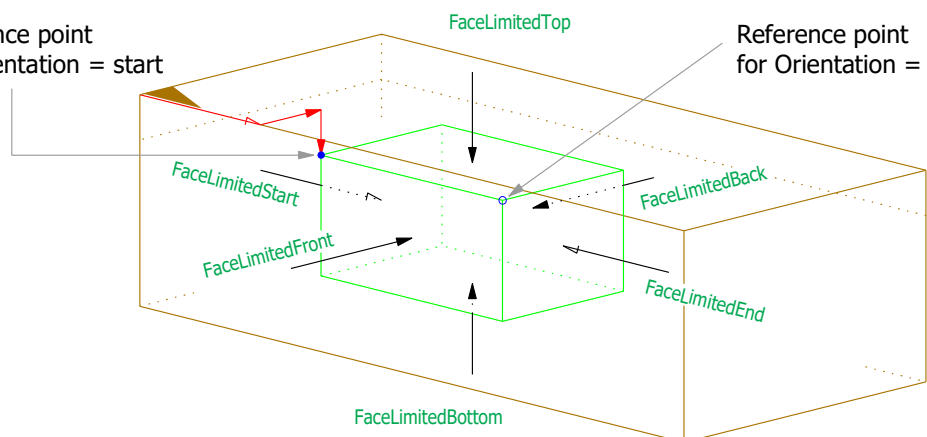
Parameters Lap

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000	100000
StartY	WidthNTType	0.0	-50000.0	50000
Angle	AngleType	90.0	0.1	179.9
Inclination	AngleType	90.0	0.1	179.9
Slope	InclinationType	0.0	-89.9	89.9
Length	LengthType	200.0	0.0	100000
Width	WidthType	50.0	0.0	50000.0
Depth	WidthNTType	40.0	-50000.0	50000.0
LeadAngleParallel	BooleanType	yes	no	yes
LeadAngle	AngleType	90.0	0.1	179.9
LeadInclinationParallel	BooleanType	yes	no	yes
LeadInclination	AngleType	90.0	0.1	179.9
MachiningLimits	MachiningLimitType			

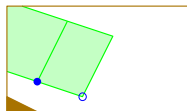
MachiningLimits

Reference point
for Orientation = start

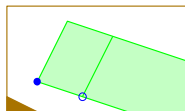
Reference point
for Orientation = end



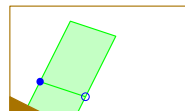
FaceLimitedStart = yes
FaceLimitedEnd = yes
FaceLimitedFront = yes
FaceLimitedBack = yes



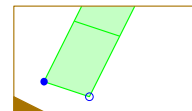
FaceLimitedStart = no
FaceLimitedEnd = yes
FaceLimitedFront = yes
FaceLimitedBack = yes



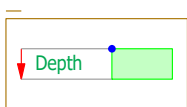
FaceLimitedStart = yes
FaceLimitedEnd = no
FaceLimitedFront = yes
FaceLimitedBack = yes



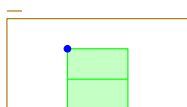
FaceLimitedStart = yes
FaceLimitedEnd = yes
FaceLimitedFront = no
FaceLimitedBack = yes



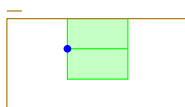
FaceLimitedStart = yes
FaceLimitedEnd = yes
FaceLimitedFront = yes
FaceLimitedBack = no



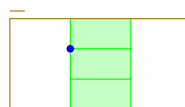
FaceLimitedBottom = yes
FaceLimitedTop = yes



FaceLimitedBottom = no
FaceLimitedTop = yes

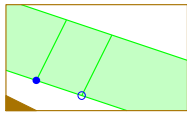


FaceLimitedBottom = yes
FaceLimitedTop = no

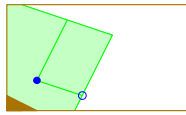


FaceLimitedBottom = no
FaceLimitedTop = no

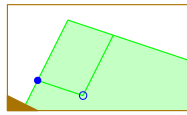
Other combinations of MachineLimits



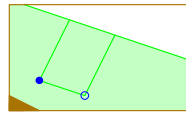
FaceLimitedStart = no
FaceLimitedEnd = no
FaceLimitedFront = no
FaceLimitedBack = yes



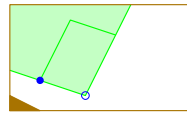
FaceLimitedStart = no
FaceLimitedEnd = yes
FaceLimitedFront = no
FaceLimitedBack = yes



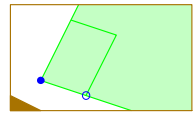
FaceLimitedStart = yes
FaceLimitedEnd = no
FaceLimitedFront = no
FaceLimitedBack = yes



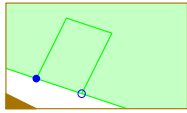
FaceLimitedStart = no
FaceLimitedEnd = no
FaceLimitedFront = no
FaceLimitedBack = yes



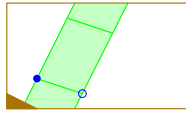
FaceLimitedStart = no
FaceLimitedEnd = yes
FaceLimitedFront = yes
FaceLimitedBack = no



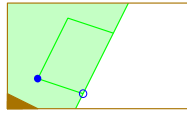
FaceLimitedStart = yes
FaceLimitedEnd = no
FaceLimitedFront = yes
FaceLimitedBack = no



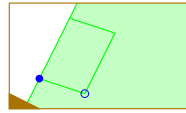
FaceLimitedStart = no
FaceLimitedEnd = no
FaceLimitedFront = yes
FaceLimitedBack = no



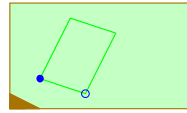
FaceLimitedStart = yes
FaceLimitedEnd = yes
FaceLimitedFront = no
FaceLimitedBack = no



FaceLimitedStart = no
FaceLimitedEnd = yes
FaceLimitedFront = no
FaceLimitedBack = no



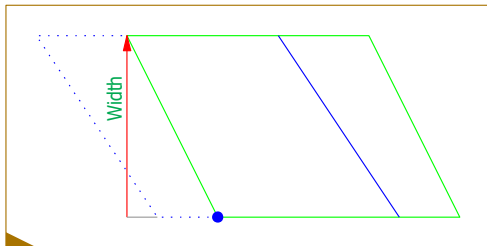
FaceLimitedStart = yes
FaceLimitedEnd = no
FaceLimitedFront = no
FaceLimitedBack = no



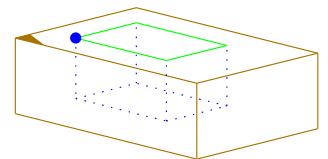
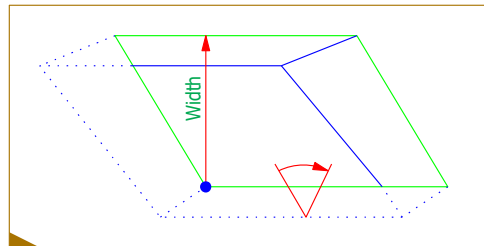
FaceLimitedStart = no
FaceLimitedEnd = no
FaceLimitedFront = no
FaceLimitedBack = no

LeadAngle:

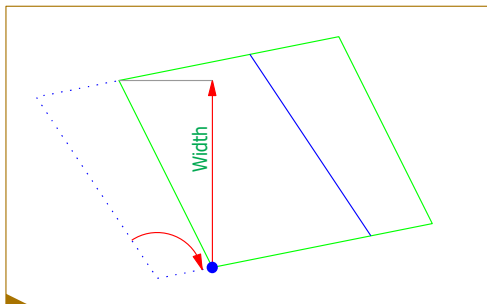
LeadAngleParallel = yes
LeadInclinationParallel = yes



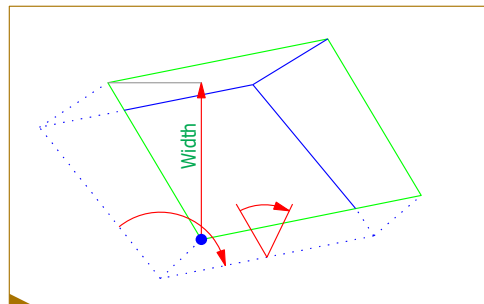
LeadAngleParallel = yes
LeadInclinationParallel = no



LeadAngleParallel = no
LeadInclinationParallel = yes

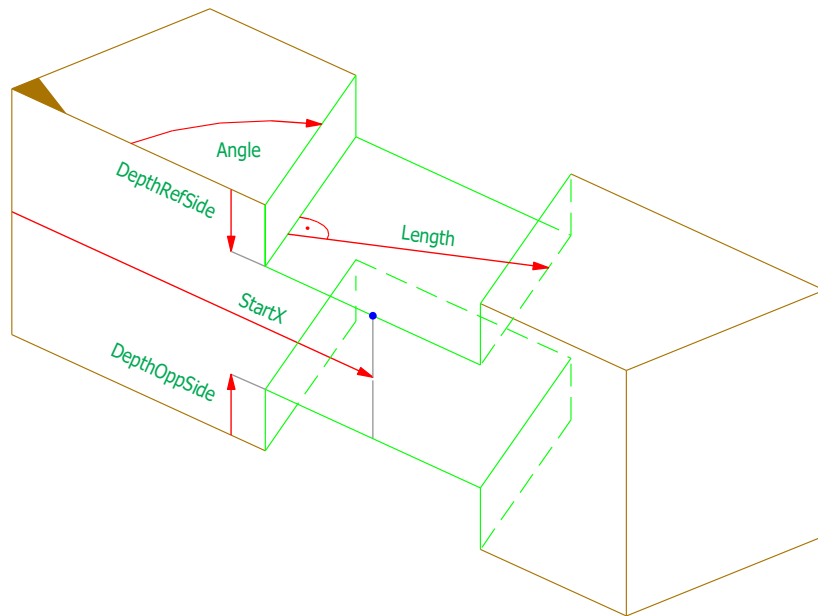


LeadAngleParallel = no
LeadInclinationParallel = no

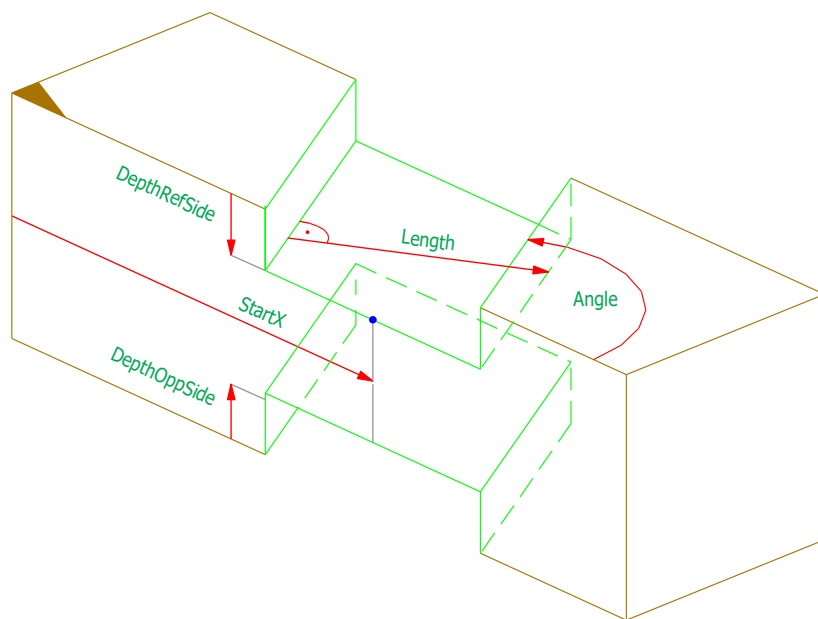


LogHouseHalfLap

Orientation = start



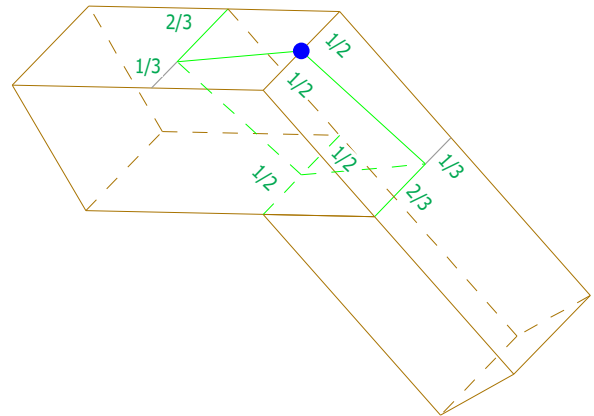
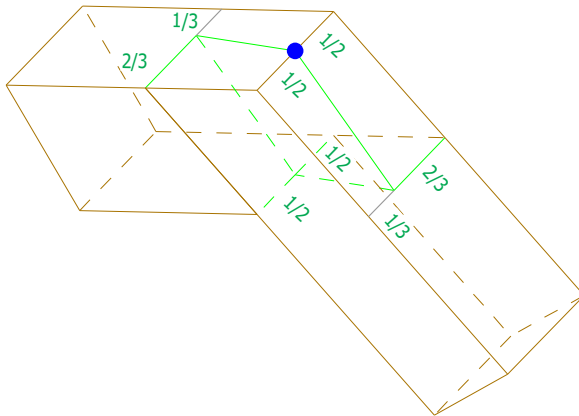
Orientation = end



Parameters LogHouseHalfLap

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
Angle	AngleType	90.0	0.1	179.9
Length	WidthType	120.0	0.0	50000.0
DepthRefSide	WidthType	20.0	0.0	50000.0
DepthOppSide	WidthType	20.0	0.0	50000.0

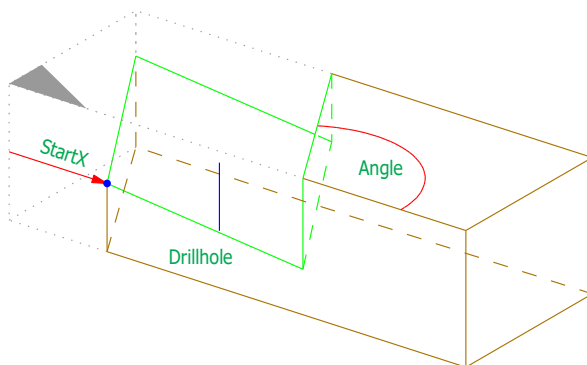
FrenchRidgeLap



The length of the lap is equal to the width of reference side.

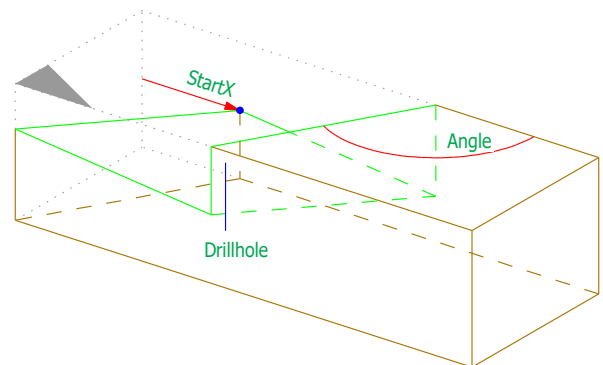
Orientation = start

RefPosition = refedge



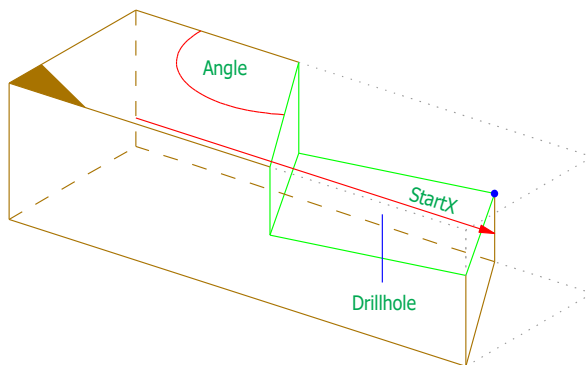
Orientation = start

RefPosition = oppedge



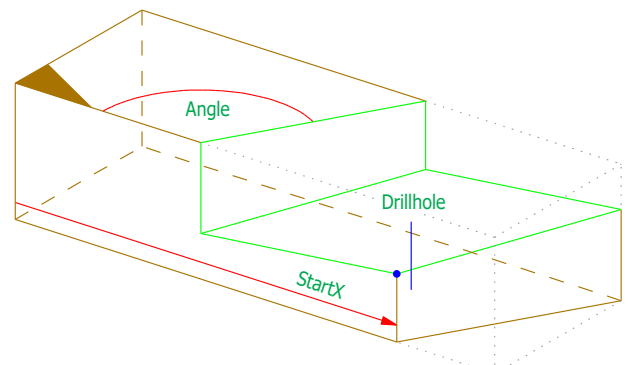
Orientation = end

RefPosition = oppedge



Orientation = end

RefPosition = refedge



Parameters FrenchRidgeLap

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
Angle	AngleType	90.0	0.1	179.9
RefPosition	EdgePositionType	refedge	refedge	oppedge
Drillhole	BooleanType	no	no	yes
DrillholeDiam	LengthSType	0.0	0.0	1000.0

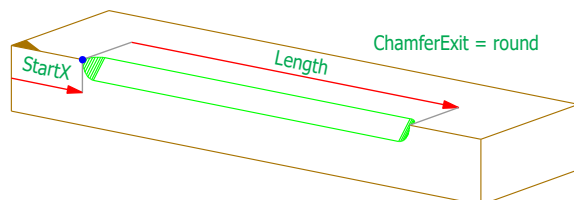
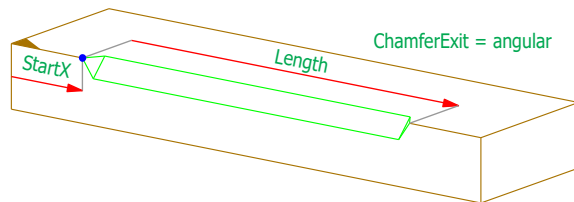
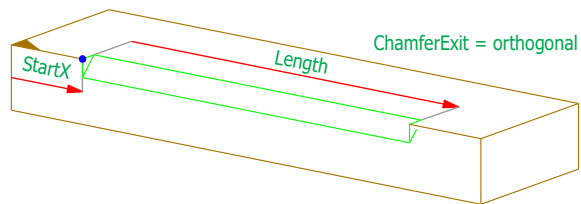
This processing trims the part, even it is on a ReferencePlane

Examples:

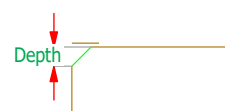
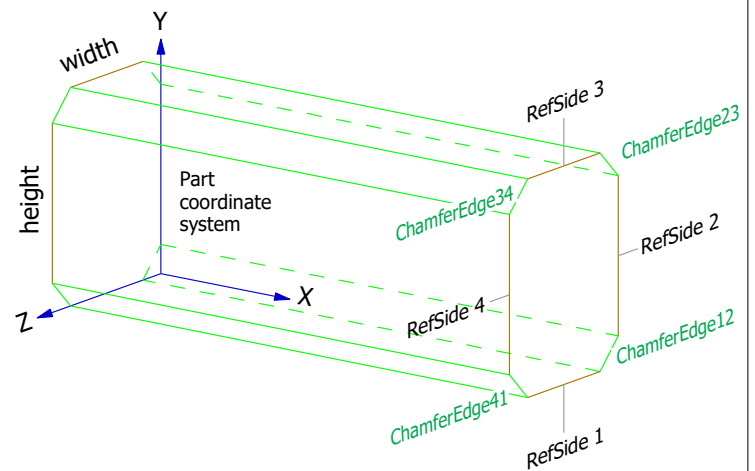
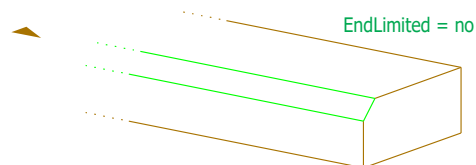
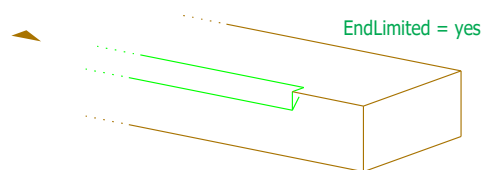
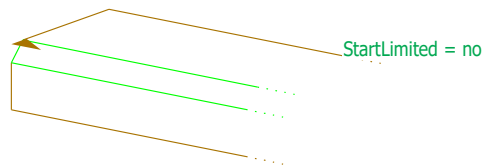
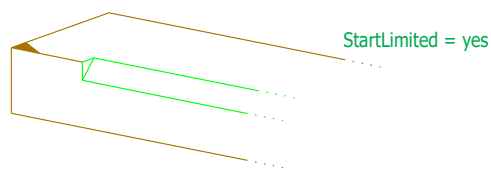
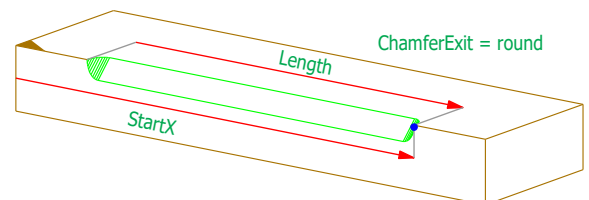
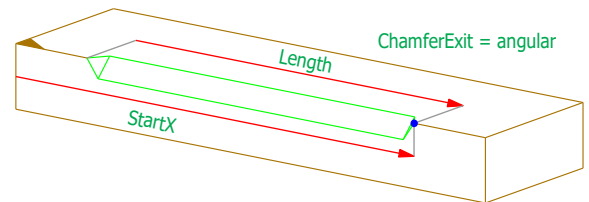
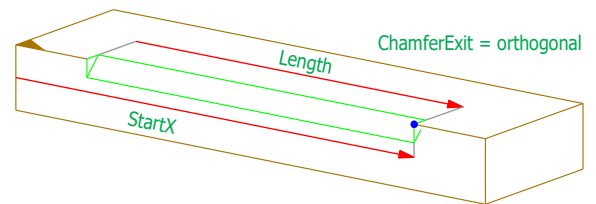


Chamfer

Orientation = start



Orientation = end

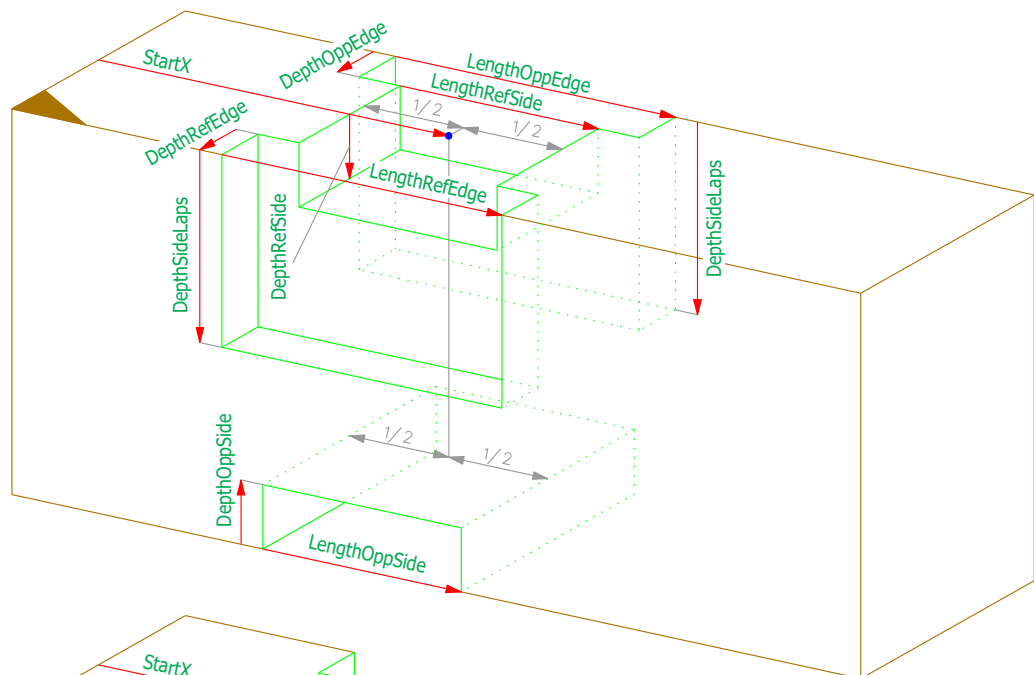


Parameters Chamfer

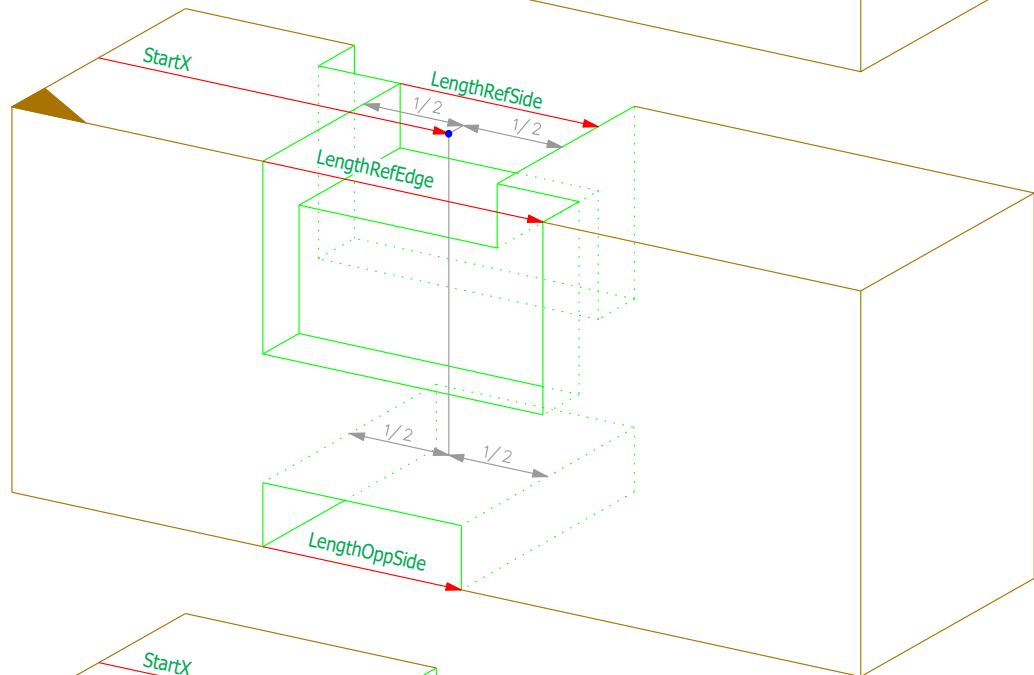
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartLimited	BooleanType	no	no	yes
EndLimited	BooleanType	no	no	yes
Length	LengthType	0.0	0.0	100000.0
Depth	double	1.0	0.0	100.0
ChamferEdge12	BooleanType	yes	no	yes
ChamferEdge23	BooleanType	yes	no	yes
ChamferEdge34	BooleanType	yes	no	yes
ChamferEdge41	BooleanType	yes	no	yes
ChamferExit	ChamferExitType	orthogonal	orthogonal/angular/round	

LogHouseJoint

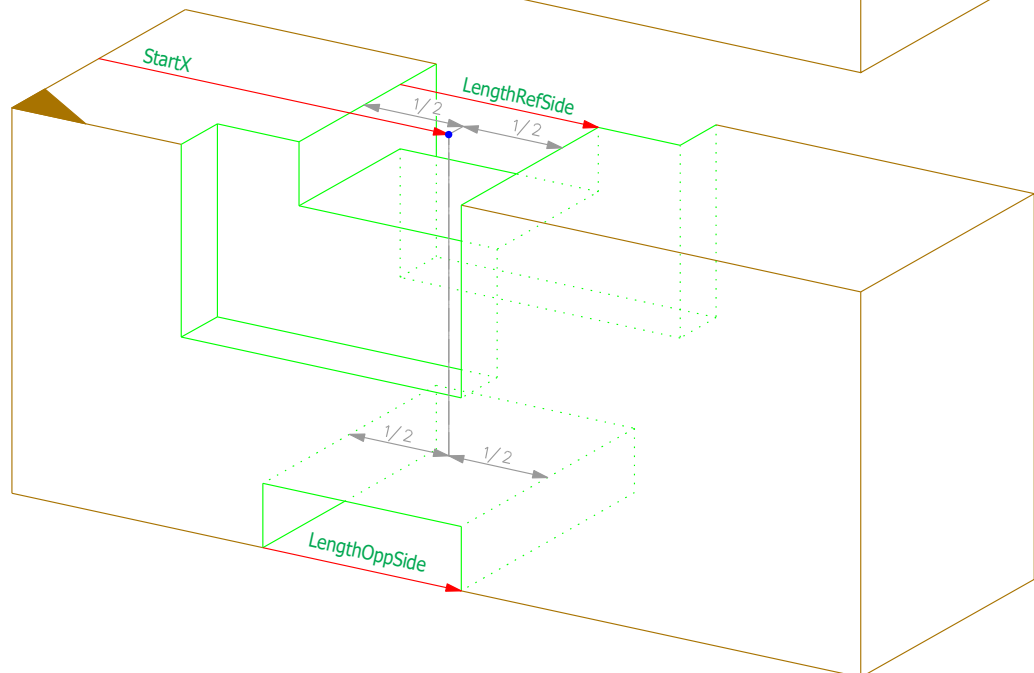
LapPosition = symmetric

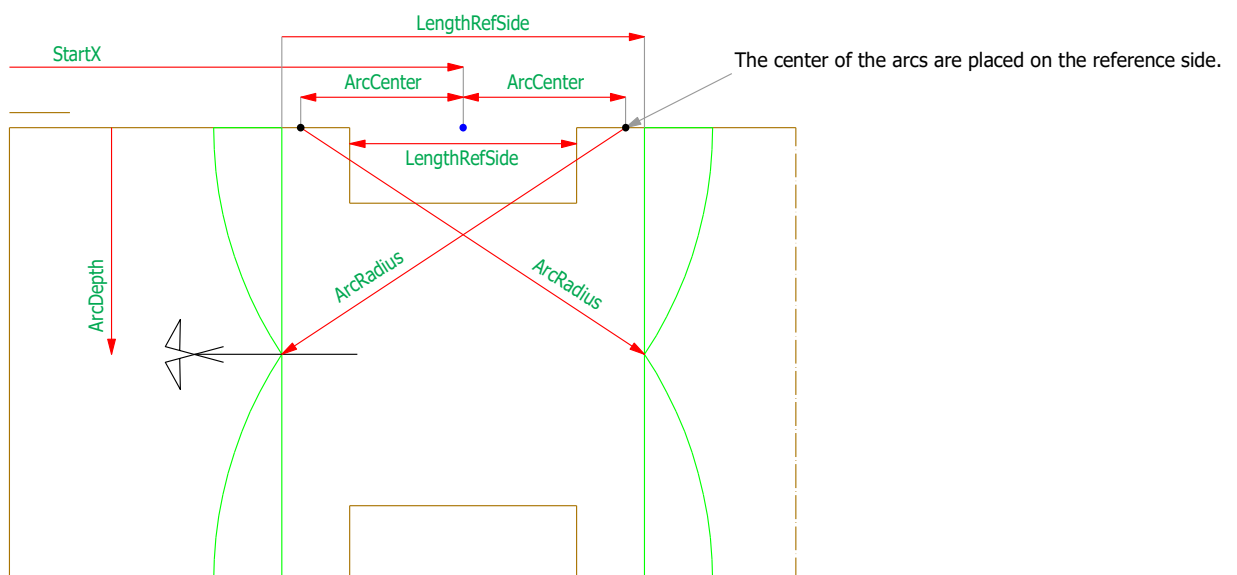
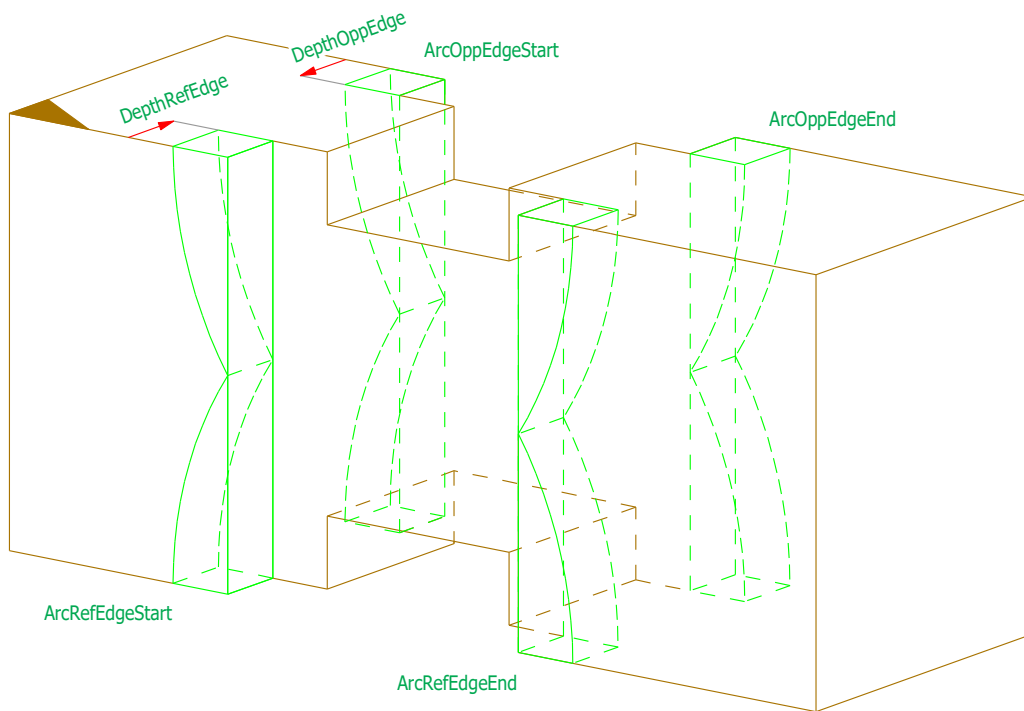
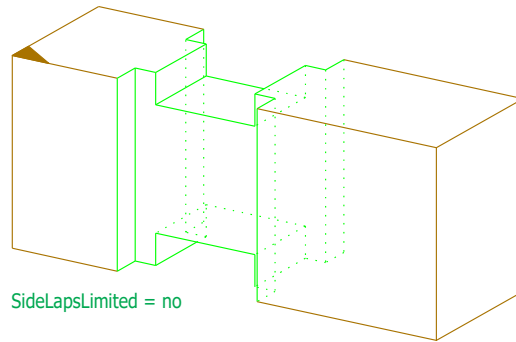
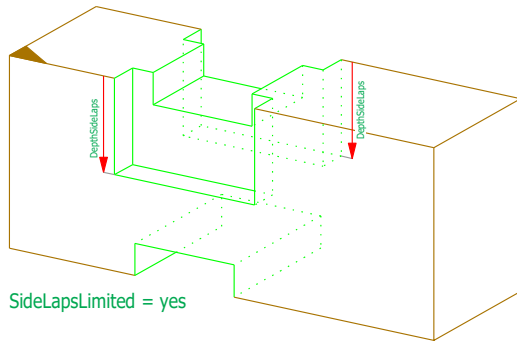


LapPosition = forward



LapPosition = backward



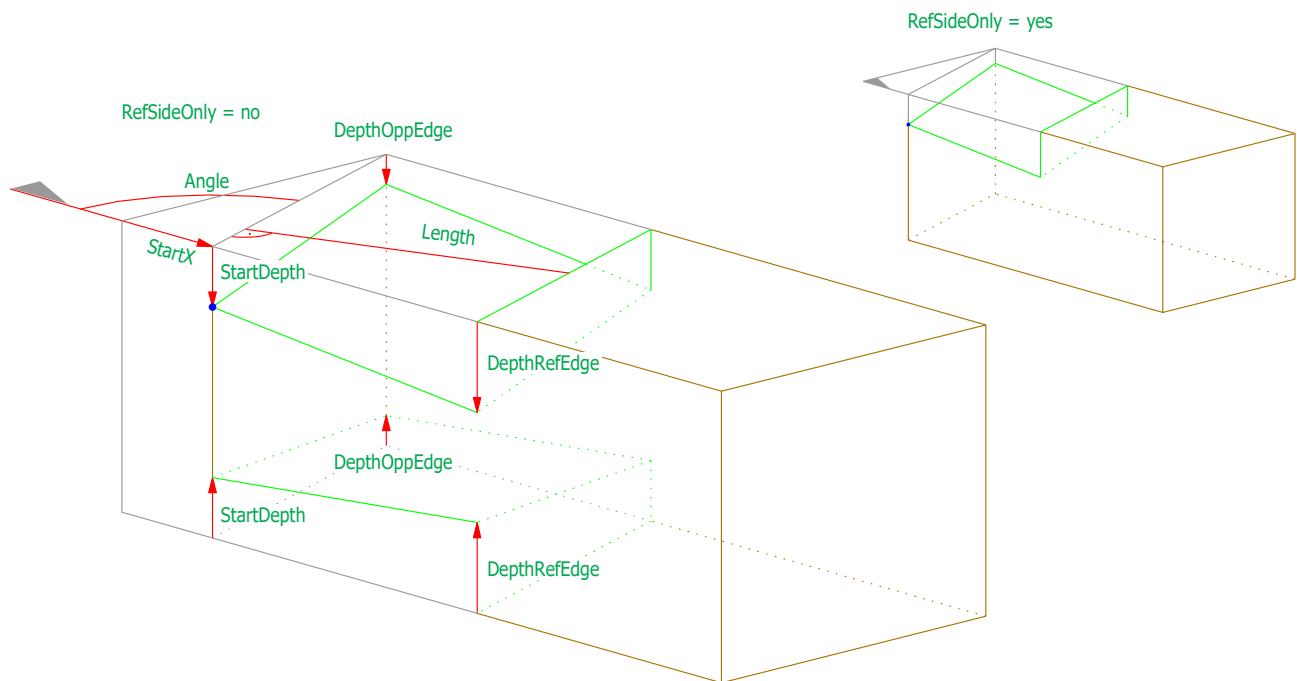


Parameters LogHouseJoint

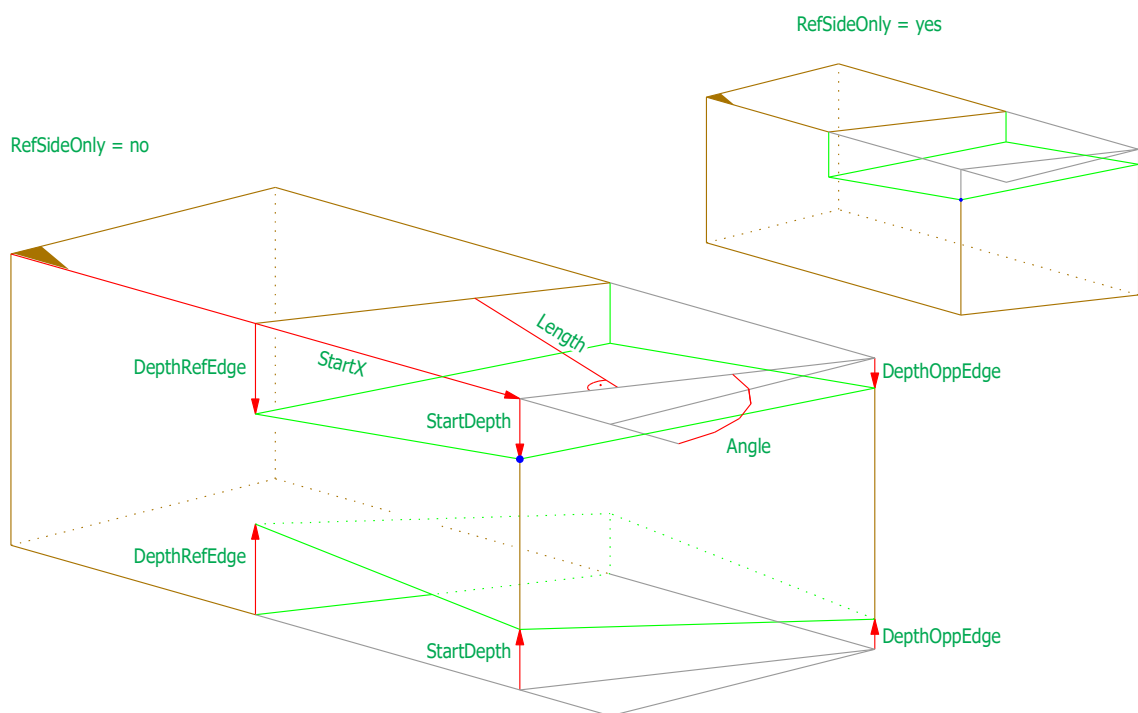
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
SideLapsLimited	BooleanType	no	no	yes
DepthSideLaps	WidthType		0.0	50000.0
LapPosition	LogLapPositionType	symmetric	symmetric/forward/backward	
LengthRefSide	WidthType	100.0	0.0	50000.0
DepthRefSide	WidthType	10.0	0.0	50000.0
LengthOppSide	WidthType	100.0	0.0	50000.0
DepthOppSide	WidthType	10.0	0.0	50000.0
LengthRefEdge	WidthType	100.0	0.0	50000.0
DepthRefEdge	WidthType	10.0	0.0	50000.0
LengthOppEdge	WidthType	100.0	0.0	50000.0
DepthOppEdge	WidthType	10.0	0.0	50000.0
Drillhole	BooleanType	no	no	yes
ArcRefEdgeStart	BooleanType	no	no	yes
ArcRefEdgeEnd	BooleanType	no	no	yes
ArcOppEdgeStart	BooleanType	no	no	yes
ArcOppEdgeEnd	BooleanType	no	no	yes
ArcRadius	WidthType	120.0	0.0	50000.0
ArcDepth	WidthNTYPE	60.0	-50000.0	50000.0
ArcCenter	WidthType	120.0	0.0	50000.0

LogHouseFront

Orientation = start



Orientation = end



Parameters LogHouseFront

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartDepth	WidthType	20.0	0.0	50000.0
Angle	AngleType	90.0	0.1	179.9
Length	WidthType	120.0	0.0	50000.0
DepthRefEdge	WidthType	20.0	0.0	50000.0
DepthOppEdge	WidthType	20.0	0.0	50000.0
RefSideOnly	BooleanType	no	no	yes

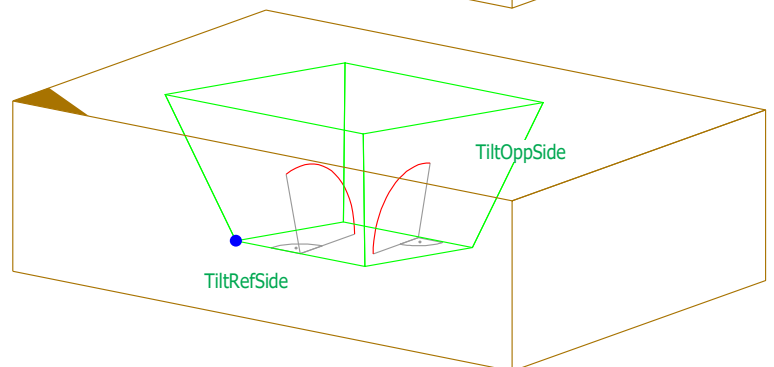
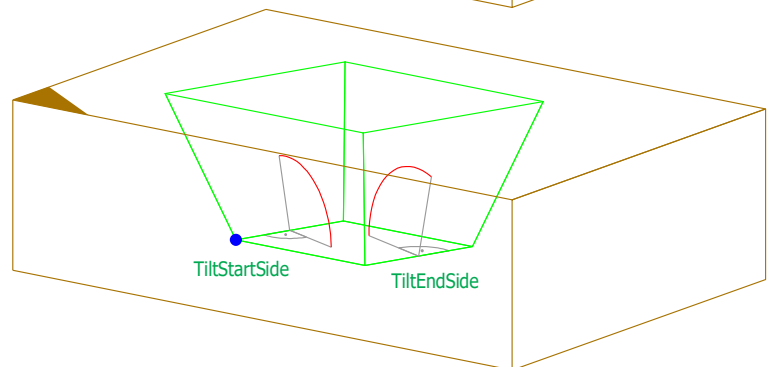
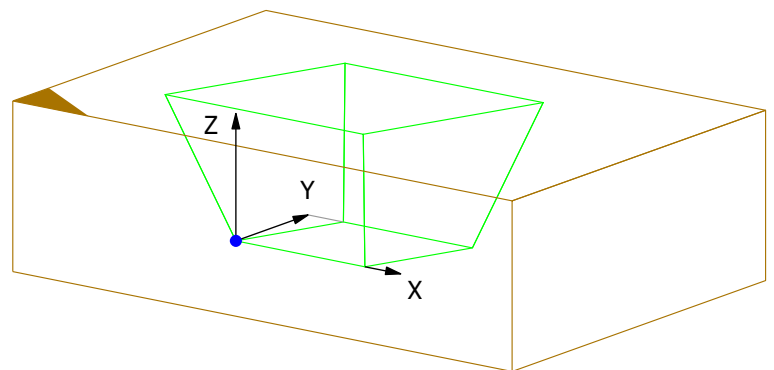
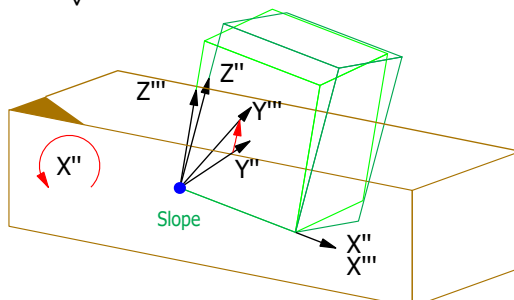
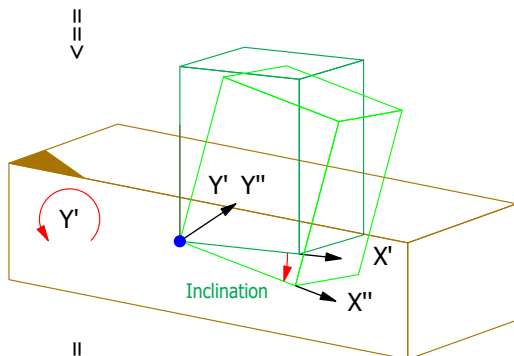
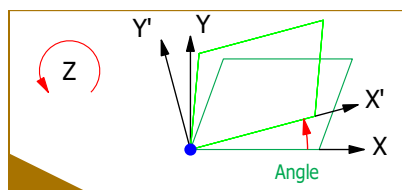
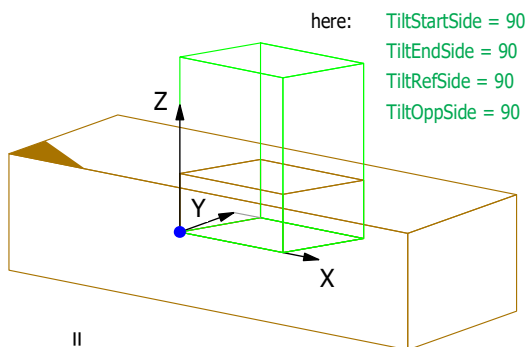
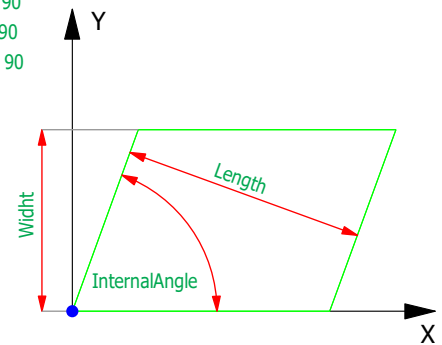
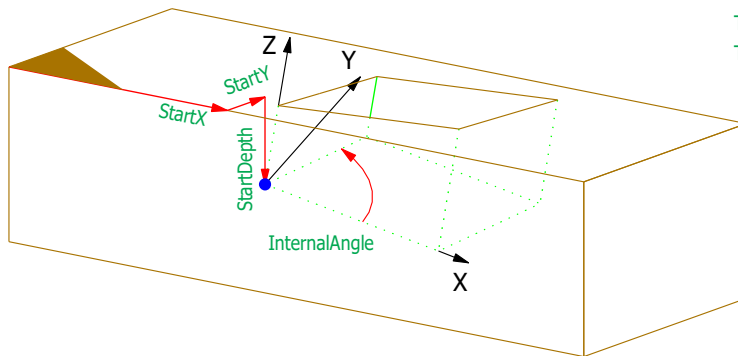
This processing trims the part, even it is on a ReferencePlane

Examples:



Pocket

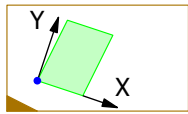
here: TiltStartSide = 90
 TiltEndSide = 90
 TiltRefSide = 90
 TiltOppSide = 90



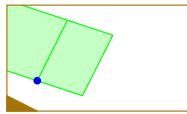
Parameters Pocket

Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	0.0	-50000.0	50000.0
StartDepth	WidthNType	0.0	-50000.0	50000.0
Angle	AngleNType	0.0	-179.9	179.9
Inclination	AngleNType	0.0	-179.9	179.9
Slope	AngleNType	0.0	-179.9	179.9
Length	LengthType	200.0	0.0	100000.0
Width	WidthType	50.0	0.0	50000.0
InternalAngle	AngleType	90.0	0.1	179.9
TiltRefSide	AngleType	90.0	0.1	179.9
TiltEndSide	AngleType	90.0	0.1	179.9
TiltOppSide	AngleType	90.0	0.1	179.9
TiltStartSide	AngleType	90.0	0.1	179.9
MachiningLimits	MachiningLimitType			

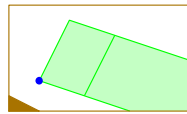
MachiningLimits



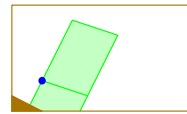
FaceLimitedStart = yes
 FaceLimitedEnd = yes
 FaceLimitedFront = yes
 FaceLimitedBack = yes



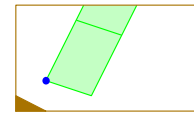
FaceLimitedStart = no
 FaceLimitedEnd = yes
 FaceLimitedFront = yes
 FaceLimitedBack = yes



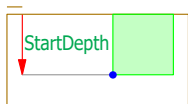
FaceLimitedStart = yes
 FaceLimitedEnd = no
 FaceLimitedFront = yes
 FaceLimitedBack = yes



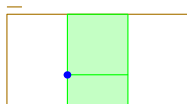
FaceLimitedStart = yes
 FaceLimitedEnd = yes
 FaceLimitedFront = no
 FaceLimitedBack = yes



FaceLimitedStart = yes
 FaceLimitedEnd = yes
 FaceLimitedFront = yes
 FaceLimitedBack = no

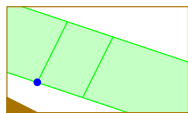


FaceLimitedBottom = yes
 FaceLimitedTop = no

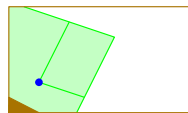


FaceLimitedBottom = no
 FaceLimitedTop = no

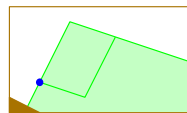
Other combinations of MachineLimits



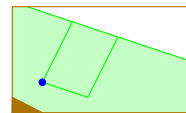
FaceLimitedStart = no
 FaceLimitedEnd = no
 FaceLimitedFront = no
 FaceLimitedBack = yes



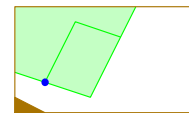
FaceLimitedStart = no
 FaceLimitedEnd = yes
 FaceLimitedFront = no
 FaceLimitedBack = yes



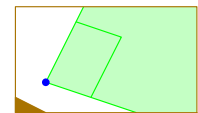
FaceLimitedStart = yes
 FaceLimitedEnd = no
 FaceLimitedFront = no
 FaceLimitedBack = yes



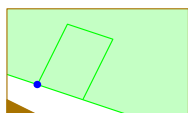
FaceLimitedStart = no
 FaceLimitedEnd = no
 FaceLimitedFront = no
 FaceLimitedBack = yes



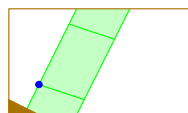
FaceLimitedStart = no
 FaceLimitedEnd = yes
 FaceLimitedFront = yes
 FaceLimitedBack = no



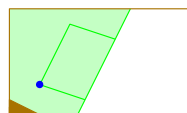
FaceLimitedStart = yes
 FaceLimitedEnd = no
 FaceLimitedFront = yes
 FaceLimitedBack = no



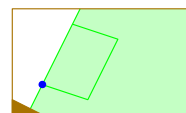
FaceLimitedStart = no
 FaceLimitedEnd = no
 FaceLimitedFront = no
 FaceLimitedBack = no



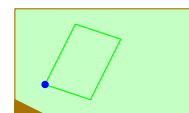
FaceLimitedStart = yes
 FaceLimitedEnd = yes
 FaceLimitedFront = no
 FaceLimitedBack = no



FaceLimitedStart = no
 FaceLimitedEnd = yes
 FaceLimitedFront = no
 FaceLimitedBack = no

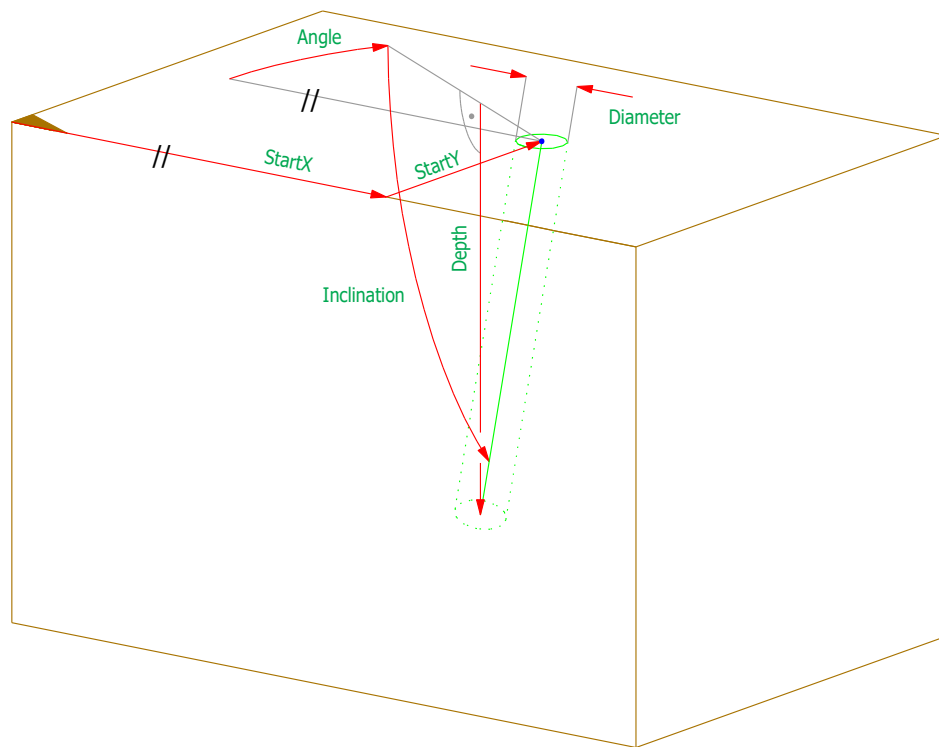


FaceLimitedStart = yes
 FaceLimitedEnd = no
 FaceLimitedFront = no
 FaceLimitedBack = no

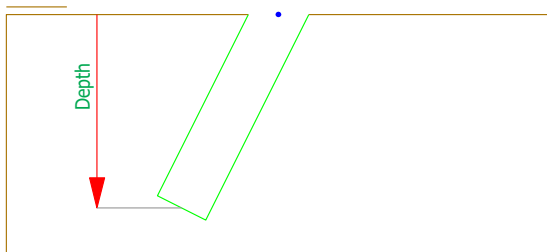


FaceLimitedStart = no
 FaceLimitedEnd = no
 FaceLimitedFront = no
 FaceLimitedBack = no

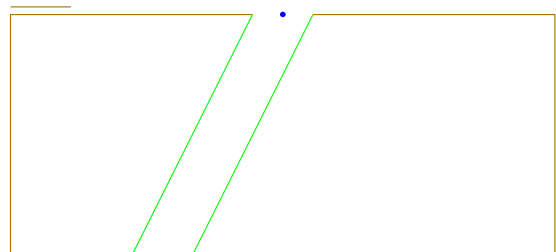
Drilling



DepthLimited = yes



DepthLimited = no

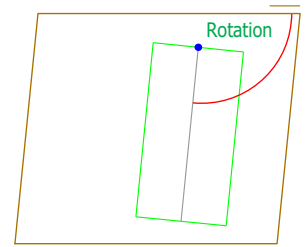
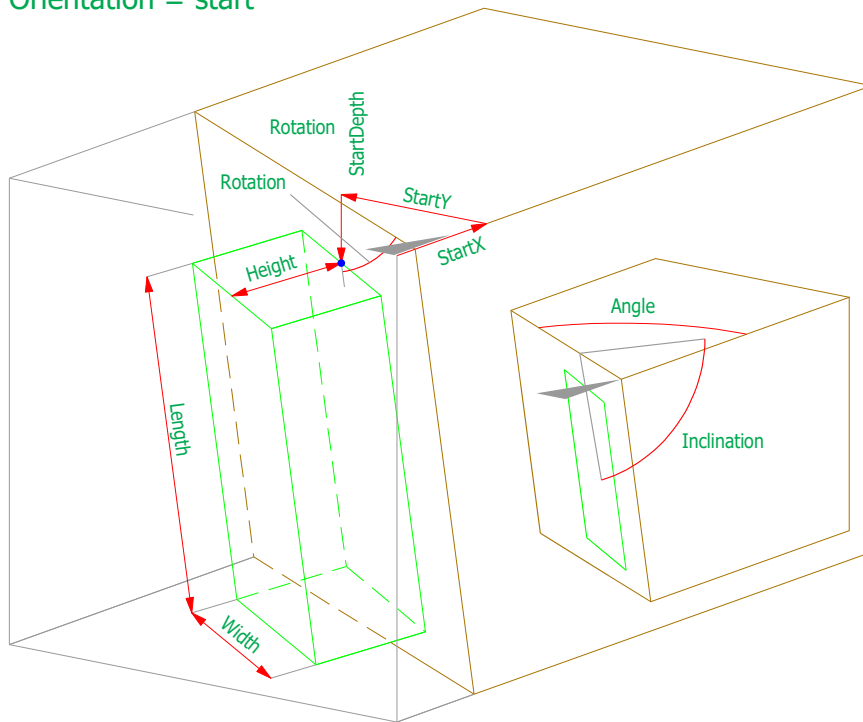


Parameters Drilling

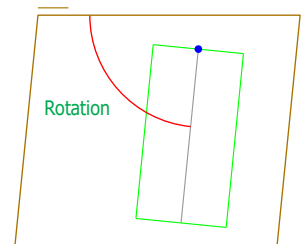
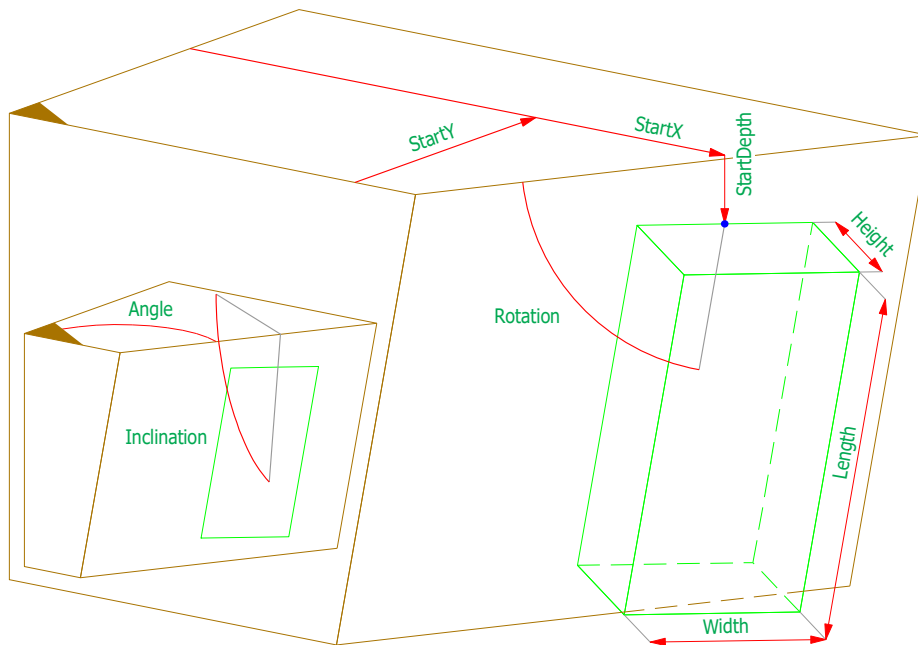
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	0.0	-50000.0	50000.0
Angle	Angle3Type	0	0.0	360.0
Inclination	AngleType	90.0	0.1	179.9
DepthLimited	BooleanType	yes	no	yes
Depth	WidthType	50.0	0.0	50000.0
Diameter	DiameterType	20.0	0.0	50000.0

Tenon

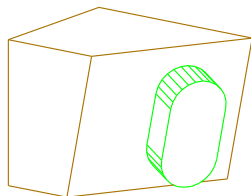
Orientation = start



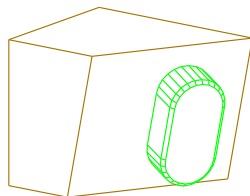
Orientation = end



Chamfer = no



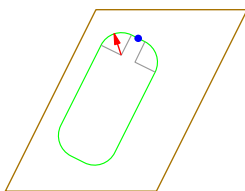
Chamfer = yes



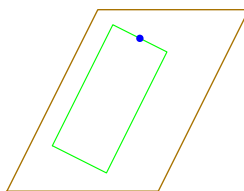
Parameters Tenon

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	50.0	-50000.0	50000.0
StartDepth	WidthNType	50.0	-50000.0	50000.0
Angle	AngleType	90.0	0.1	179.9
Inclination	AngleType	90.0	0.1	179.9
Rotation	AngleType	90.0	0.1	179.9
LengthLimitedTop	BooleanType	yes	no	yes
LengthLimitedBottom	BooleanType	yes	no	yes
Length	WidthType	80.0	0.0	50000.0
Width	LengthSType	40.0	0.0	1000.0
Height	LengthSType	40.0	0.0	1000.0
Shape	TenonShapeType	automatic		
ShapeRadius	LengthSType	20.0	0.0	1000.0
Chamfer	BooleanType	no	no	yes

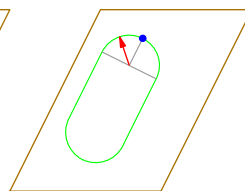
Shape = automatic



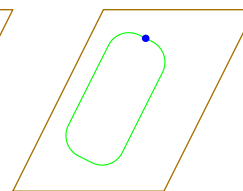
Shape = square



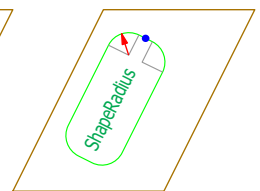
Shape = round



Shape = rounded



Shape = radius



The tenon can be square, round or machine defined depending on the capabilities of the machine.

tool's radius
at mortise:



Effective shape



View perpendicularly on cut face

LengthLimitedTop = NO		LengthLimitedTop = YES	
StartDepth > 0	StartDepth < 0	StartDepth > 0	StartDepth < 0
Here: No statement about LengthLimitedBottom			

LengthLimitedBottom = NO		LengthLimitedBottom = YES	
Here: No statement about LengthLimitedTop			
end = "inside"	end = "outside"	end = "inside"	end = "outside"

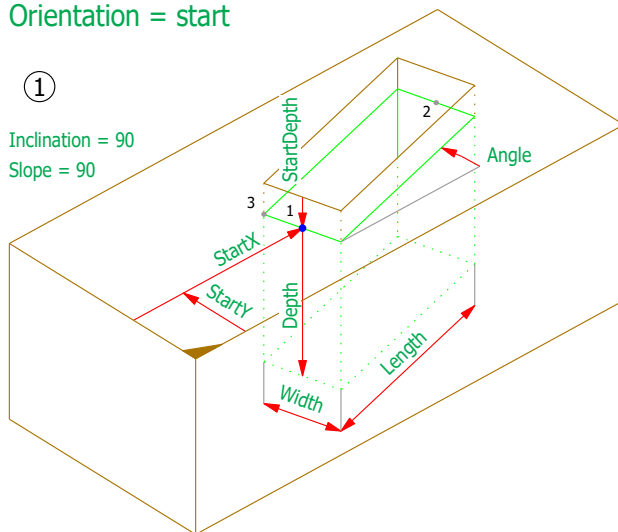
Mortise

Orientation = start

①

Inclination = 90

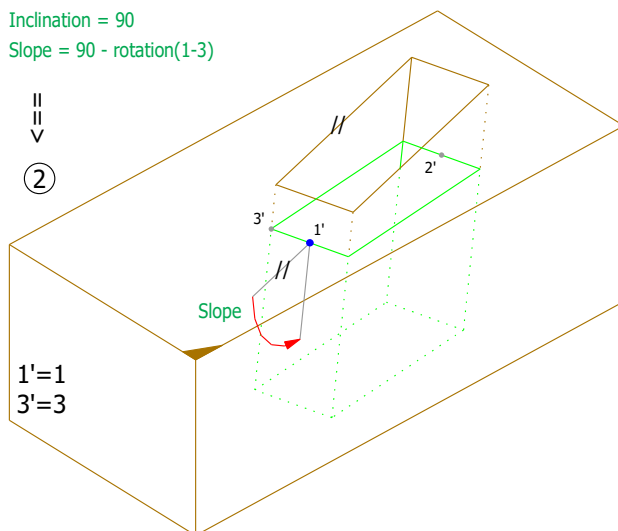
Slope = 90



Inclination = 90

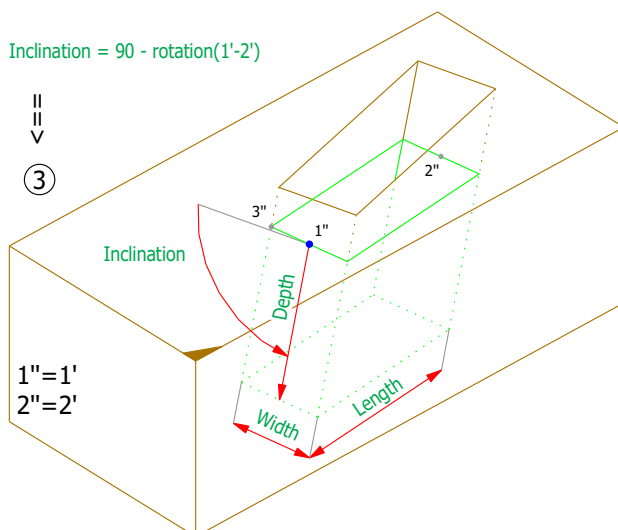
Slope = 90 - rotation(1-3)

②



Inclination = 90 - rotation(1'-2')

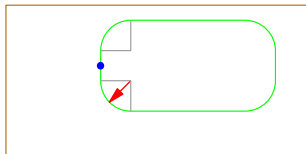
③



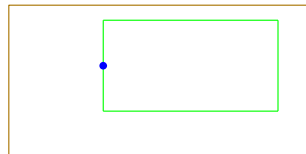
Parameters Mortise

Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	50.0	-50000.0	50000.0
StartDepth	WidthType	0.0	0.0	50000.0
Angle	Angle2NType	0.0	-180.0	180.0
Slope	AngleType	90.0	0.1	179.9
Inclination	AngleType	90.0	0.1	179.9
LengthLimitedTop	BooleanType	yes	no	yes
LengthLimitedBottom	BooleanType	yes	no	yes
Length	WidthType	80.0	0.0	50000.0
Width	LengthSType	40.0	0.0	1000.0
Depth	LengthSType	40.0	0.0	1000.0
Shape	TenonShapeType	automatic		
ShapeRadius	LengthSType	20.0	0.0	1000.0

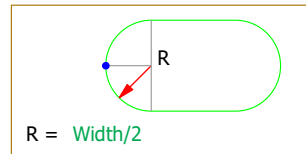
Shape = automatic



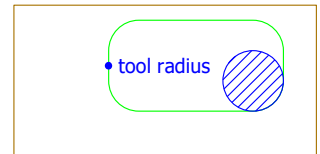
Shape = square



Shape = round

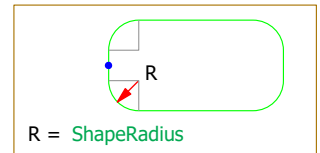


Shape = rounded



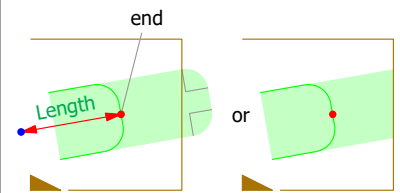
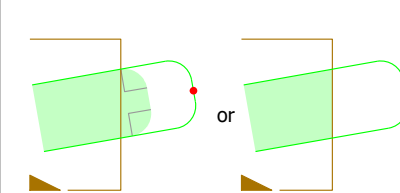
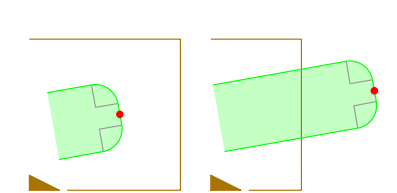
The mortise can be square, round or machine defined, depending on the capabilities of the machine.

Shape = radius



Effective shape

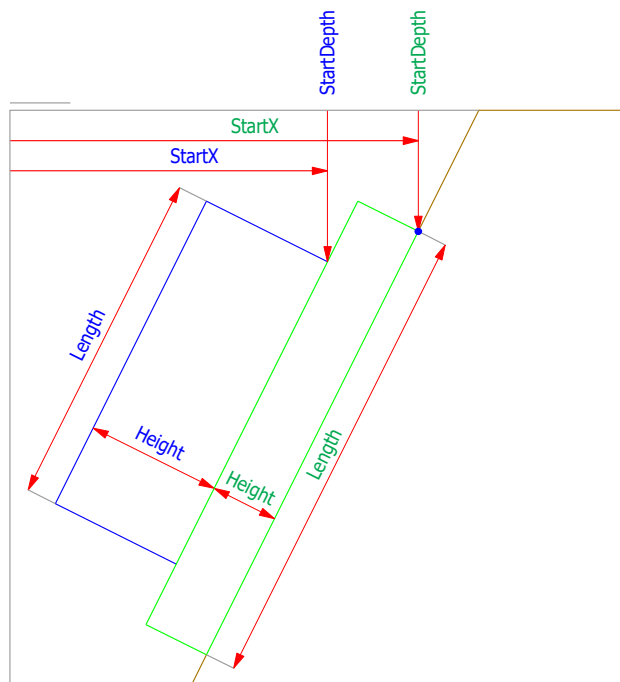
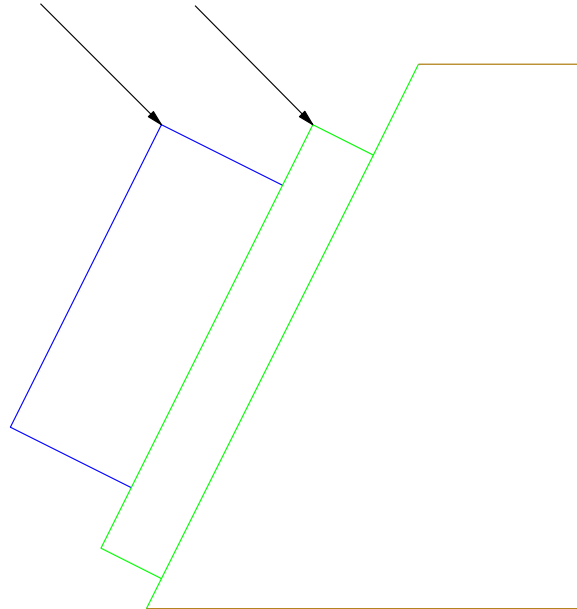
LengthLimitedTop = NO		LengthLimitedTop = YES	
start = "inside"	start = "outside"	start = "inside"	start = "outside"
Here: No statement about LengthLimitedBottom			

LengthLimitedBottom = NO		LengthLimitedBottom = YES	
Here: No statement about LengthLimitedTop			
end = "inside"	end = "outside"	end = "inside"	end = "outside"
			

House

Tenon or DovetailTenon

House



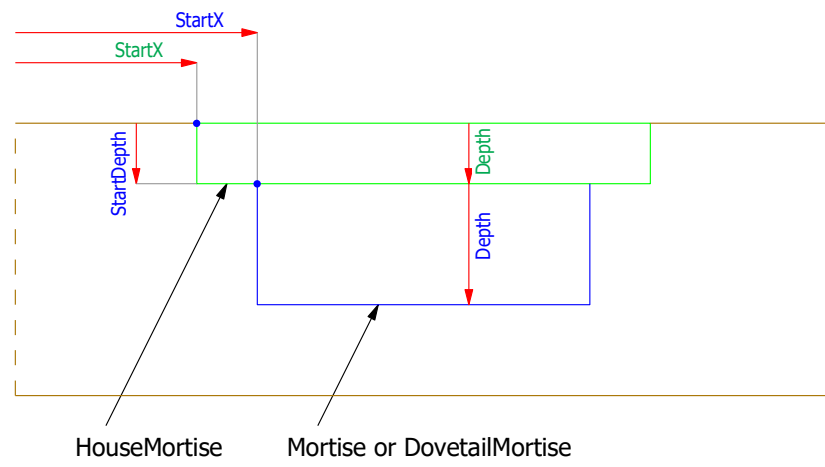
green: Parameters for House.

blue: Parameters for Tenon or DovetailTenon

Parameters House

The House has same parameters as the Tenon.

HouseMortise

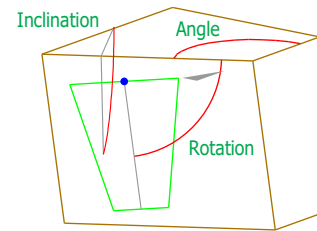
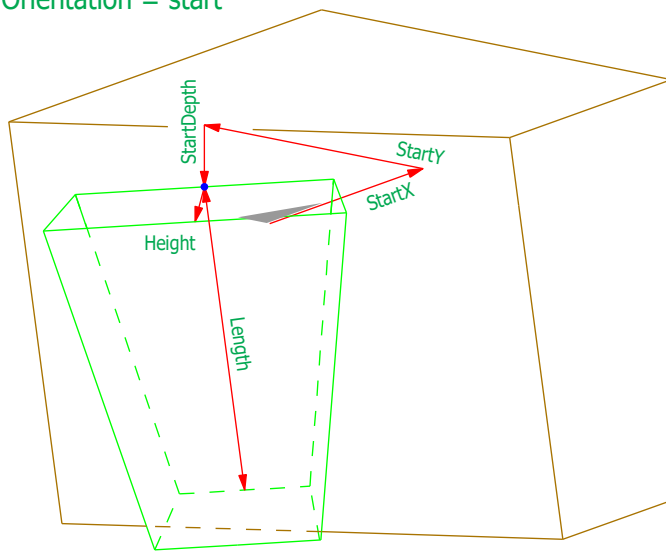


Parameters HouseMortise

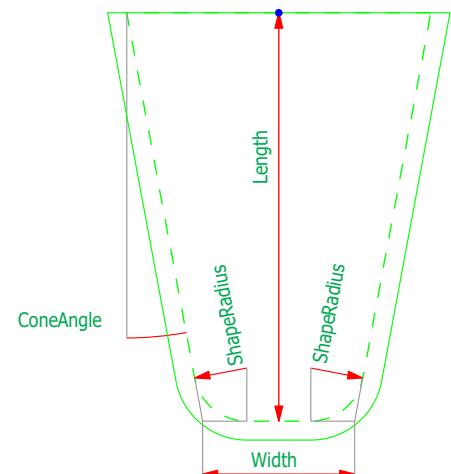
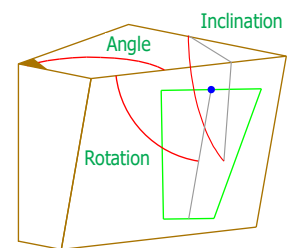
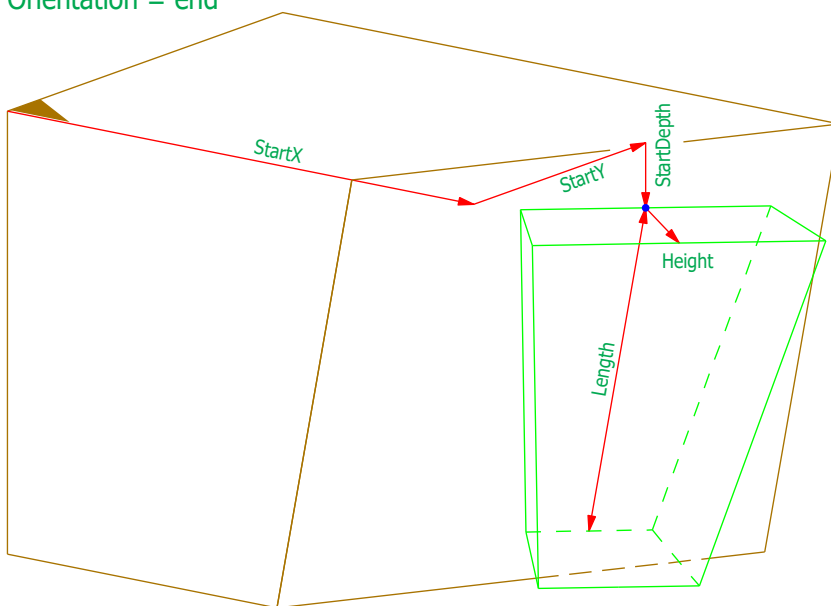
The HouseMortise has same parameters as the Mortise.

DovetailTenon

Orientation = start



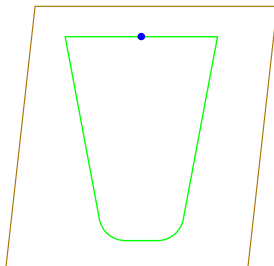
Orientation = end



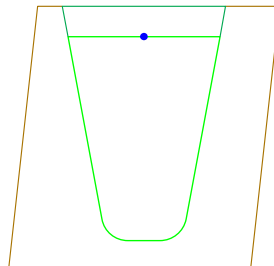
Parameters DovetailTenon

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	50.0	-50000.0	50000.0
StartDepth	WidthNType	50.0	-50000.0	50000.0
Angle	AngleType	90.0	0.1	179.9
Inclination	AngleType	90.0	0.1	179.9
Rotation	AngleType	90.0	0.1	179.9
LengthLimitedTop	BooleanType	yes	no	yes
LengthLimitedBottom	BooleanType	yes	no	yes
Length	WidthType	80.0	0.0	50000.0
Width	LengthSType	40.0	0.0	1000.0
Height	LengthSType	28.0	0.0	1000.0
ConeAngle	double		0.0	30.0
UseFlankAngle	BooleanType	no	no	yes
FlankAngle	double	15.0	5.0	35.0
Shape	TenonShapeType	automatic		
ShapeRadius	LengthSType	20.0	0.0	1000.0

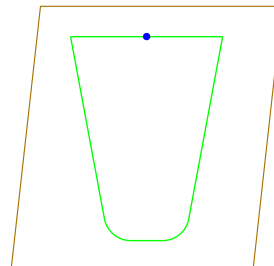
LengthLimitedTop = yes



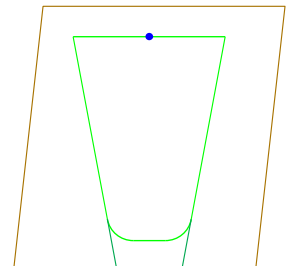
LengthLimitedTop = no



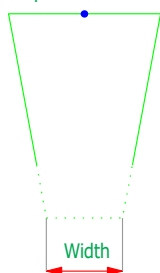
LengthLimitedBottom = yes



LengthLimitedBottom = no

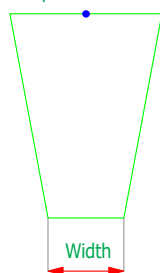


Shape = automatic

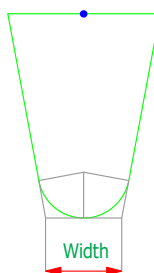


The machine
decides
which shape
will be
produced.

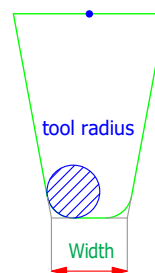
= square



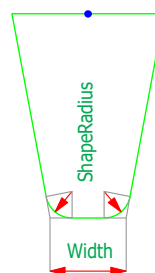
= round



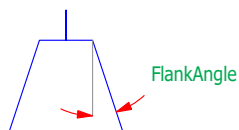
= rounded



= radius



ShapeRadius and
Width must be
coherent.
This condition is
not controlled
by the XML schema



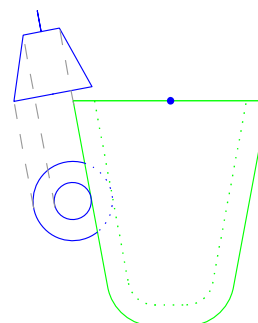
FlankAngle

UseFlankAngle = no:

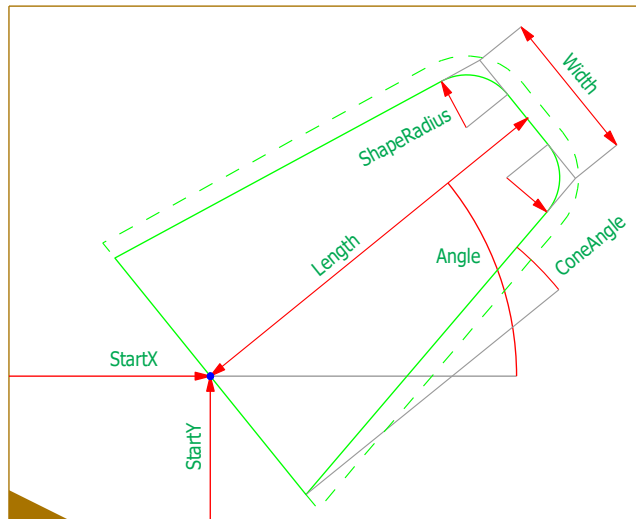
Shape of dovetail must be done with
FlankAngle of the tool from machine.

UseFlankAngle = yes:

Shape of dovetail must be done with the
parameter FlankAngle



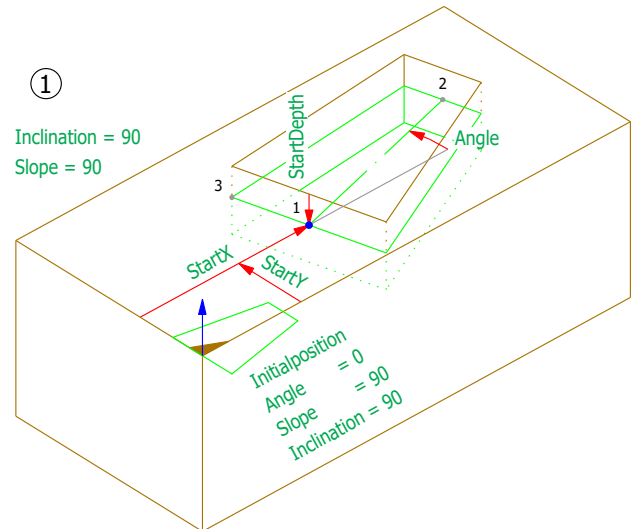
DovetailMortise



Angle / Slope / Inclination

In case of ReferenceSide 1, 2, 3 and 4

Angle = Rotation
 Slope = Rotation 1-3
 Inclination = Rotation 1'-2'



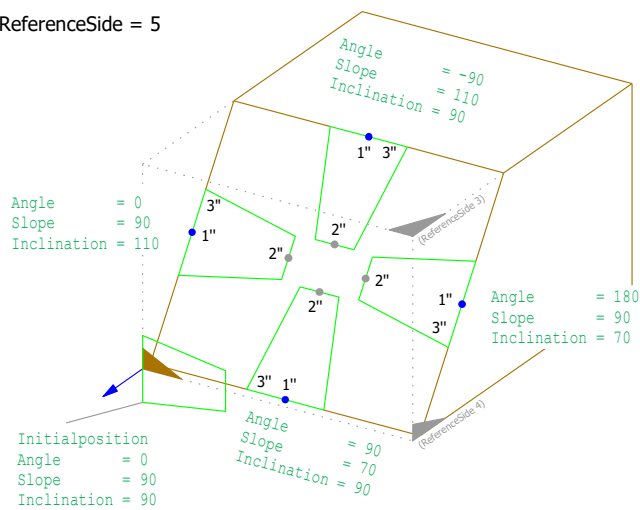
Angle / Slope / Inclination

In case of ReferenceSide 5 and 6

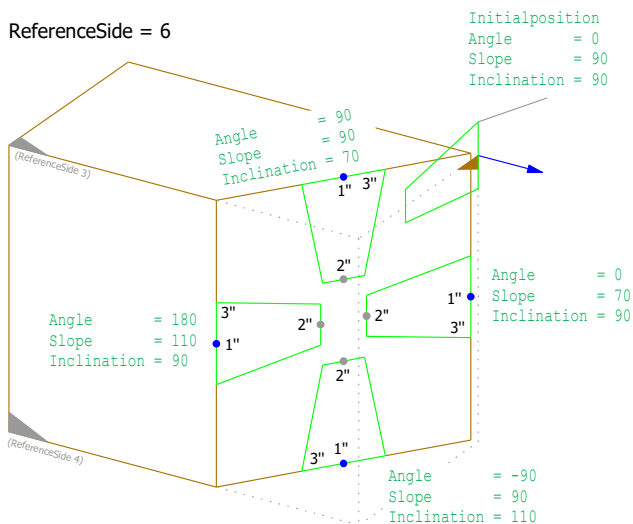
Examples !

Angle = Rotation
 Slope = Rotation 1-3
 Inclination = Rotation 1'-2'

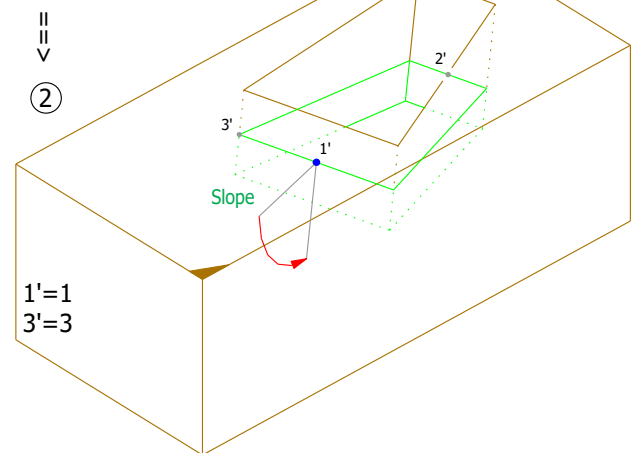
ReferenceSide = 5



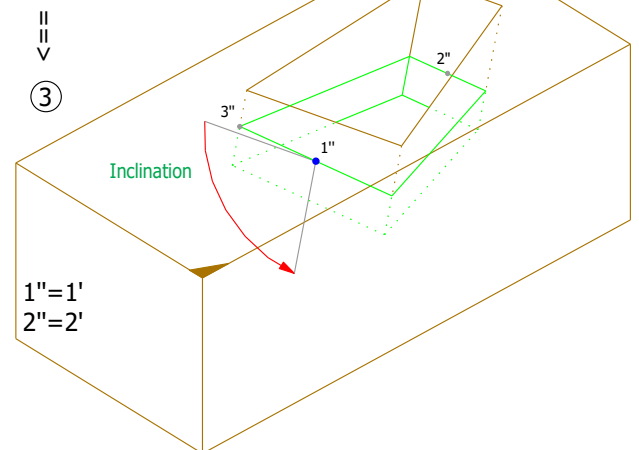
ReferenceSide = 6



Inclination = 90
 Slope = 90 - rotation(1-3)



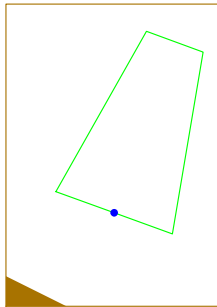
Inclination = 90 - rotation(1'-2')



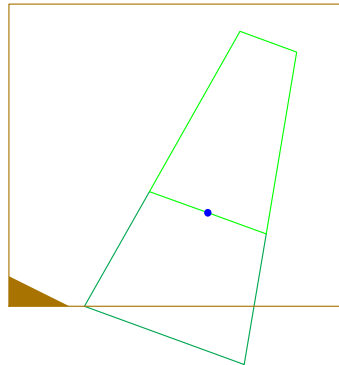
Parameters DovetailMortise

Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	50.0	-50000.0	50000.0
StartDepth	WidthType	0.0	0.0	50000.0
Angle	Angle2NType	0.0	-180.0	180.0
Slope	AngleType	90.0	0.1	179.9
Inclination	AngleType	90.0	0.1	179.9
LimitationTop	LimitationTopType	limited		
LengthLimitedBottom	BooleanType	yes	no	yes
Length	WidthType	80.0	0.0	50000.0
Width	LengthSType	40.0	0.0	1000.0
Depth	LengthSType	28.0	0.0	1000.0
ConeAngle	double		0.0	30.0
UseFlankAngle	BooleanType	no	no	yes
FlankAngle	double	15.0	5.0	35.0
Shape	TenonShapeType	automatic		
ShapeRadius	LengthSType	20.0	0.0	1000.0

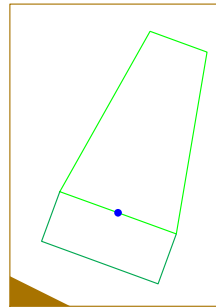
LimitationTop= limited



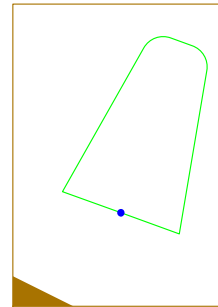
LimitationTop = unlimited



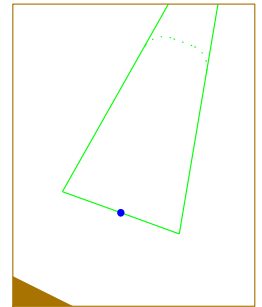
LimitationTop = pocket



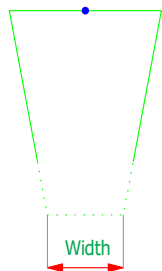
LengthLimitedBottom = yes



LengthLimitedBottom = no

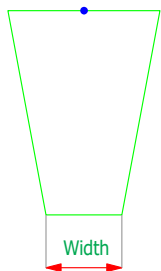


Shape = automatic

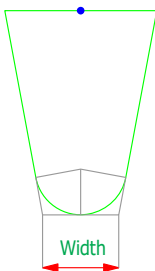


The machine decides which shape will be produced.

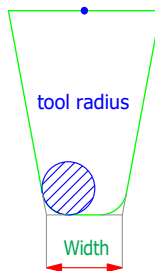
= square



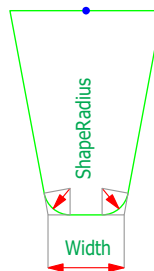
= round



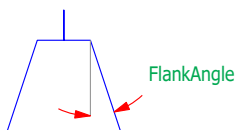
= rounded



= radius



ShapeRadius and Width must be coherent. This condition is not controlled by the XML schema

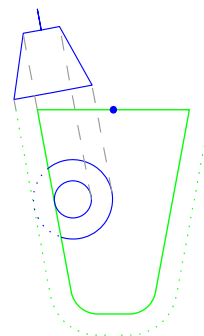


UseFlankAngle = no:

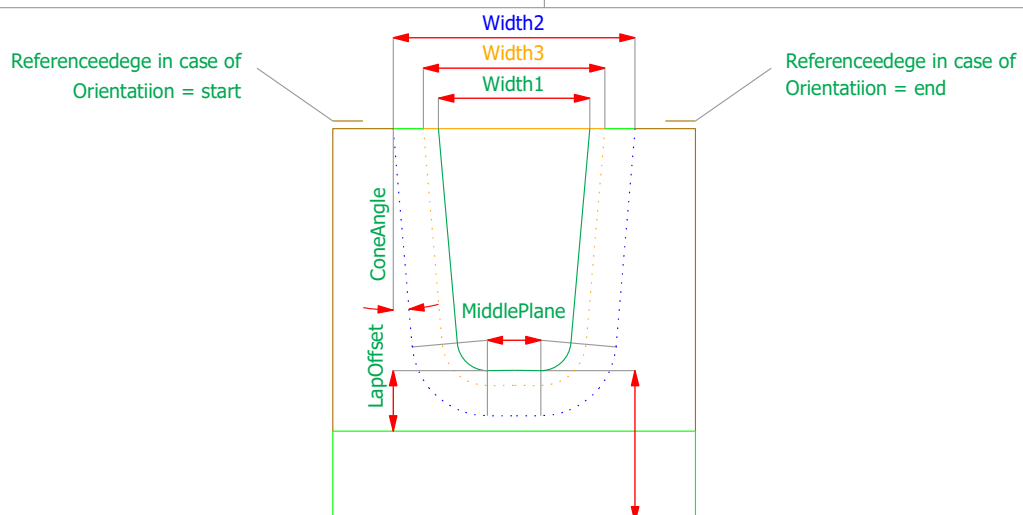
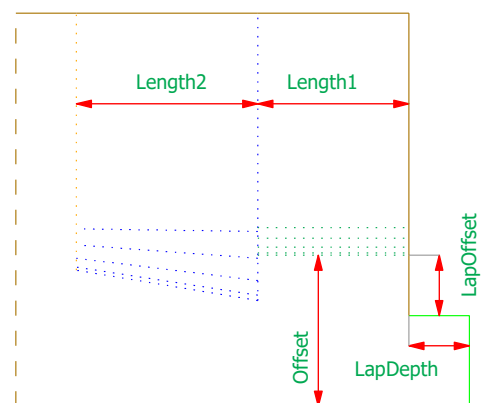
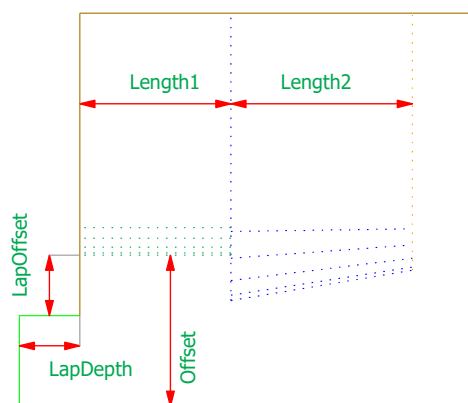
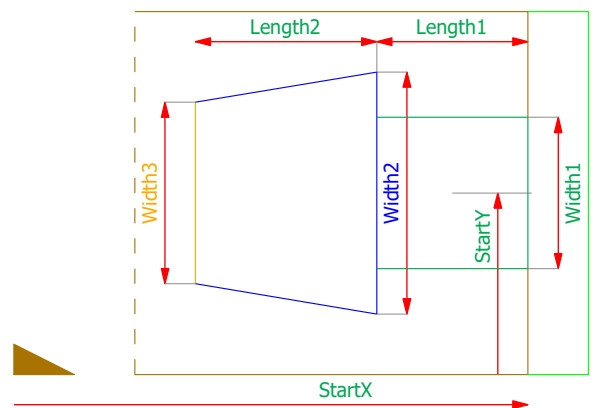
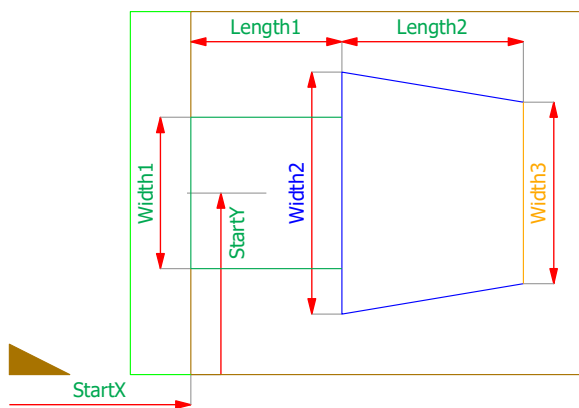
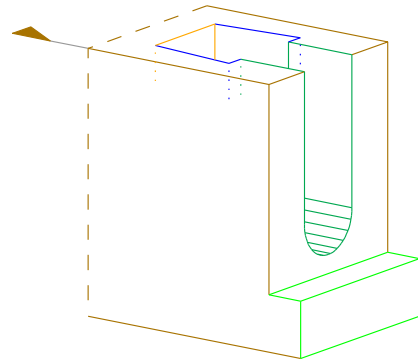
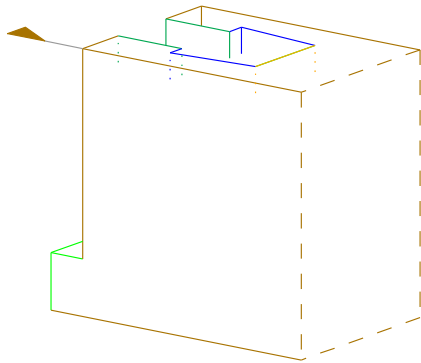
Shape of dovetail must be done with FlankAngle of the tool from machine.

UseFlankAngle = yes:

Shape of dovetail must be done with the parameter FlankAngle



Orientation = end

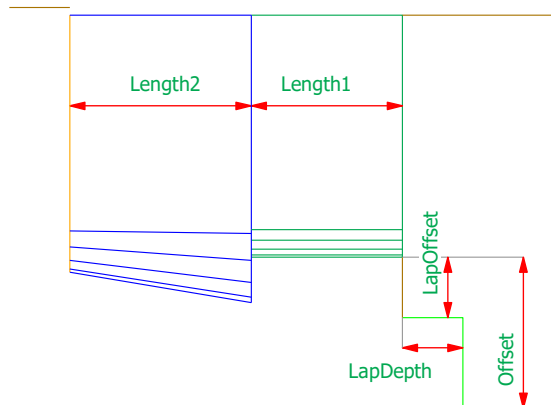
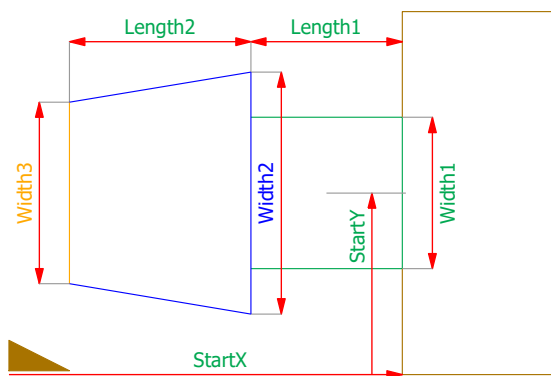
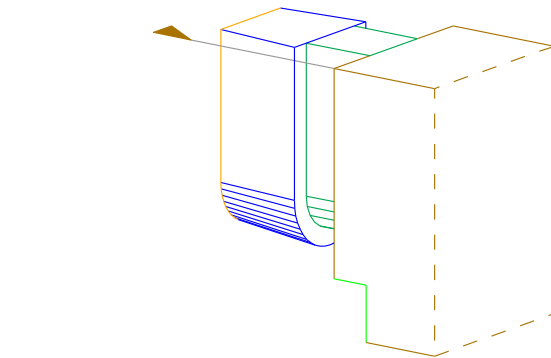


Parameters JapaneseMortise

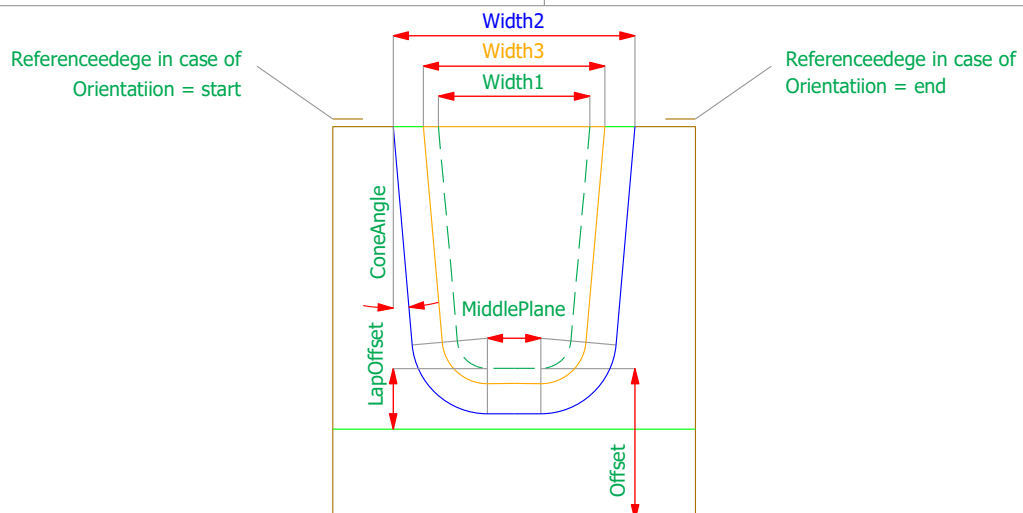
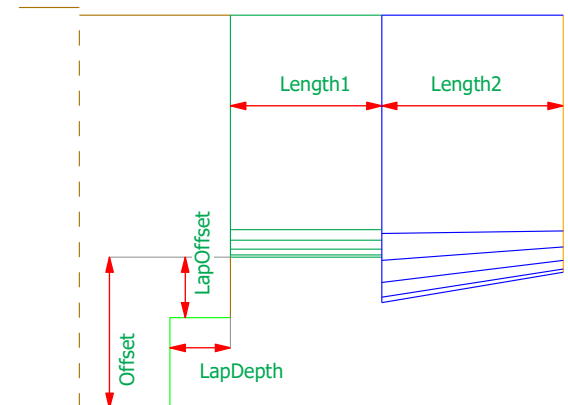
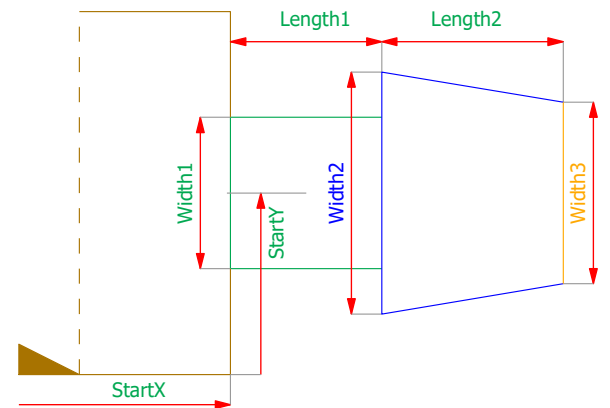
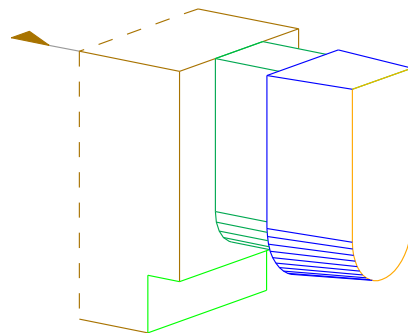
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	50.0	-50000.0	50000.0
Width1	LengthType	40.0	0.0	10000.0
Length1	LengthType	50.0	0.0	10000.0
Width2	LengthType	60.0	0.0	10000.0
Length2	LengthType	50.0	0.0	10000.0
Width3	LengthType	40.0	0.0	10000.0
ConeAngle	Double	30.0	0.0	30.0
MiddlePlane	LengthType	0.0	0.0	10000.0
Offset	LengthType	30.0	0.0	10000.0
UseLap	BooleanType	yes	no	yes
LapOffset	LengthType	10.0	0.0	10000.0
LapDepth	LengthType	20.0	0.0	10000.0

JapaneseTenon

Orientation = start



Orientation = end

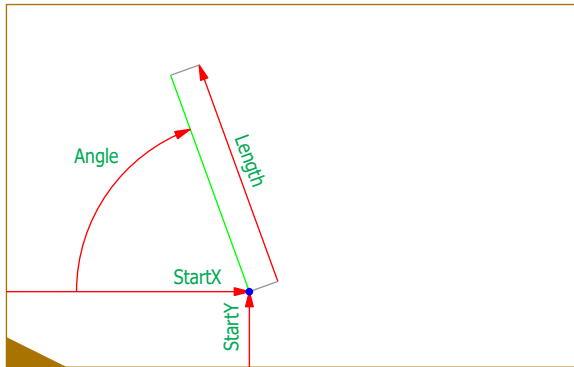


Parameters JapaneseTenon

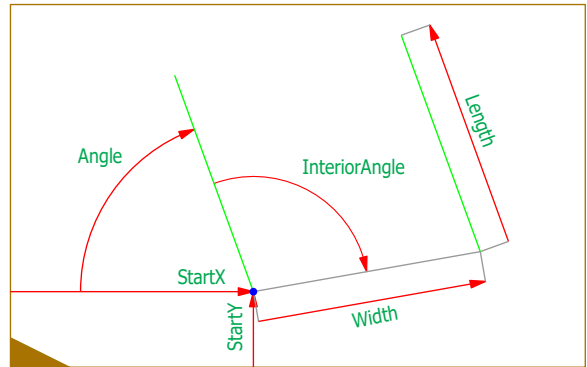
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	50.0	-50000.0	50000.0
Width1	LengthType	40.0	0.0	10000.0
Length1	LengthType	50.0	0.0	10000.0
Width2	LengthType	60.0	0.0	10000.0
Length2	LengthType	50.0	0.0	10000.0
Width3	LengthType	40.0	0.0	10000.0
ConeAngle	Double	30.0	0.0	30.0
MiddlePlane	LengthType	0.0	0.0	10000.0
Offset	LengthType	30.0	0.0	10000.0
UseLap	BooleanType	yes	no	yes
LapOffset	LengthType	10.0	0.0	10000.0
LapDepth	LengthType	20.0	0.0	10000.0

Marking

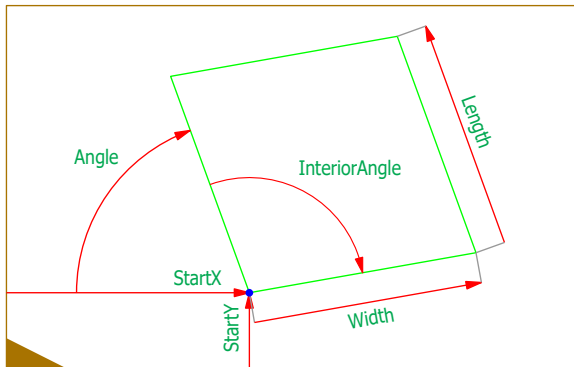
MarkingStyle = single



MarkingStyle = double



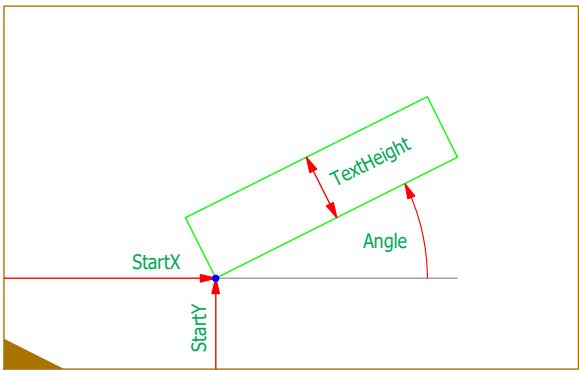
MarkingStyle = square



Parameters Marking

Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	0.0	-50000.0	50000.0
Angle	Angle2NType	0	-180.0	180.0
LengthLimited	BooleanType	no	no	yes
Length	WidthType	20.0	0.0	50000.0
Width	WidthType	100.0	0.0	50000.0
InteriorAngle	AngleType	90.0	0.1	179.9
Style	MarkingStyleType	single	single/double/square	

Text



Text = "ABCD"

		AlignmentHorizontal		
		left	center	right
AlignmentVertical	bottom			
	center			
	top			

Text = "ABCD\nEF\nGHI"

AlignmentMultiline		
left	center	right

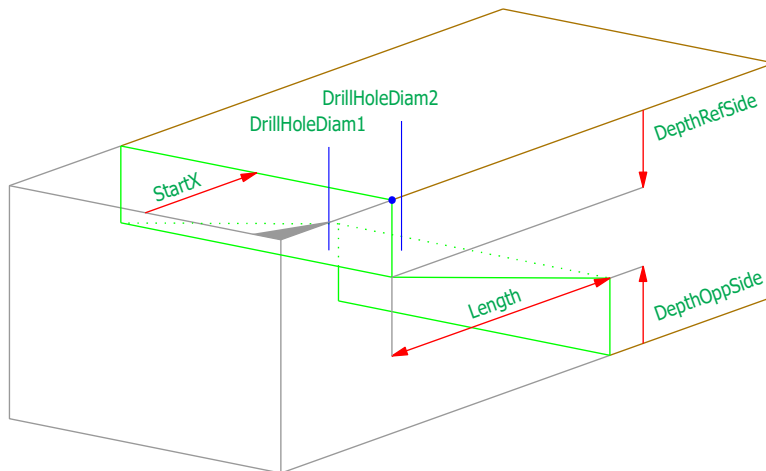
StackedMarking	
no	yes

Parameters Text

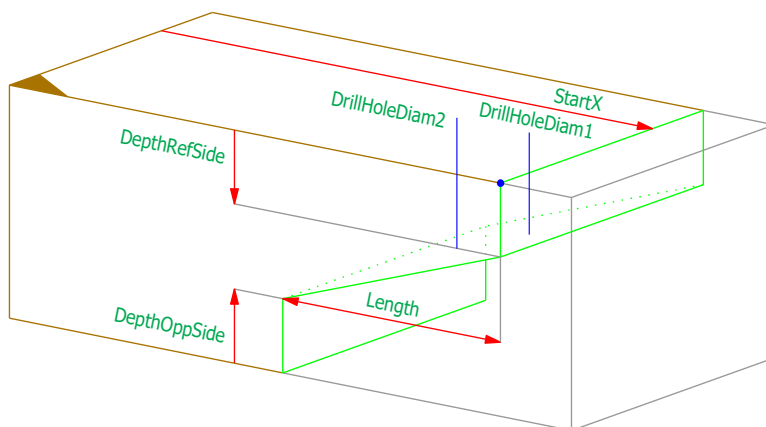
Name	Type	Default	Min	Max
StartX	LengthPosType	0	-100000	100000
StartY	WidthNType	0	-50000	50000
Angle	Angle2NType	0	-180	180
AlignmentVertical	AlignmentVerticalType	bottom		
AlignmentHorizontal	AlignmentHorizontalType	left		
AlignmentMultiline	AlignmentHorizontalType	left		
StackedMarking	BooleanType	no	no	yes
TextHeightAuto	BooleanType	yes	no	yes
TextHeight	WidthType	20	0	50000
Text	xs:string			

SimpleScarf

Orientation = start



Orientation = end



This processing trims the part, even it is on a ReferencePlane

Examples:

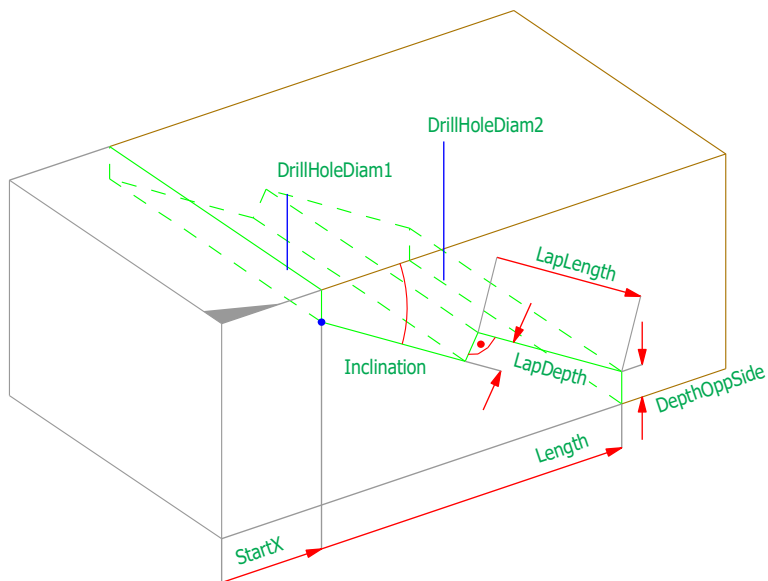


Parameters SimpleScarf

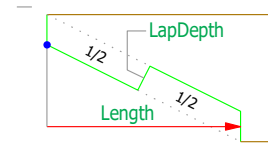
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
Length	WidthType	200.0	0.0	50000.0
DepthRefSide	WidthType	20.0	0.0	50000.0
DepthOppSide	WidthType	20.0	0.0	50000.0
NumDrillHole	byte	0	0	2
DrillHoleDiam1	LengthSType	20.0	0.0	1000.0
DrillHoleDiam2	LengthSType	20.0	0.0	1000.0

ScarfJoint

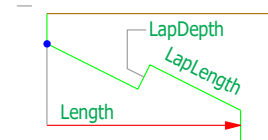
Orientation = start



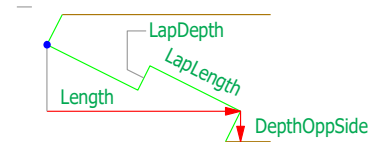
ScarfShape = classic



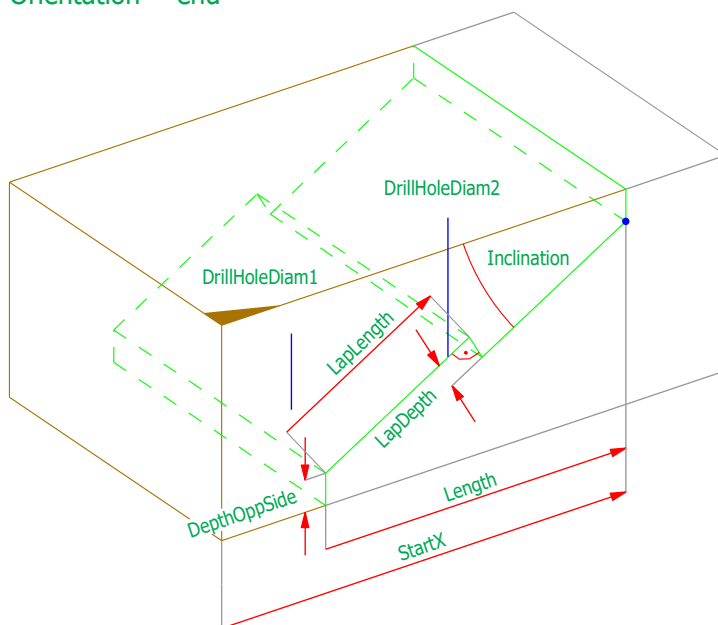
ScarfShape = refside



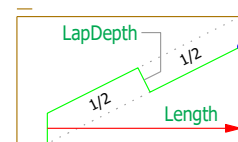
ScarfShape = baseside



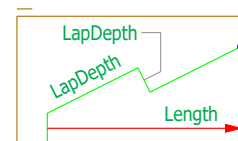
Orientation = end



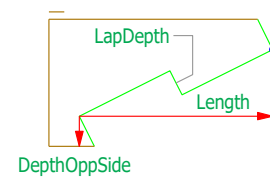
ScarfShape = classic



ScarfShape = refside



ScarfShape = baseside



This processing trims the part, even it is on a ReferencePlane
Examples:



Parameters ScarfJoint

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
Inclination	Inclination3Type		0.0	90.0
LapLength	WidthType	100.0	0.0	50000.0
LapDepth	WidthType	20.0	0.0	50000.0
Length	WidthType	200.0	0.0	50000.0
DepthOppSide	WidthType	20.0	0.0	50000.0
ScarfShape	ScarfShapeType	refside		
NumDrillHole	byte	0	0	2
DrillHoleDiam1	LengthSType	20.0	0.0	1000.0
DrillHoleDiam2	LengthSType	20.0	0.0	1000.0

StepJoint

Tenon = no

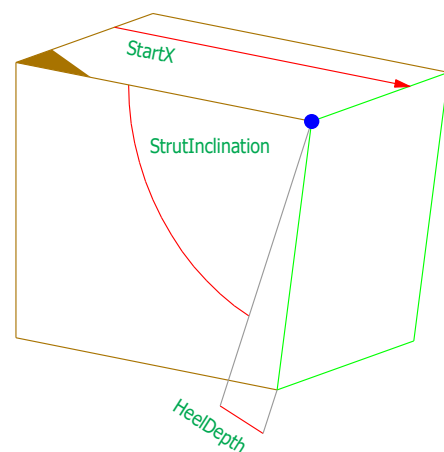
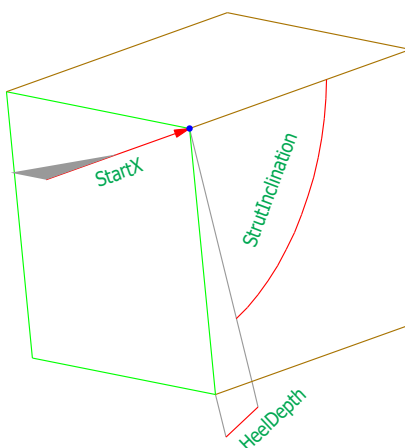
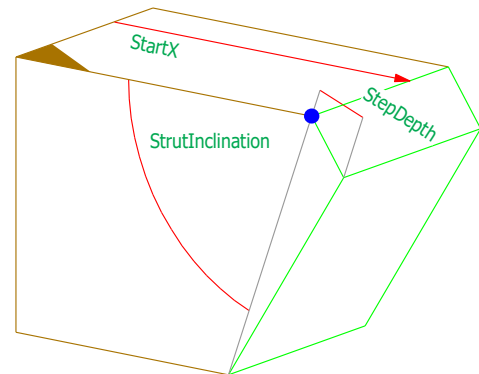
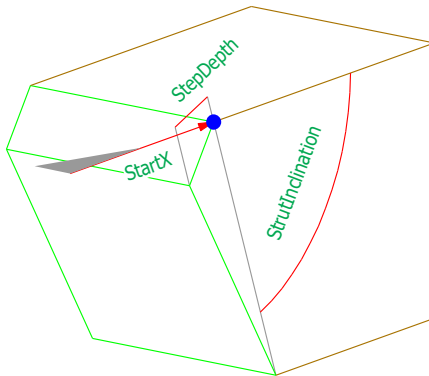
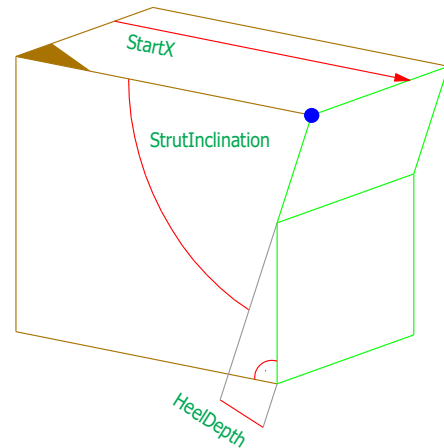
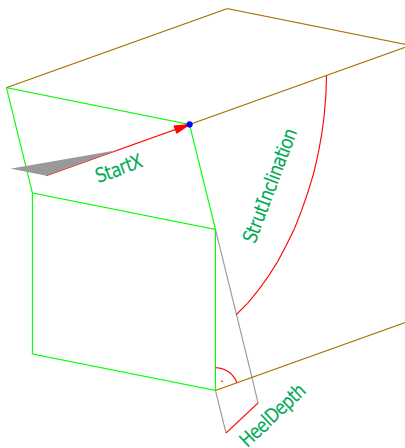
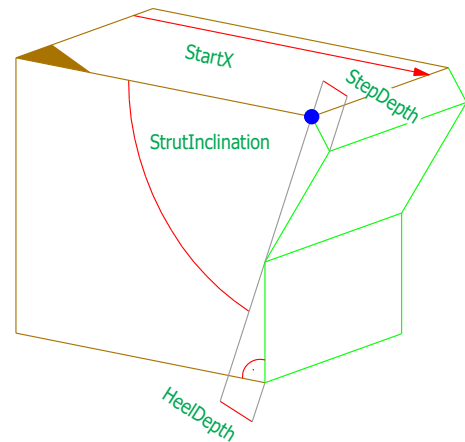
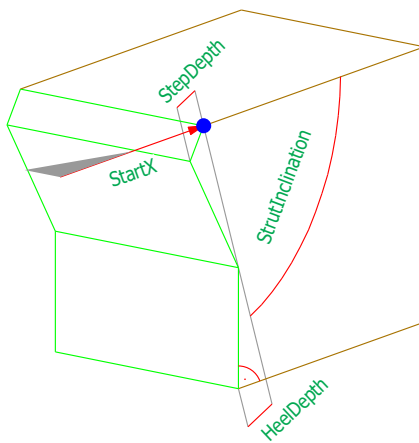
Orientation = start

Orientation = end

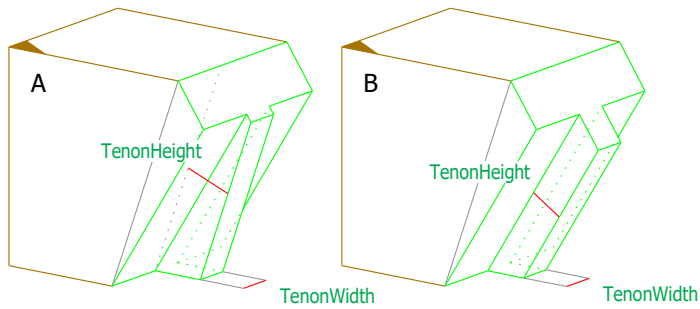
StepShape = double

StepShape = step

StepShape = heel

StepShape =
taperedheel

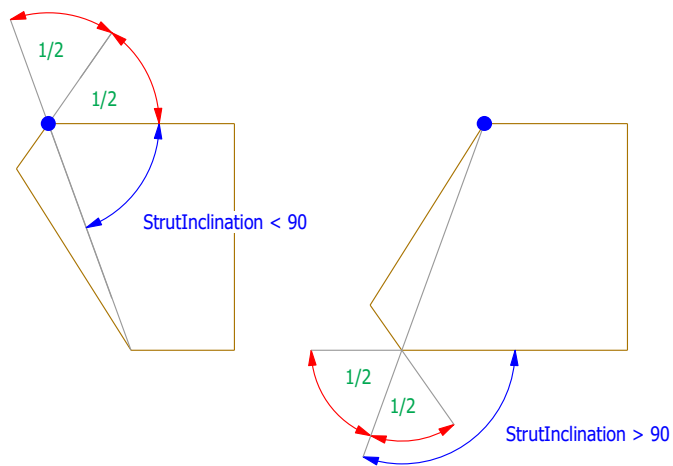
Tenon = yes



Which style (A or B) is used depends on the machine

Parameters StepJoint

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPostType	0.0	-100000.0	100000.0
StrutInclination	AngleType		0.1	179.9
StepDepth	WidthType	20.0	0.0	50000.0
HeelDepth	WidthType	20.0	0.0	50000.0
StepShape	StepShapeType	double		
Tenon	BooleanType	no	no	yes
TenonWidth	LengthSType	40.0	0.0	1000.0
TenonHeight	LengthSType	40.0	0.0	1000.0



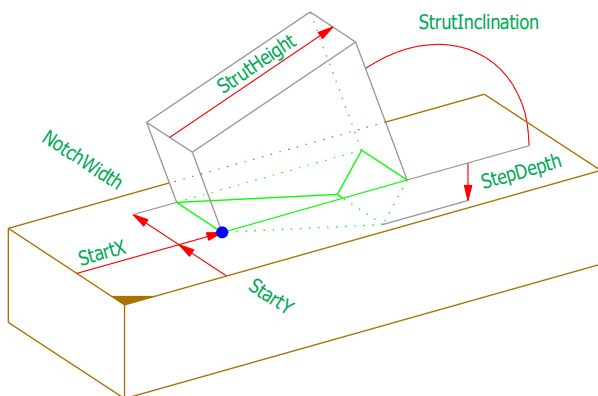
This processing trims the part, even it is on a ReferencePlane

Examples:



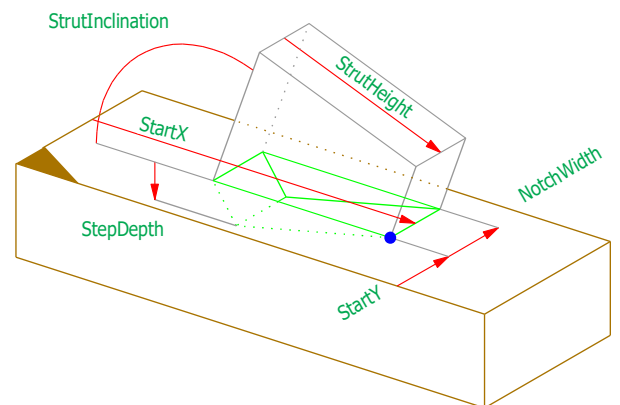
StepJointNotch

Orientation = start

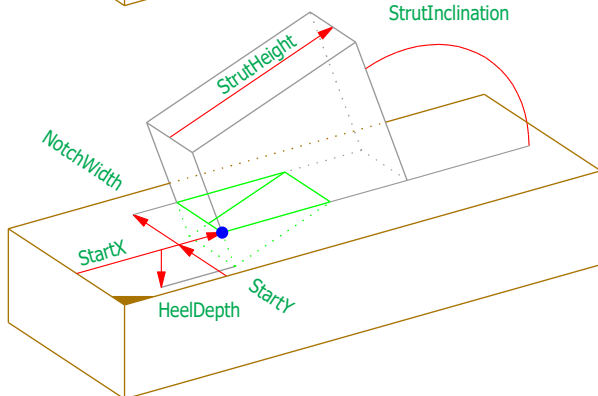


StepShape = step

Orientation = end

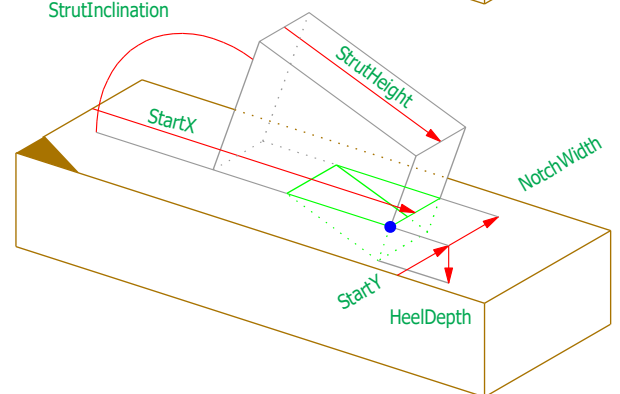


StrutInclination



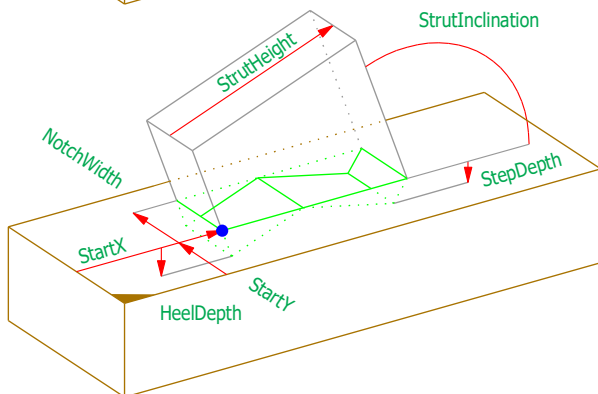
StepShape = heel

StrutInclination



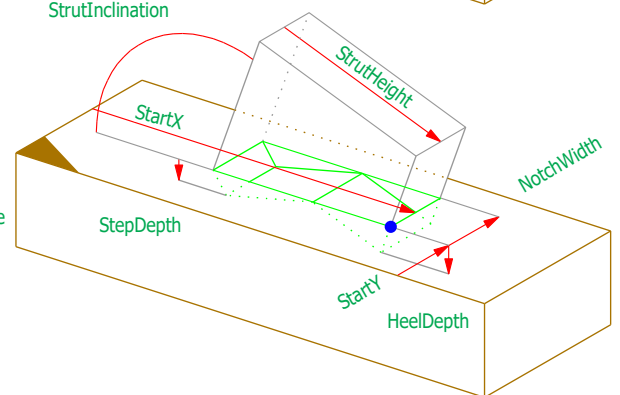
HeelDepth

StrutInclination



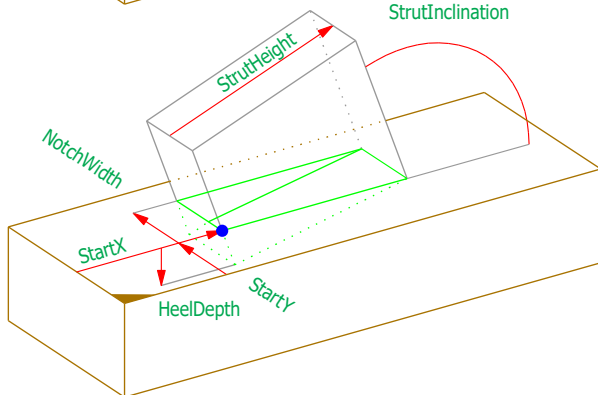
StepShape = double

StrutInclination



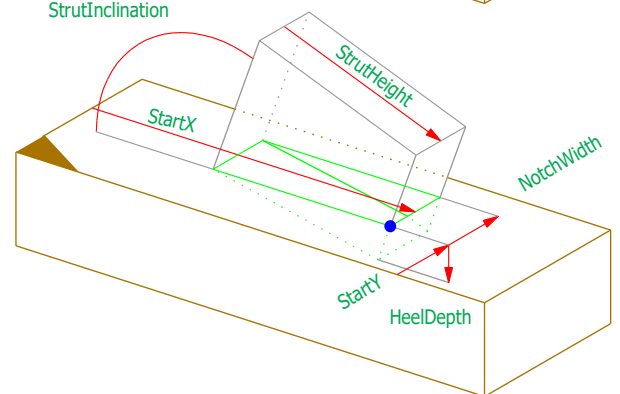
HeelDepth

StrutInclination

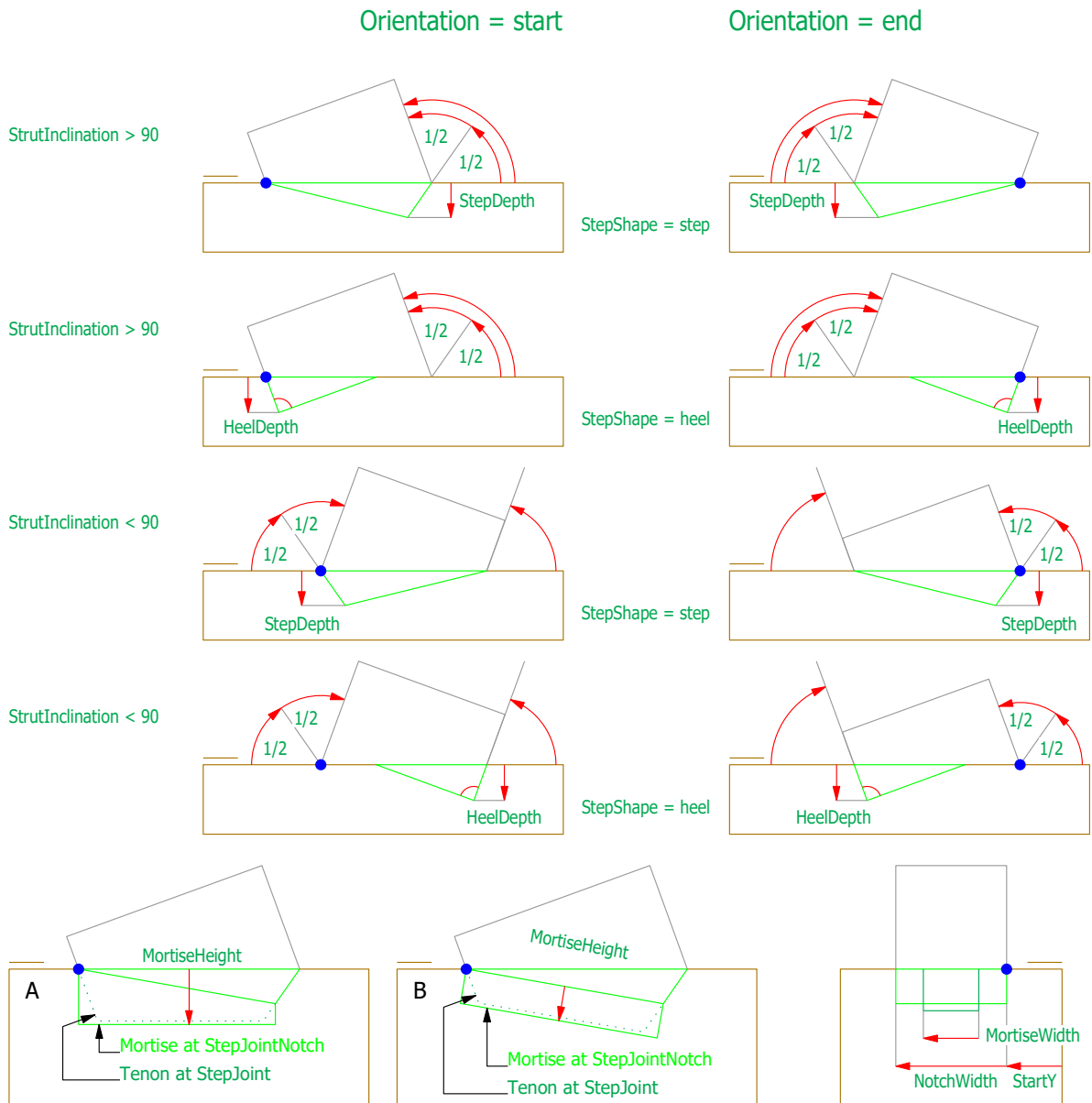


StepShape = taperedheel

StrutInclination



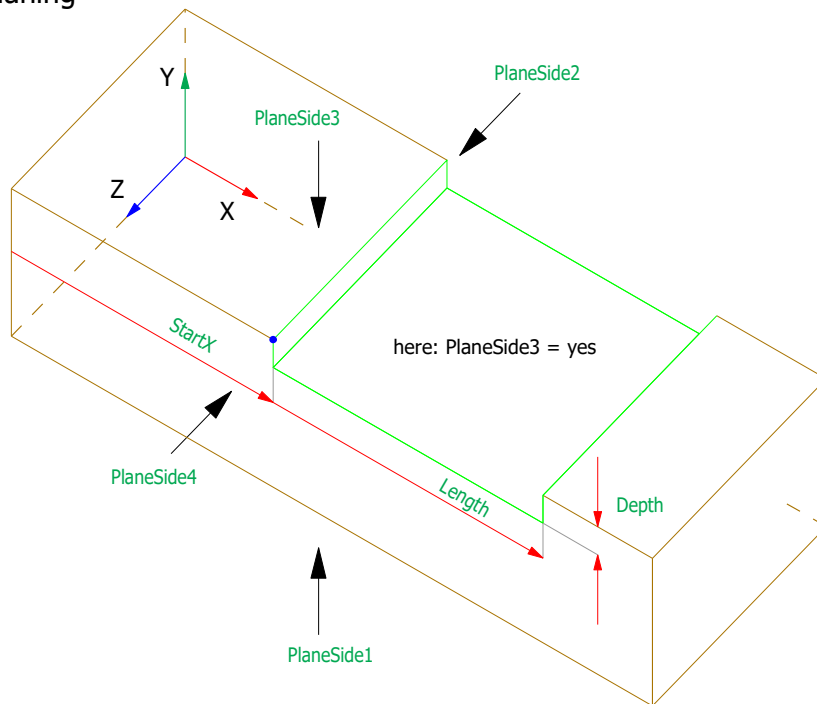
HeelDepth



Parameters StepJointNotch

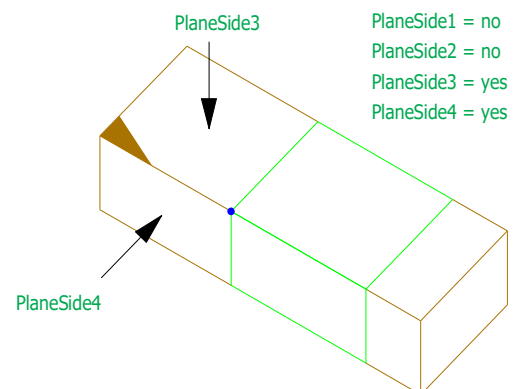
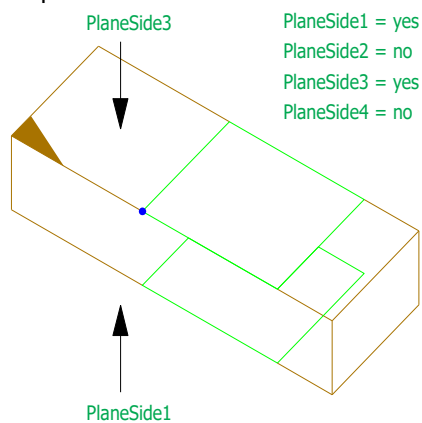
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	0.0	-50000.0	50000.0
StrutInclination	AngleType		0.1	179.9
NotchLimited	BooleanType	no	no	yes
NotchWidth	WidthType	20.0	0.0	50000.0
StepDepth	WidthType	20.0	0.0	50000.0
HeelDepth	WidthType	20.0	0.0	50000.0
StrutHeight	WidthType	20.0	0.0	50000.0
StepShape	StepShapeType	double		
Mortise	BooleanType	no	no	yes
MortiseWidth	LengthSType	40.0	0.0	1000.0
MortiseHeight	LengthSType	40.0	0.0	1000.0

Planing



StartLimited	EndLimited	
yes	yes	
no	yes	
yes	no	
no	no	

Examples

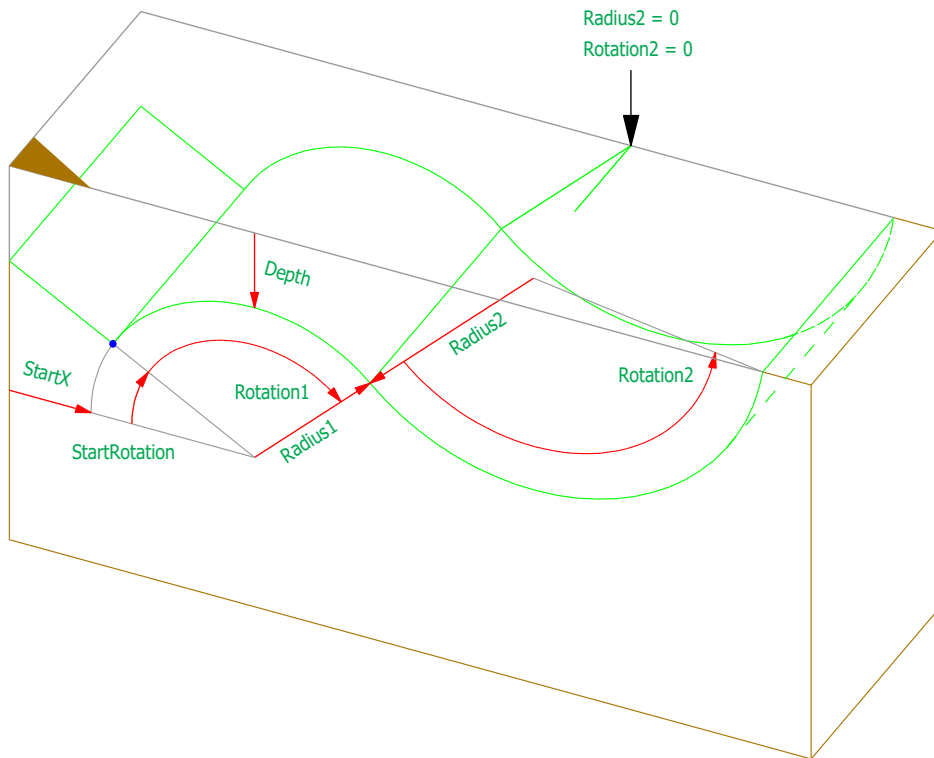


Parameters Planing

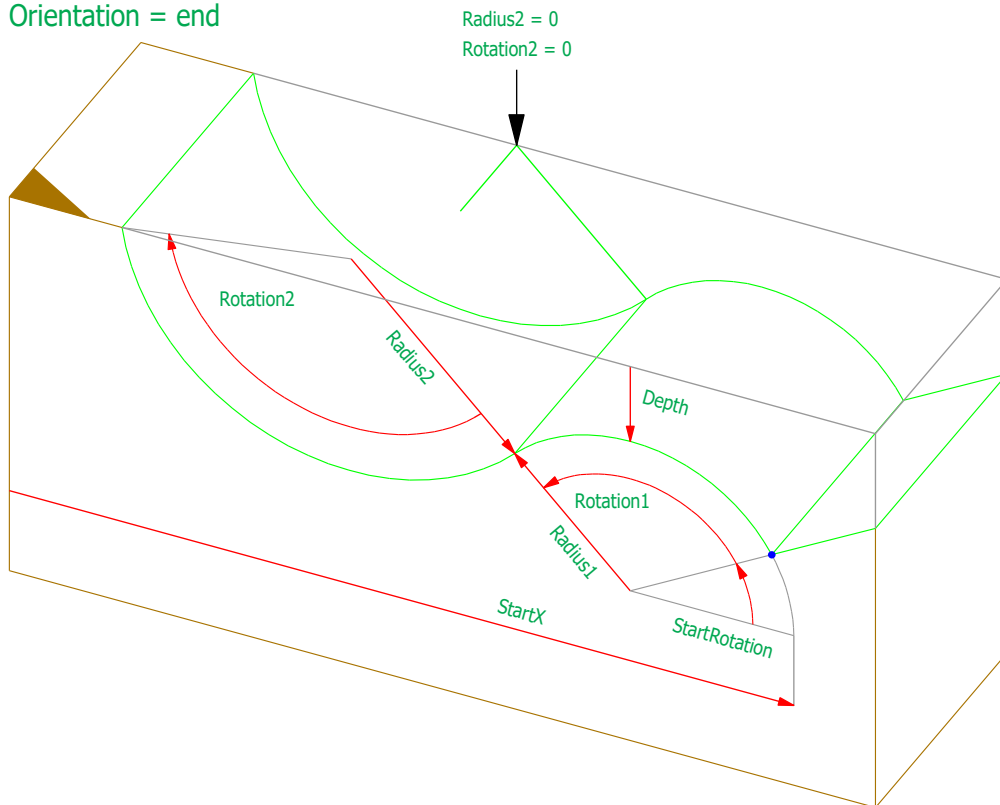
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
Length	LengthType	0.0	0.0	100000.0
Depth	double	1.0	0.0	50.0
StartLimited	BooleanType	no	no	yes
EndLimited	BooleanType	no	no	yes
PlaneSide1	BooleanType	yes	no	yes
PlaneSide2	BooleanType	yes	no	yes
PlaneSide3	BooleanType	yes	no	yes
PlaneSide4	BooleanType	yes	no	yes

ProfileFront

Orientation = start



Orientation = end

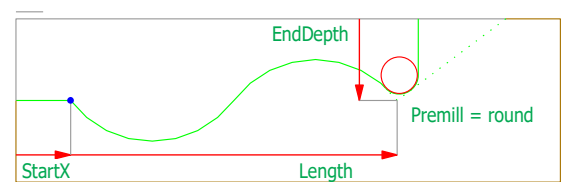
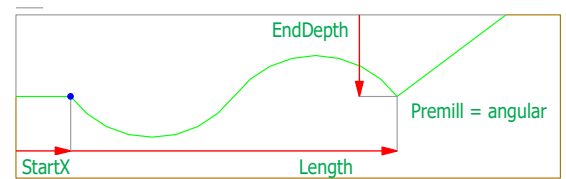
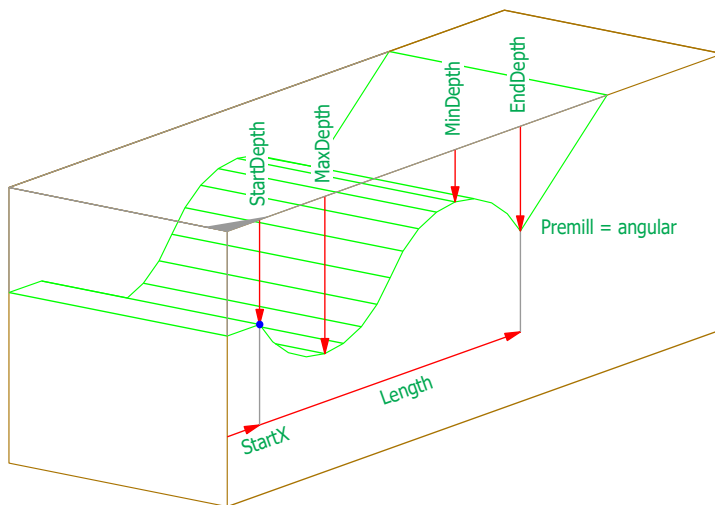


Parameters ProfileFront

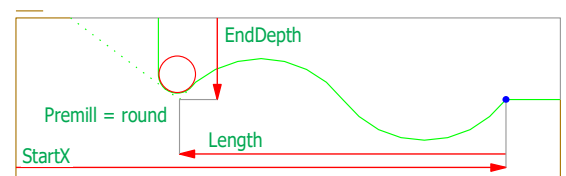
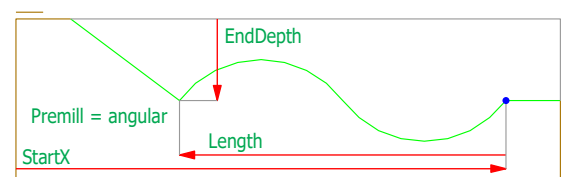
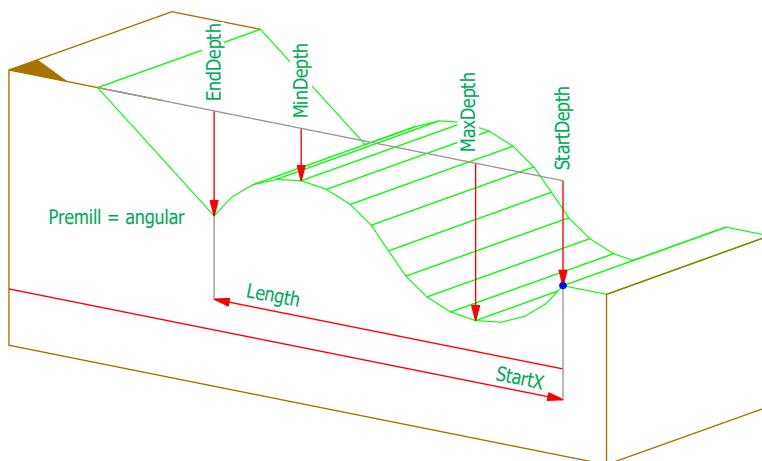
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
ArcShape	ArcShapeType	convex		
Depth	LengthSType	0.0	0.0	1000.0
StartRotation	Inclination2Type	0.0	-90.0	90.0
Rotation1	Angle2Type	90.0	0.0	180.0
Radius1	LengthSType	250.0	0.0	1000.0
Rotation2	Angle2Type	90.0	0.0	180.0
Radius2	LengthSType	250.0	0.0	1000.0

ProfileCambered

Orientation = start



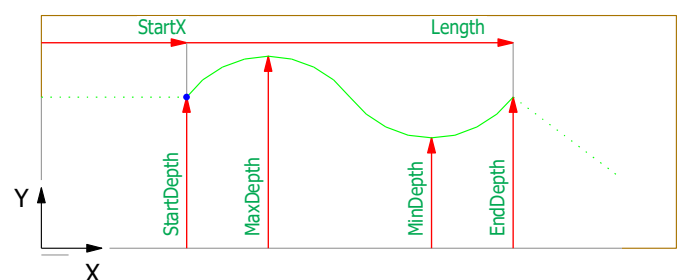
Orientation = end



The curve is defined by a cubic polynomial.

$$Y = Ax^3 + Bx^2 + Cx + D$$

The coefficients A, B, C and D must be calculated on the machine side.

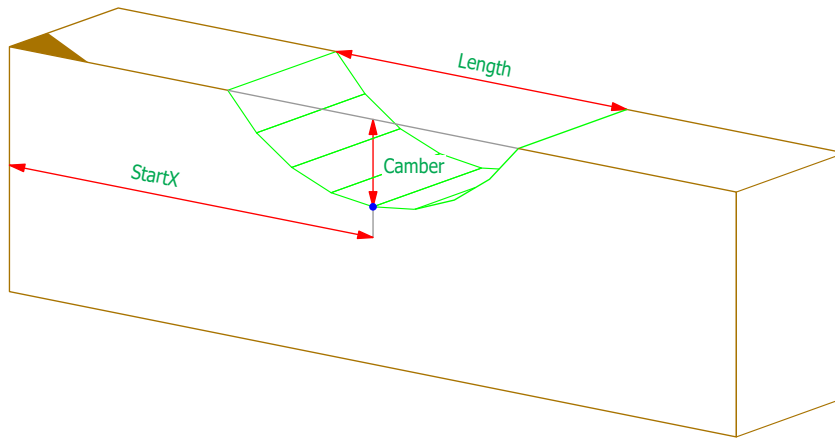


Parameters ProfileCambered

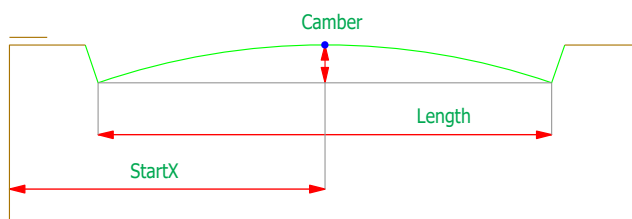
Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
Length	LengthType	0.0	0.0	100000.0
StartDepth	LengthSType	40.0	0.0	1000.0
MaxDepth	LengthSType	60.0	0.0	1000.0
MinDepth	LengthSType	10.0	0.0	1000.0
EndDepth	LengthSType	40.0	0.0	1000.0
Premill	PremillType	angular	round/angular	

RoundArch

ArcShape = concave



ArcShape = convex

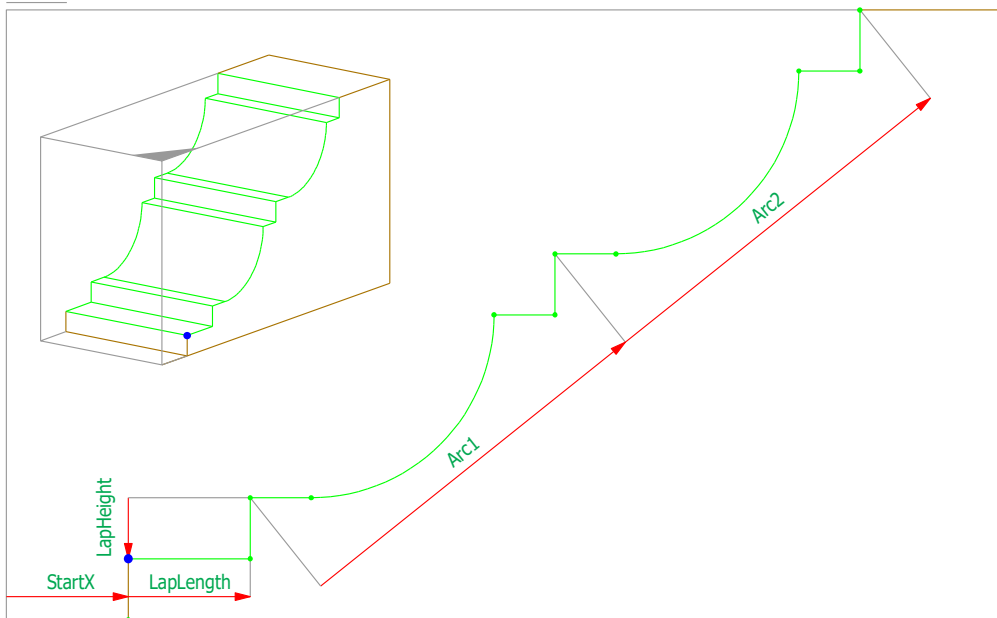


Parameters RoundArch

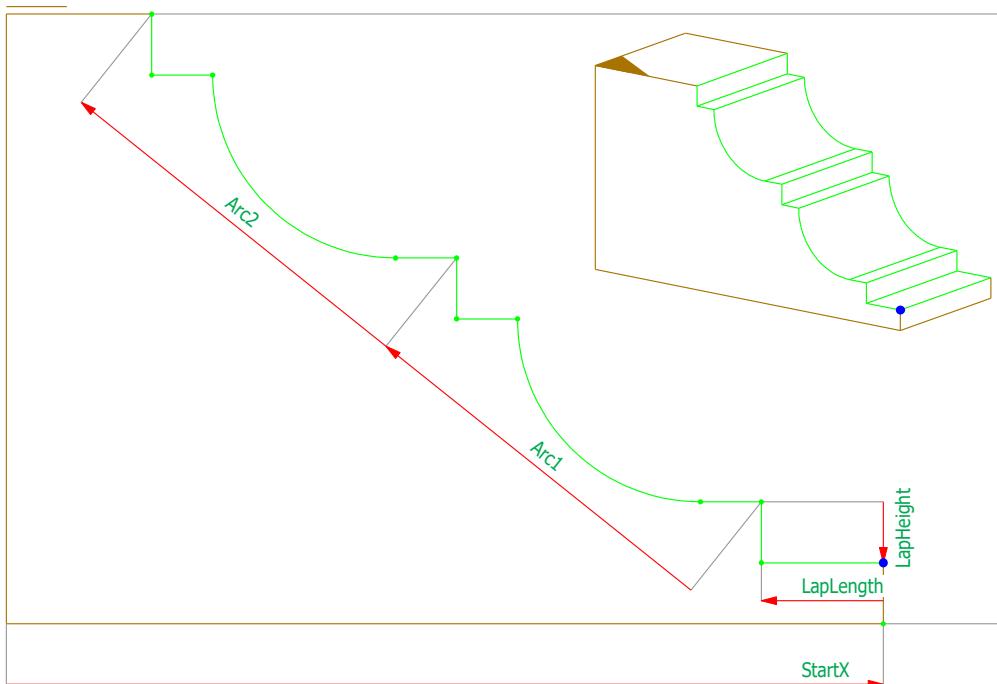
Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
Length	LengthType	500.0	0.0	100000.0
Camber	LengthSType	30.0	0.0	1000.0
ArcShape	ArcShapeType	concave		
Premill	PremillType	angular	round/angular	

ProfileHead

Orientation = start



Orientation = end



Parameters ProfileHead

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
Arc2	ProfileArcType			
LapLength	LengthSType	10.0	0.0	1000.0
LapHeight	LengthSType	10.0	0.0	1000.0

ProfileArcType

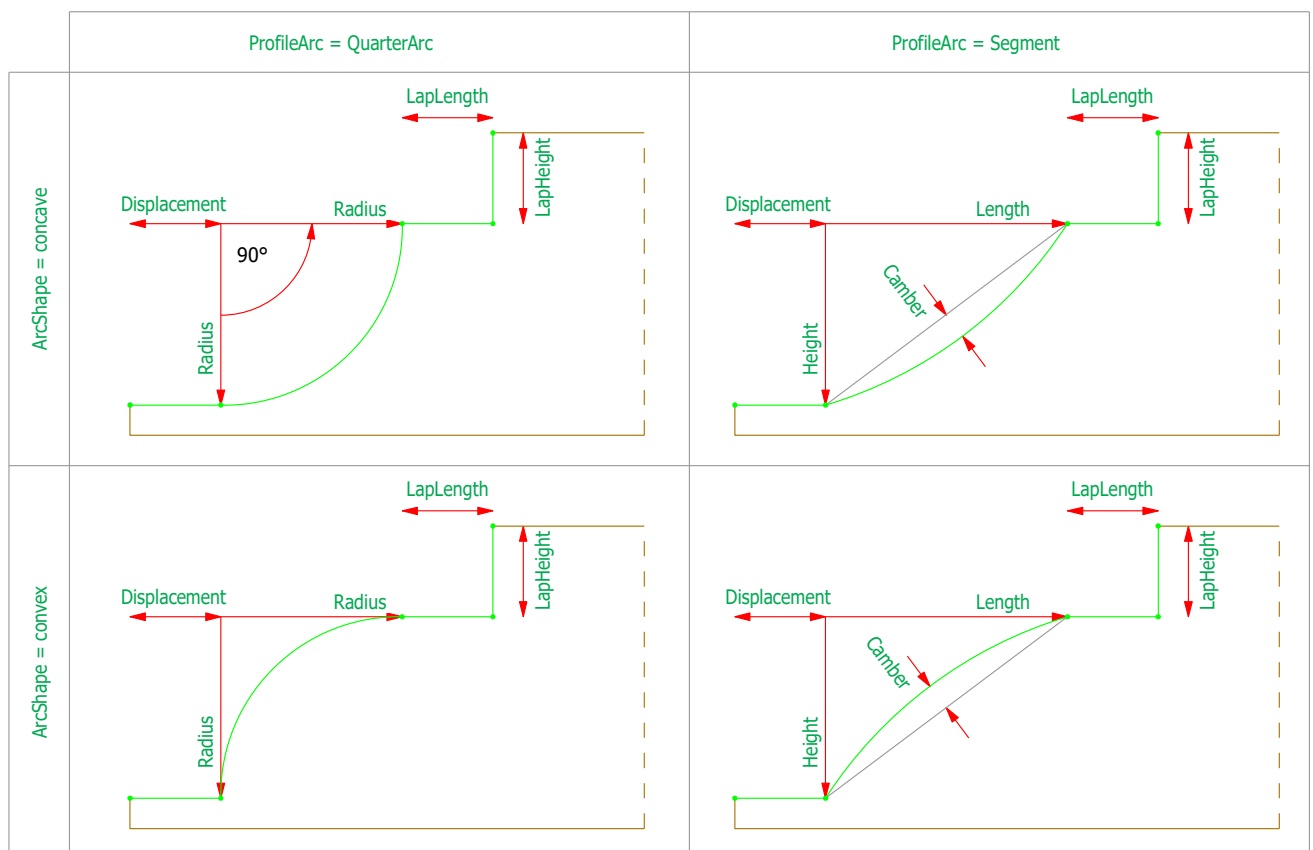
ArcShape	ArcShapeType	QuarterArc	QuarterArc/Segment	
LapLength	LengthSType	10.0	0.0	1000.0
LapHeight	LengthSType	10.0	0.0	1000.0
Displacement	LengthSType	10.0	0.0	1000.0

QuarterArc

Radius	LengthSType	50.0	0.0	1000.0
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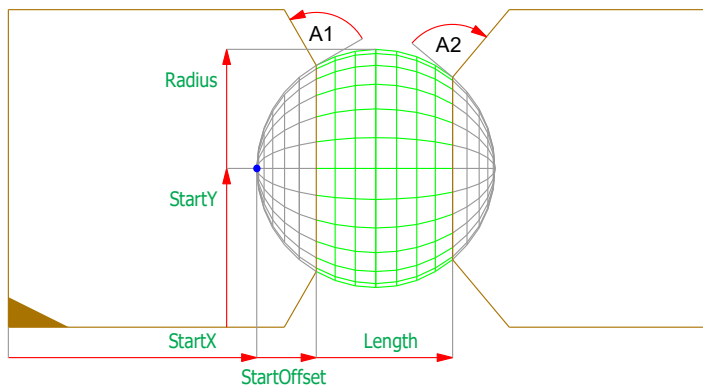
Segment

Length	LengthSType	50.0	0.0	1000.0
Height	LengthSType	50.0	0.0	1000.0
Camber	LengthSType	50.0	0.0	1000.0

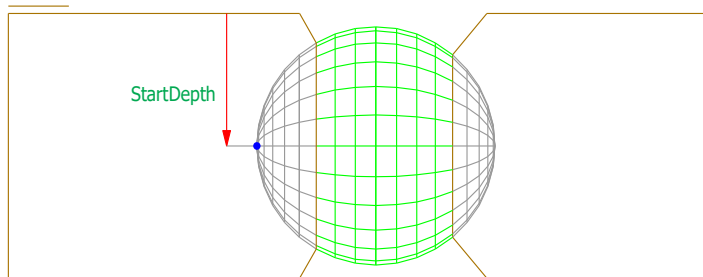


Sphere

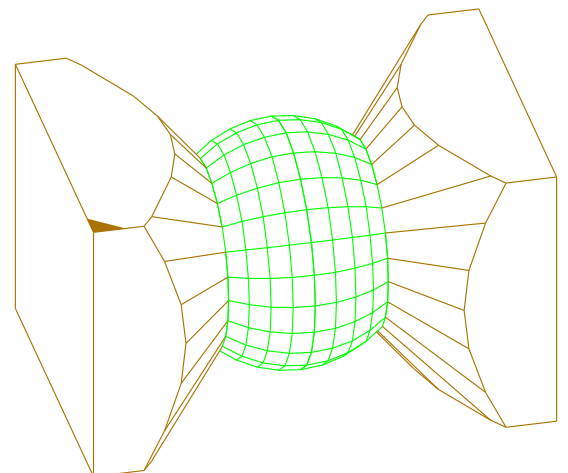
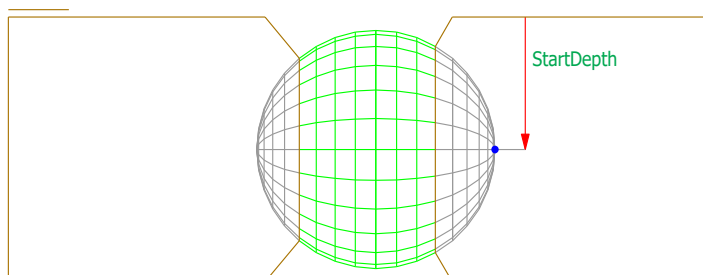
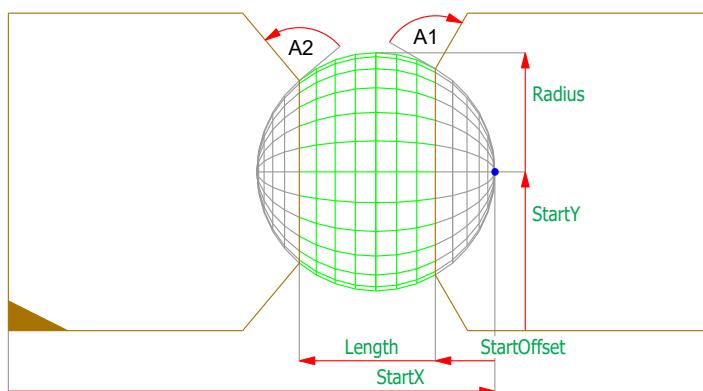
Orientation = start



A1 and A2 are defined on the machine side. They depend on the capabilities of the machine. In this pictures A1 and A2 are 90°.



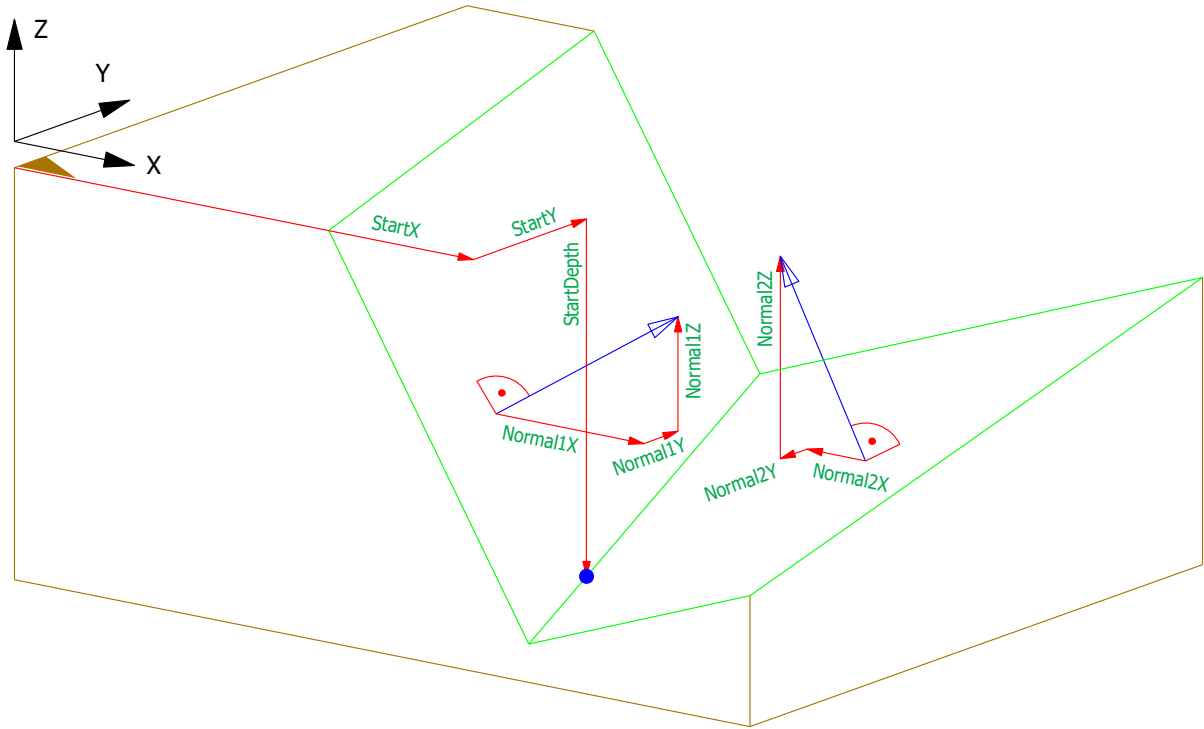
Orientation = end



Parameters Sphere

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	60.0	-50000.0	50000.0
StartDepth	WidthNType	60.0	-50000.0	50000.0
Length	WidthType	50.0	0.0	50000.0
Radius	WidthType	50.0	0.0	50000.0
StartOffset	WidthType	0.0	0.0	50000.0

TriangleCut



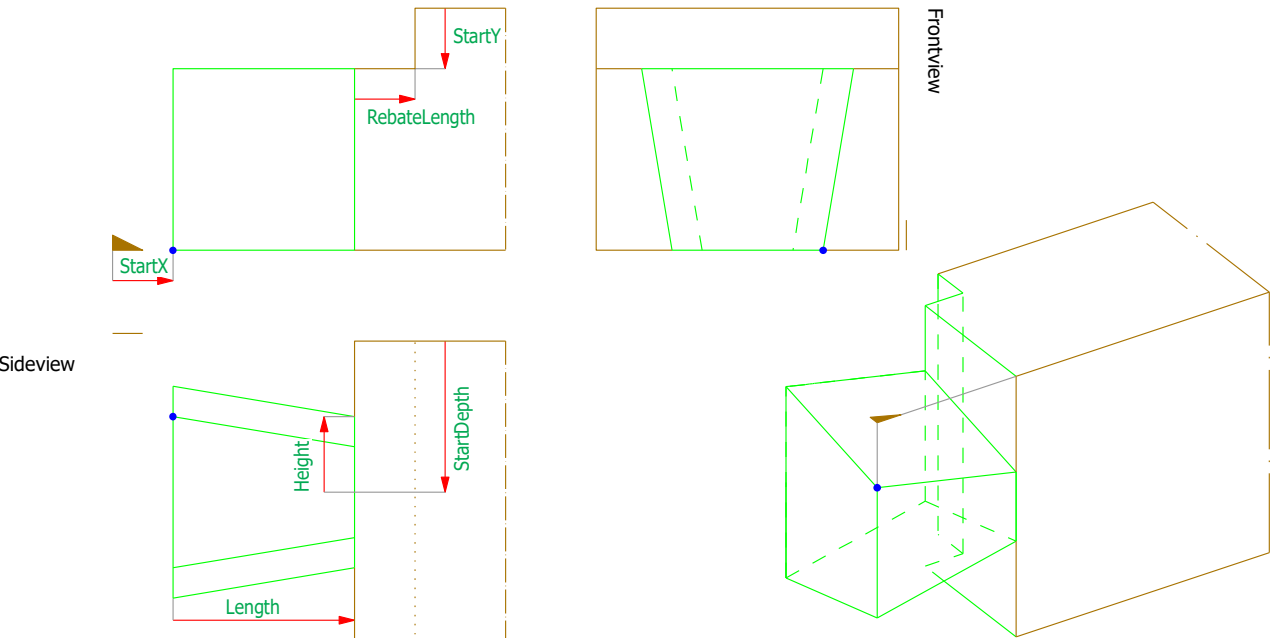
Parameters TriangleCut

Name	Type	Default	Min	Max
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthNType	60.0	-50000.0	50000.0
StartDepth	WidthNType	60.0	-50000.0	50000.0
Normal1X	WidthNType	1.0	-50000.0	50000.0
Normal1Y	WidthNType	0.0	-50000.0	50000.0
Normal1Z	WidthNType	0.0	-50000.0	50000.0
Normal2X	WidthNType	1.0	-50000.0	50000.0
Normal2Y	WidthNType	0.0	-50000.0	50000.0
Normal2Z	WidthNType	0.0	-50000.0	50000.0

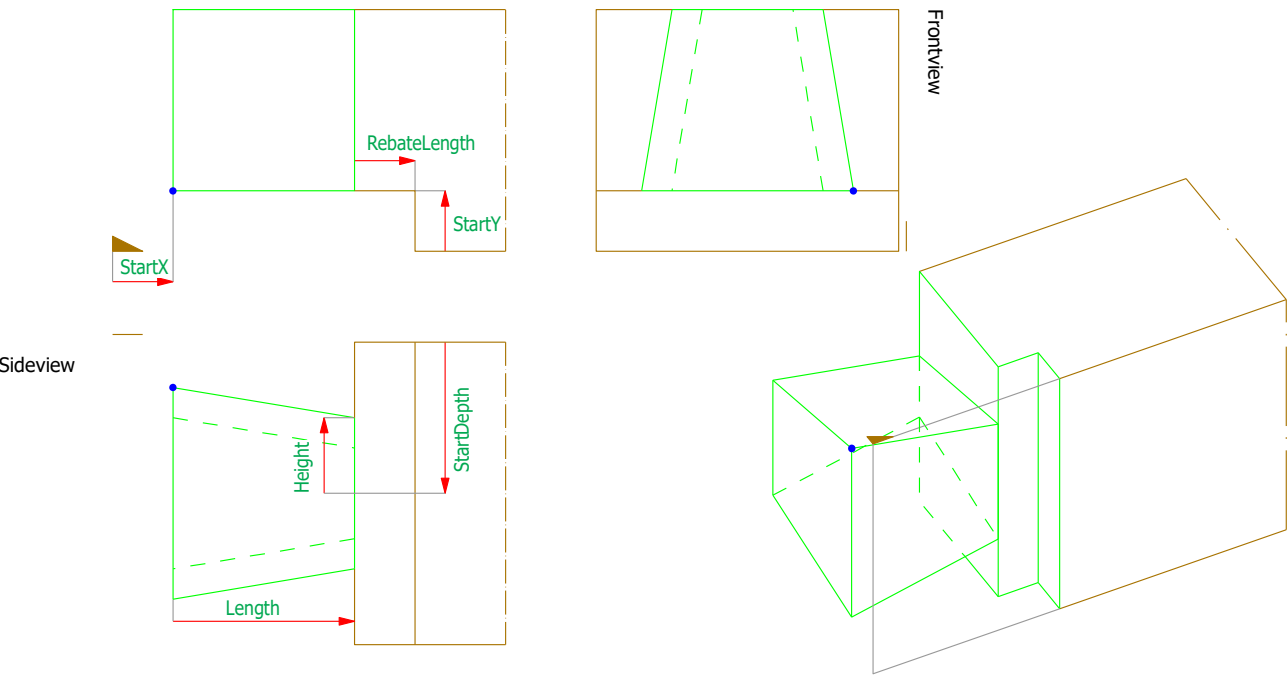
TyroleanDovetail

Orientation = start

LapPosition = refedge

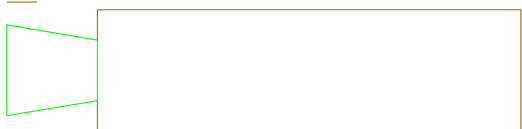


LapPosition = oppedge

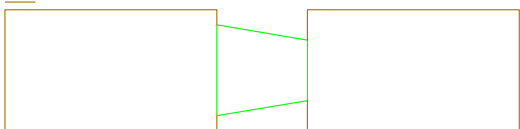


CutOff = yes

This processing trims the part,
even it is on a ReferencePlane



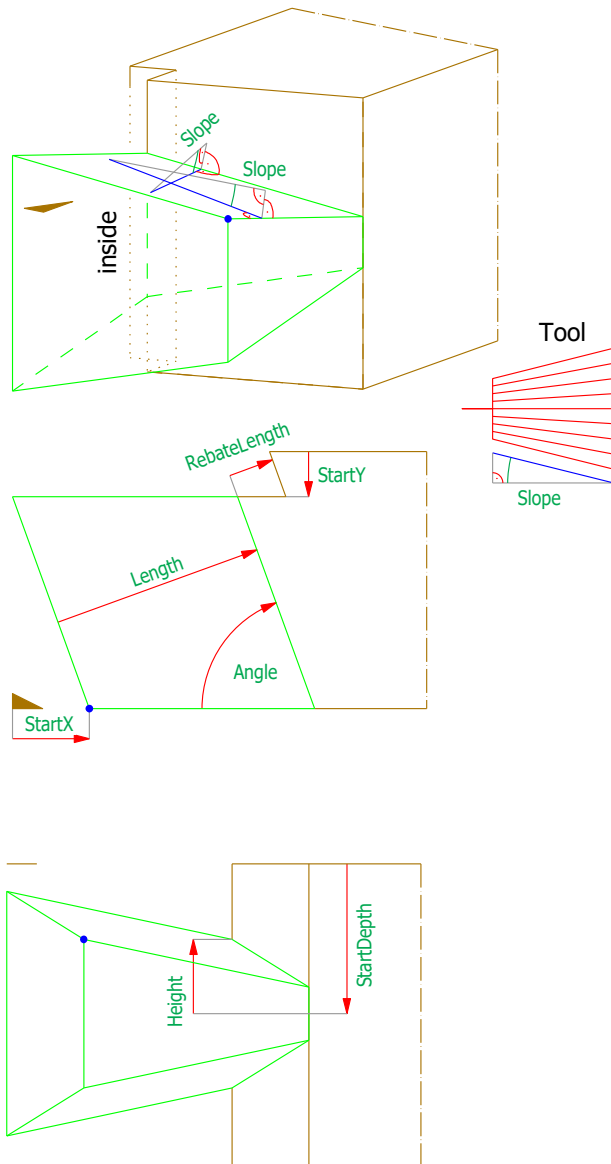
CutOff = no



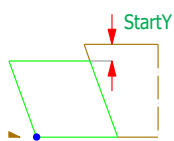
TyroleanDovetail

Orientation = start

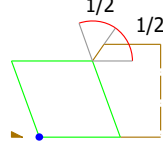
LapPosition = refedge



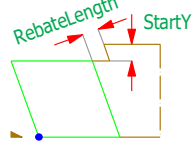
LapExit = none



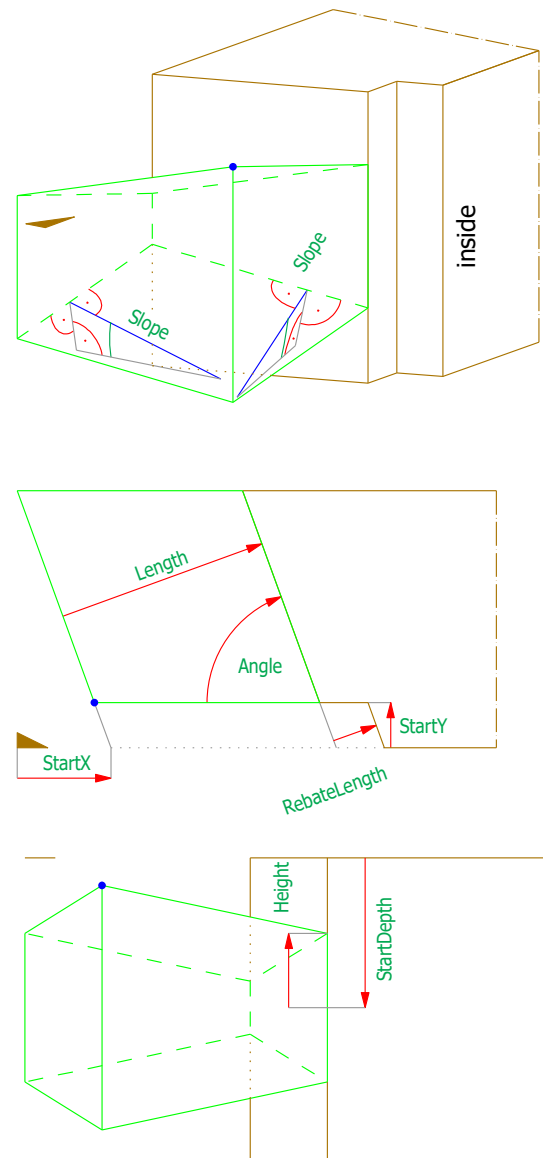
LapExit = mitre



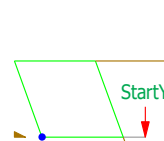
LapExit = rebate



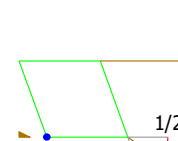
LapPosition = oppedge



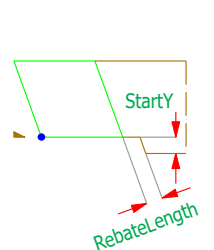
LapExit = none



LapExit = mitre



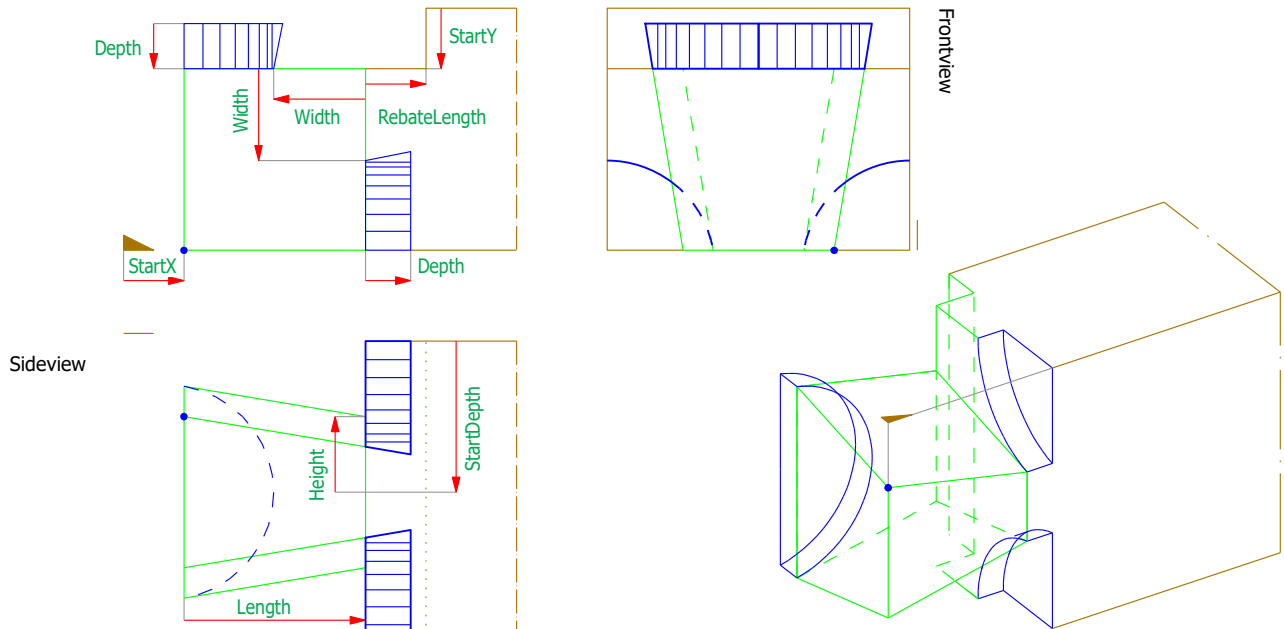
LapExit = rebate



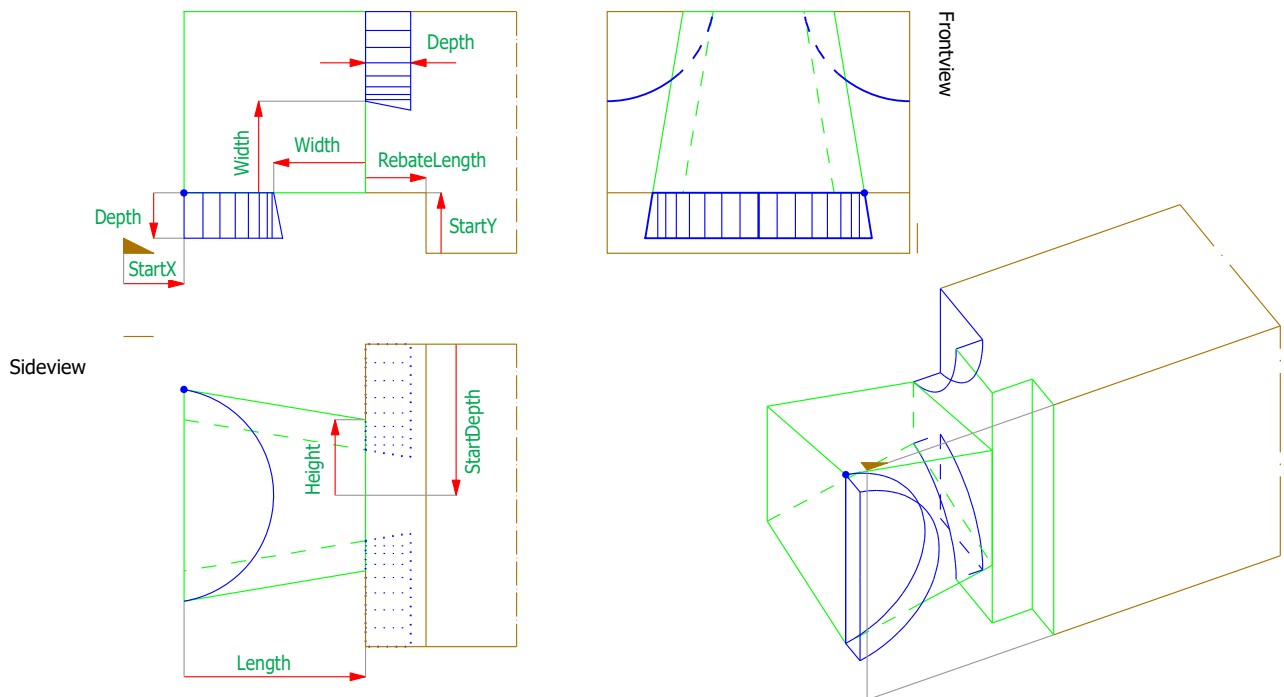
TyroleanDovetail

Orientation = start

LapPosition = refedge



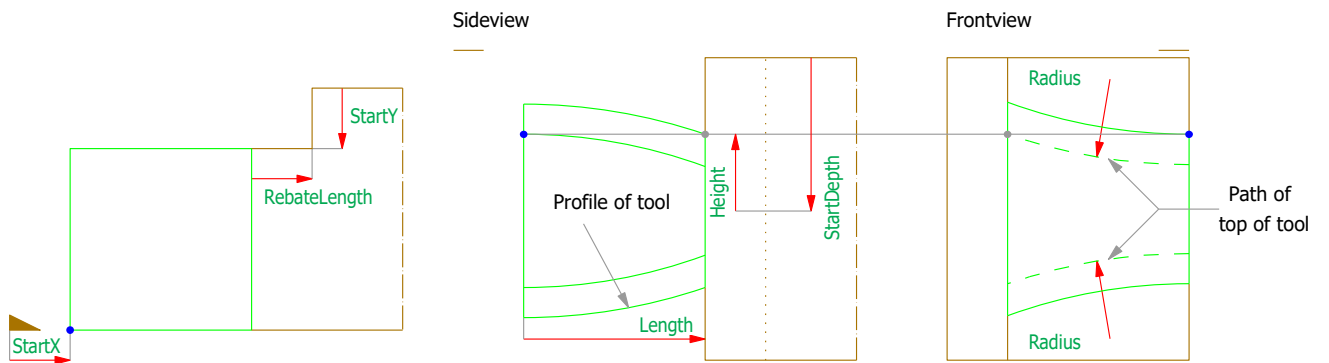
LapPosition = oppedge



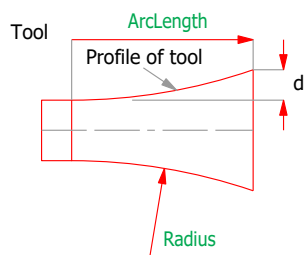
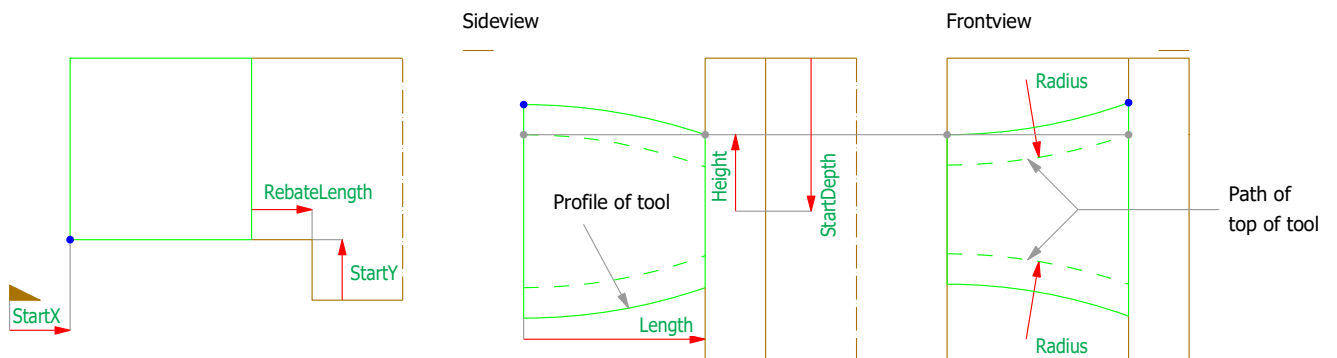
TyroleanDovetail

Orientation = start

LapPosition = refedge



LapPosition = oppedge



This processing trims the part, even it is on a ReferencePlane
Examples:

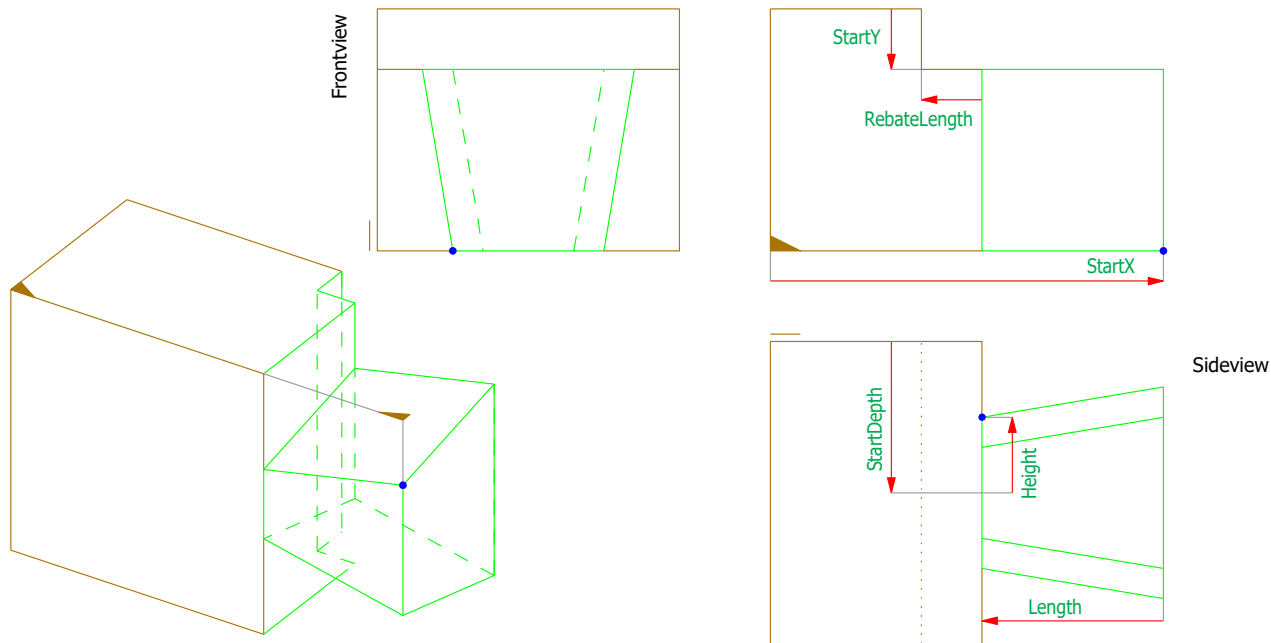


TyroleanDovetail

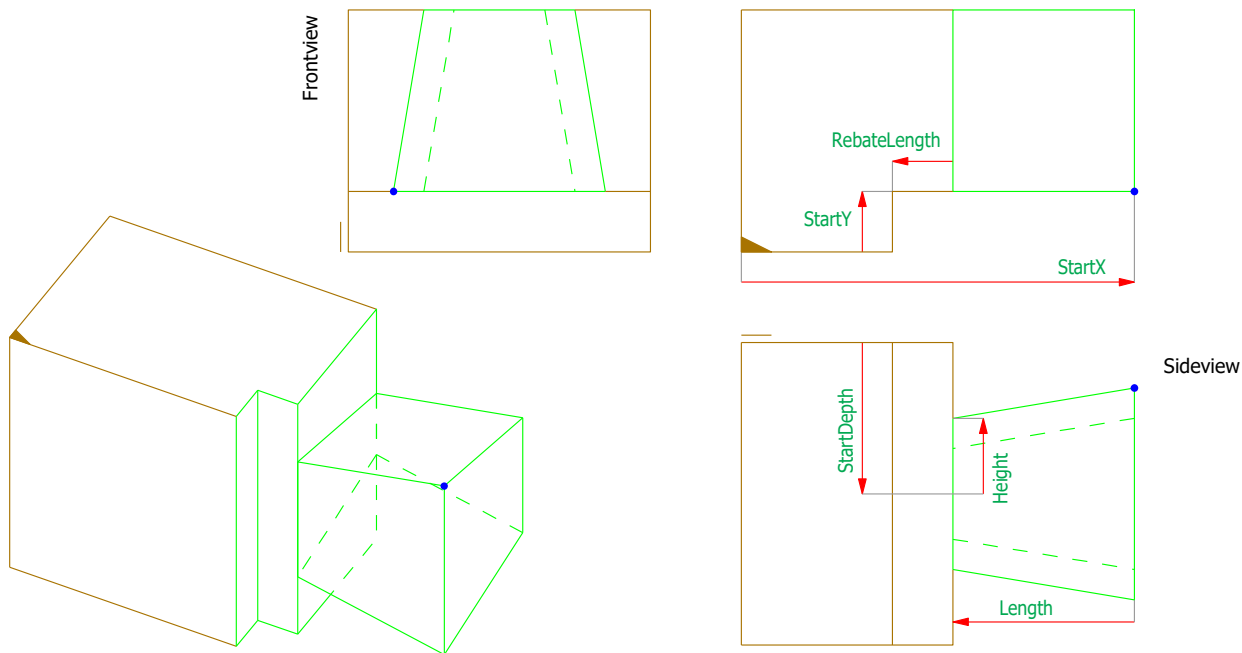
Orientation = end

CutOff = yes

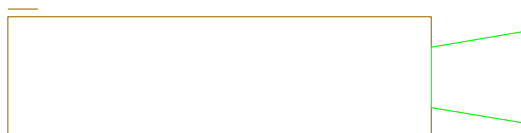
LapPosition = refedge



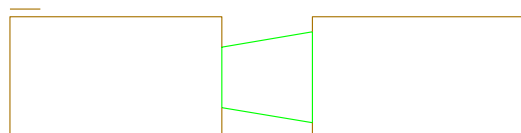
LapPosition = oppedge



CutOff = yes



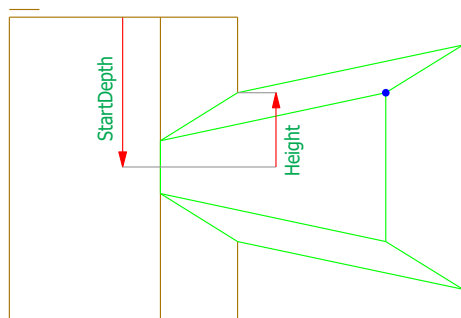
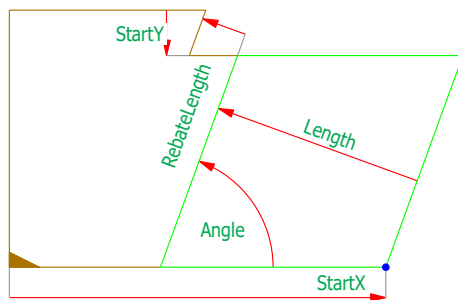
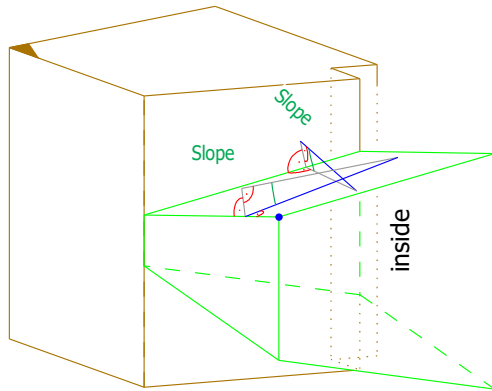
CutOff = no



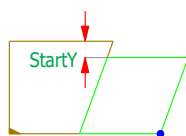
TyroleanDovetail

Orientation = end

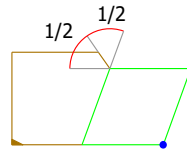
LapPosition = refedge



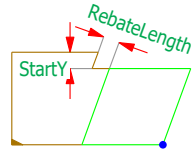
LapExit = none



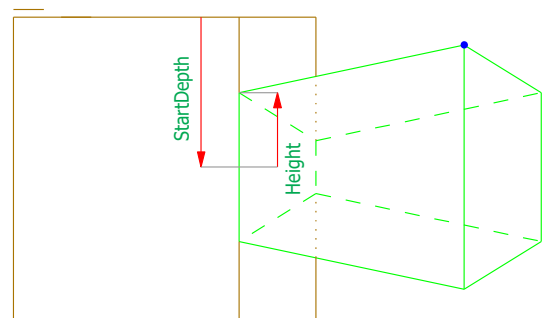
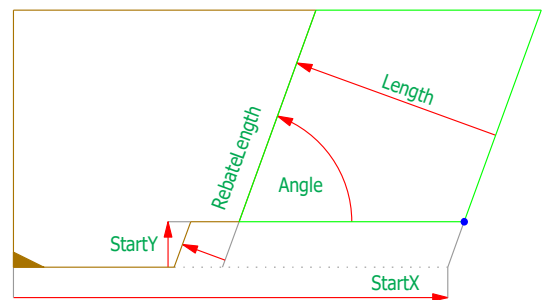
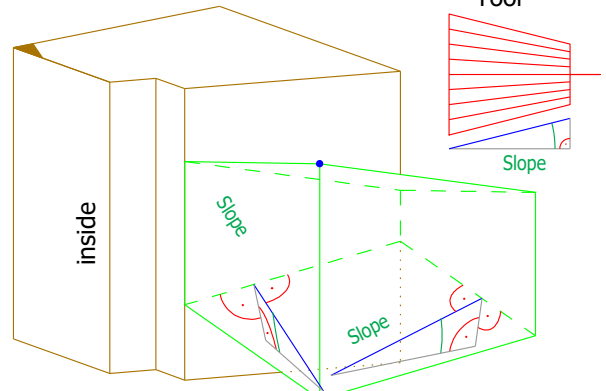
LapExit = mitre



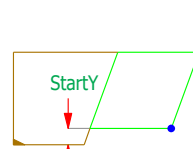
LapExit = rebate



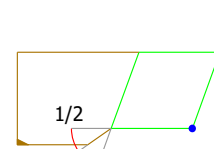
LapPosition = oppedge



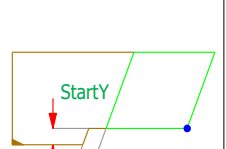
LapExit = none



LapExit = mitre



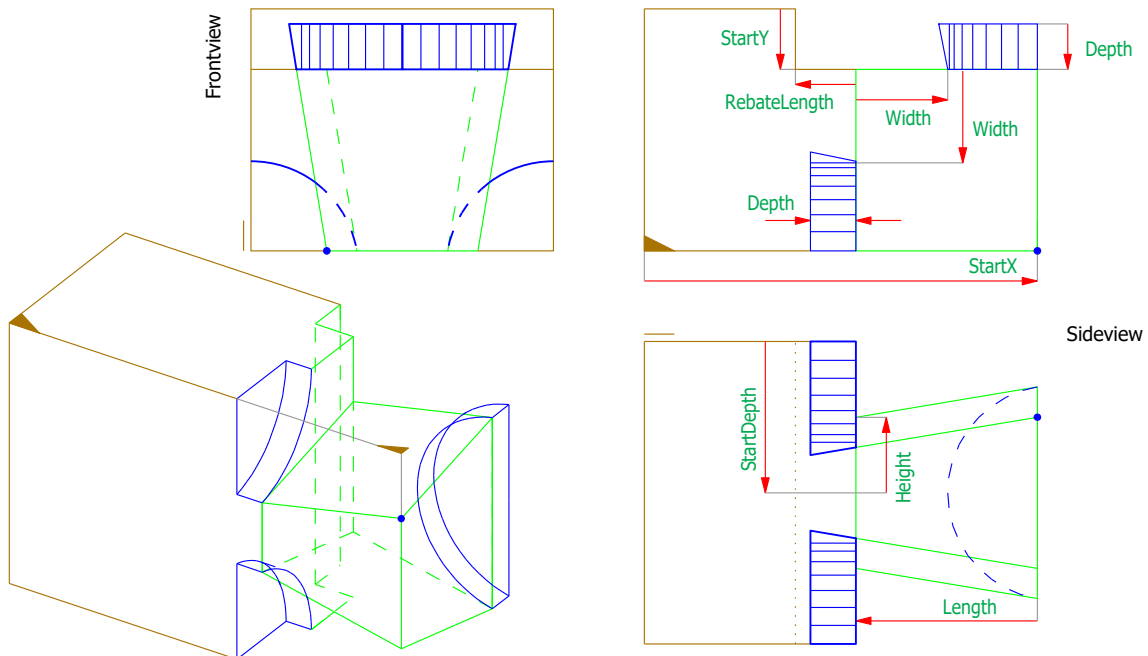
LapExit = rebate



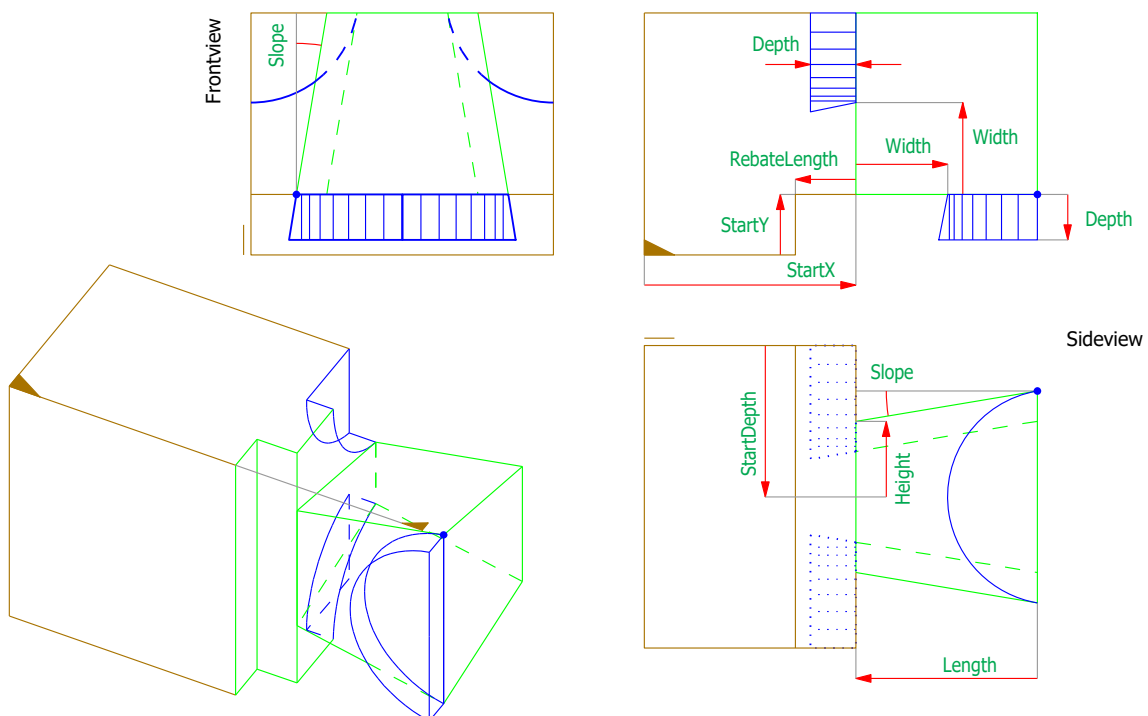
TyroleanDovetail

Orientation = end

LapPosition = refedge



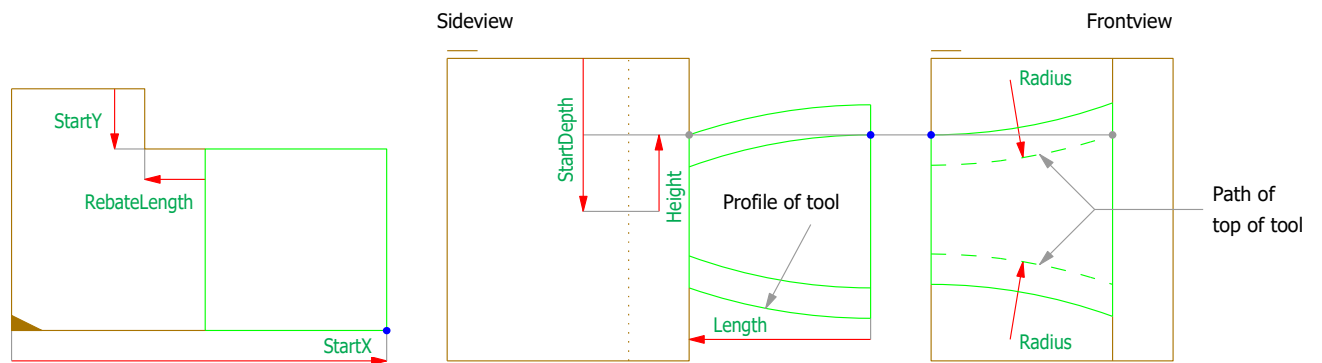
LapPosition = oppedge



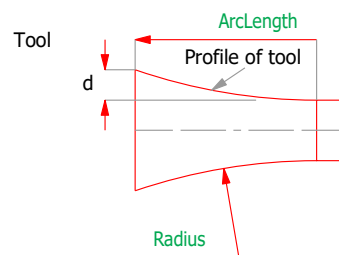
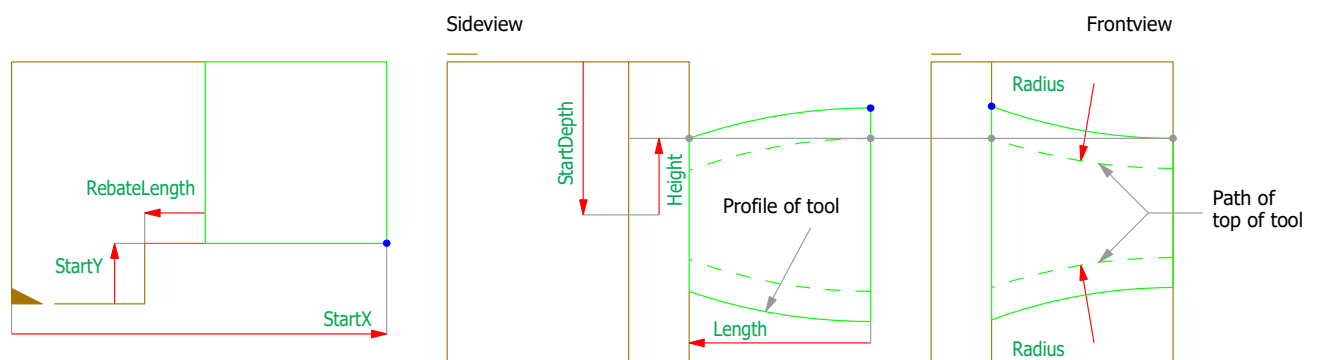
TyroleanDovetail

Orientation = end

LapPosition = refedge



LapPosition = oppedge



Parameters Tyroleandovetail

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
CutOff	BooleanType	no	no	yes
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthType	30.0	0.0	50000.0
StartDepth	WidthNType	50.0	-50000.0	50000.0
Angle	AngleType		0.1	179.9
Slope	double		0.0	45.0
Length	WidthType	150.0	0.0	50000.0
RebateLength	WidthType	10.0	0.0	50000.0
Height	WidthType	60	0.0	50000.0
LapPosition	EdgePositionType	refedge	refedge/oppedge	
LapExit	LapExitType	mitre	none/mitre/rebate	
Shape	TyroleandovetailShapeType	angular	angular/straight	
ProcessSide	ProcessSideType	both	both/refside/oppside	

Frosch

Name	Type	Default	Min	Max
Width	WidthType			
Depth	WidthType			

Klingschrot

Name	Type	Default	Min	Max
Radius	WidthType			
ArcLength	WidthType			

Dovetail

Orientation = start

	LapPosition = refedge	LapPosition = oppedge
Shape = european		
Shape = american		
LapExit	LapExit = none LapExit = mitre LapExit = rebate 	LapExit = none LapExit = mitre LapExit = rebate

Dovetail

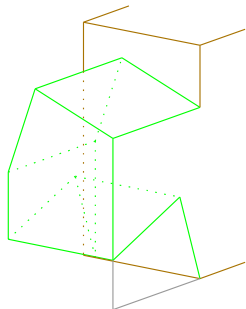
Orientation = end

	LapPosition = refedge	LapPosition = oppedge
Shape = european		
Shape = american		
LapExit	LapExit = none LapExit = mitre LapExit = rebate	LapExit = none LapExit = mitre LapExit = rebate

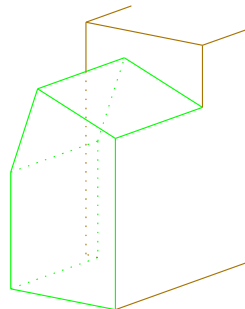
Dovetail

Name	Type	Default	Min	Max
Orientation	OrientationType		start	end
CutOff	BooleanType	no	no	yes
StartX	LengthPosType	0.0	-100000.0	100000.0
StartY	WidthType	30.0	0.0	50000.0
StartDepth	WidthNType	50.0	-50000.0	50000.0
Slope	double		0.0	45.0
Length	WidthType	150.0	0.0	50000.0
RebateLength	WidthType	10.0	0.0	50000.0
HeightRefSide	WidthType	60	0.0	50000.0
HeightOppSide	WidthType	30.0	0.0	50000.0
LapPosition	EdgePositionType	refedge	refedge/oppedge	
LapExit	LapExitType	mitre	none/mitre/rebate	
Shape	DovetailShapeType	european	european/american	
ProcessSide	ProcessSideType	both	both/refside/oppside	

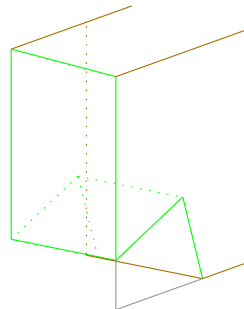
ProcessSide = both



ProcessSide = refside



ProcessSide = oppside



This processing trims the part, even it is on a ReferencePlane

Examples:

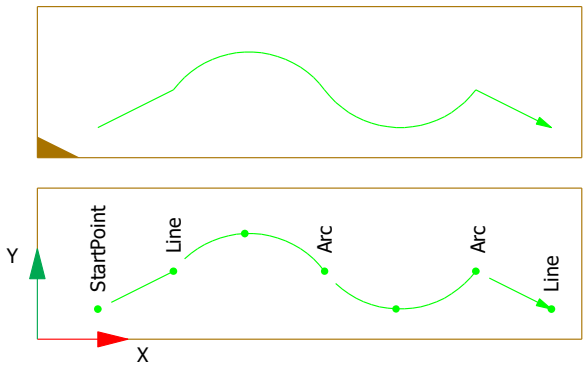


Contour, some definitions

The descriptions on the following sides show some special definitions and additional parameters, which appear around the topic contour, outline, aperture, etc.

Contour

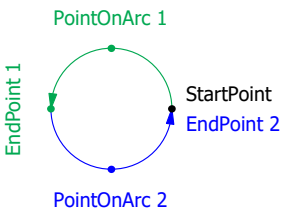
The elements of a SimpleContour are a Startpoint and a list of Lines and Arcs.



Name	Type
StartPoint	PointType
Line	LineType
Arc	Arctype

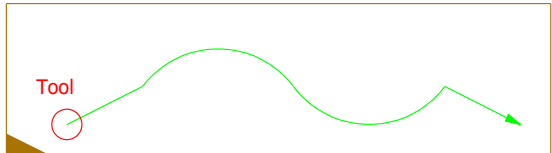
Circle

A circle must be defined with 2 arcs a 180 degrees.

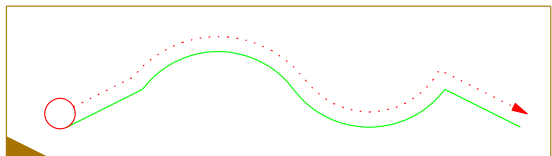


Parameter: ToolPosition

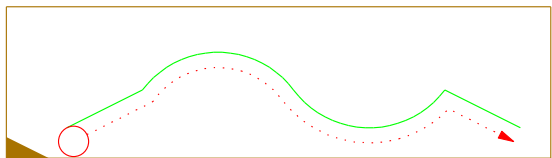
Toolposition = center



Toolposition = left

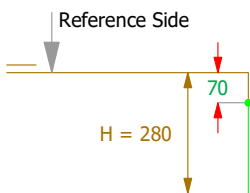


Toolposition = right



Depth and DepthBounded

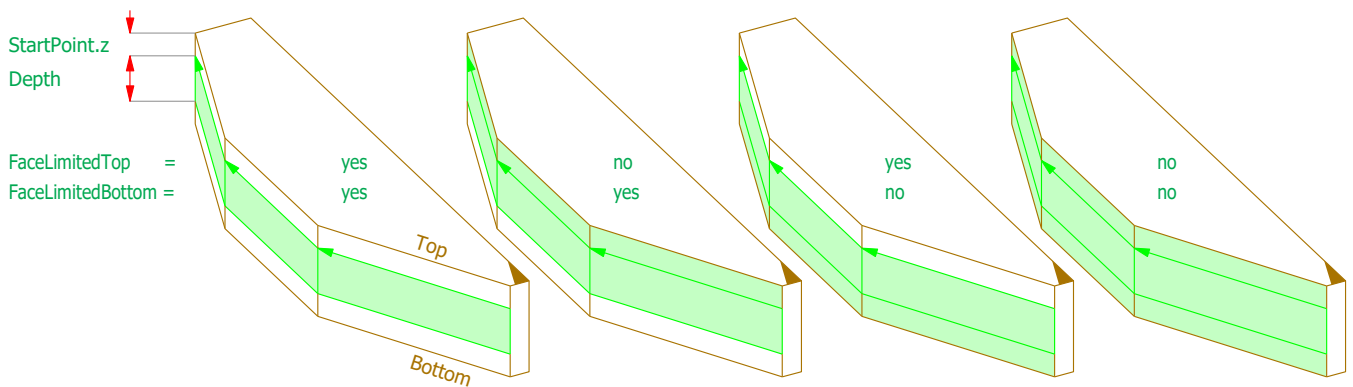
Example: $H = 280$
 $StartPoint.z = 70$



Effective Depth

		Depth in BTLx File		
		Depth = 0 or not set	Depth = 210	Depth = 140
DepthBounded in BTLx File	DepthBounded = NO or not set			
	DepthBounded = YES			

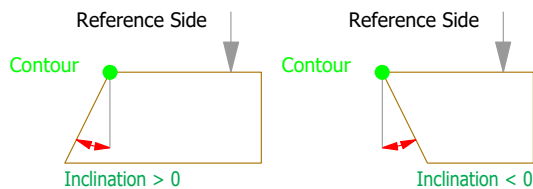
Face limited top or Bottom



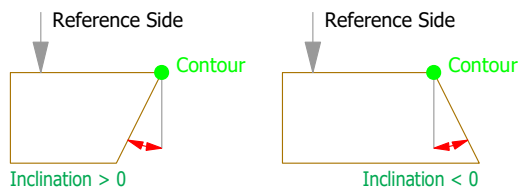
Inclination

In this view the contour is oriented away from the observer.

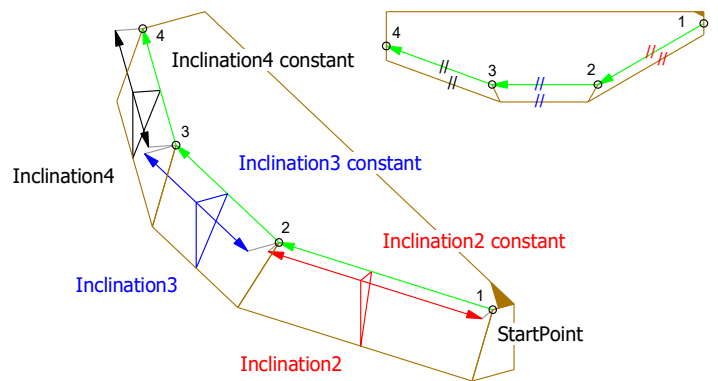
Toolposition = left or center



Toolposition = right



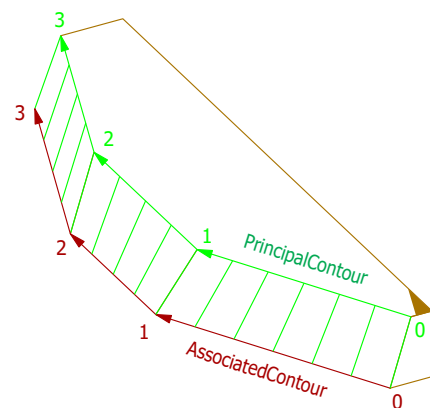
The inclination is constant over the length of the segment and is always measured from the tangent of the contour at the actual point.



DualContour

Name	Type
PrincipalContour	SimpleContourType
AssociatedContour	SimpleContourType

The PrincipalContour and the AssociatedContour must have the same number of points. The lines between the points on the PrincipalContour and the associated points on the AssociatedContour should not cross each other.

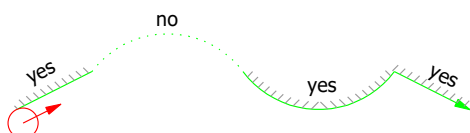


FaceLimited

Attribute in SawContourAttributes

Example:

One segment has attribute FaceLimited=no.

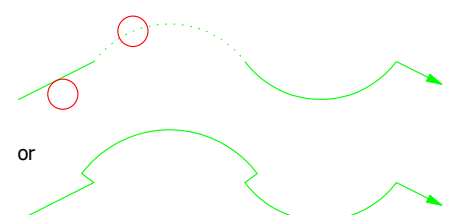


FaceLimited = no = Edge is destructible

Attribute FaceLimited is available for:

- FreeContourType
- SawContourType
- MillContourType

Two of possible procedures on machine side



NURBS / NURBSCurveType

A NURBSCurve, also called as spline, is defined with:

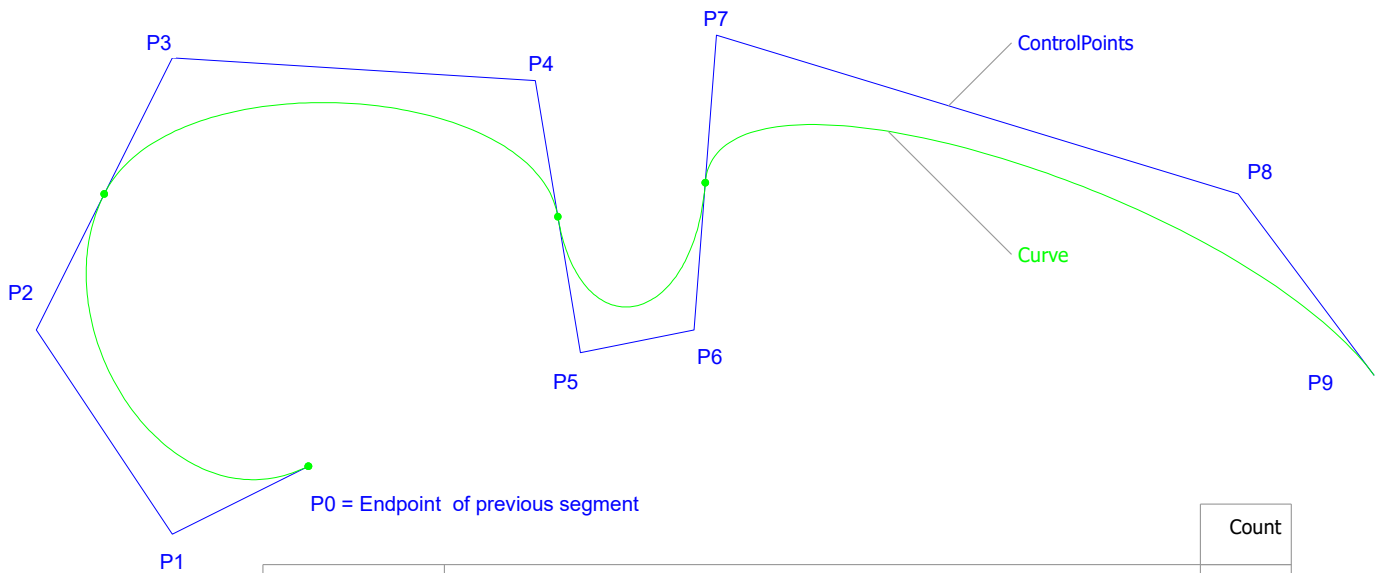
ControlPoints

Knots

Degree

ControlPoints	List of points Attributes of one point	Coordinates		
			X	Double
			Y	Double
		Weight	Z	Double
			W	Double
Knots	List of values			Double
Degree	Degree of curve			Integer

Example



P0 = Endpoint of previous segment													Count
ControlPoints	P0	P1	P2	P3	P4	P5	P6	P7	P8	P9			10
Knots	0.0	0.0	0.0	1.0	1.0	2.0	2.0	3.0	3.0	4.0	4.0	4.0	12
Degree	3												

FreeSurface

A NURBSPatch is defined with:

ControlPoints

KnotsU

KnotsV

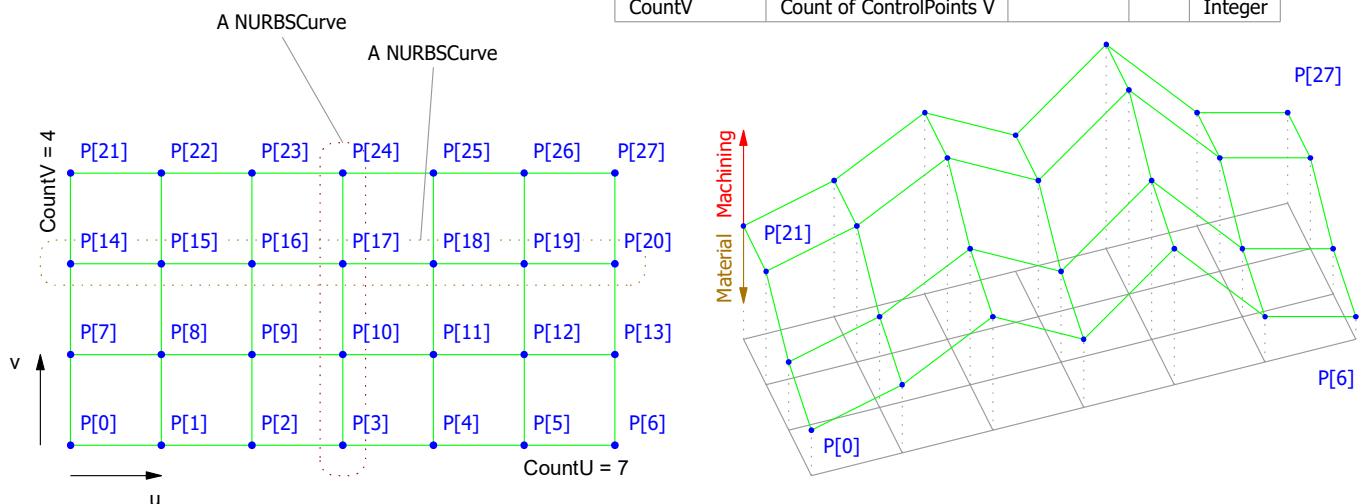
DegreeU

DegreeV

CountU

CountV

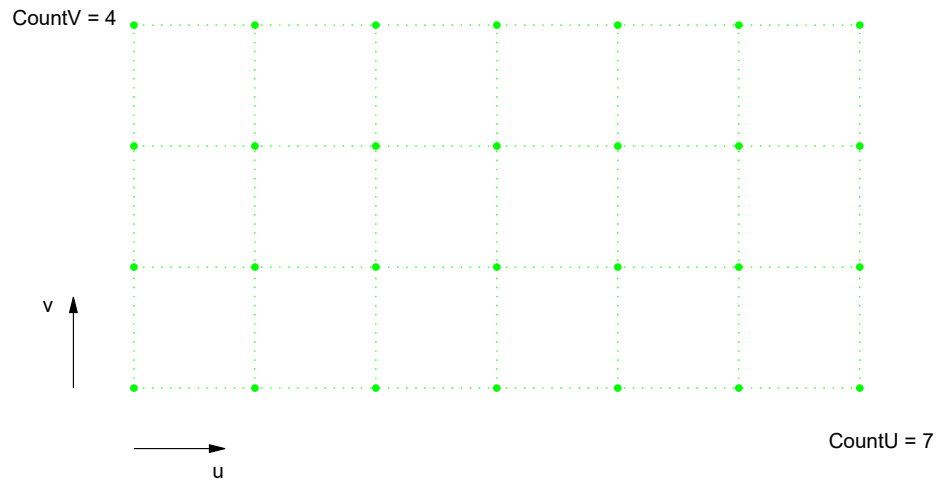
ControlPoints	List of points U and V Attributes of one points	Coordinates		
			X	Double
			Y	Double
		Weight	Z	Double
			W	Double
KnotsU	List of values			Double
KnotsV	List of values			Integer
DegreeU	Degree of curve U			Integer
DegreeV	Degree of curve V			Integer
CountU	Count of ControlPoints U			Integer
CountV	Count of ControlPoints V			Integer



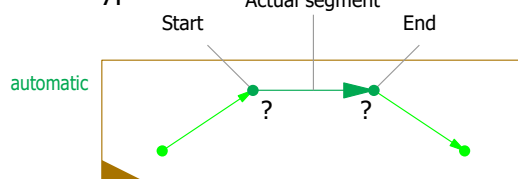
FreeSurface

A NURBSPatch is defined with:

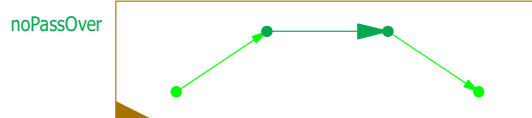
ControlPoints
KnotsU
KnotsV
DegreeU
DegreeV
CountU
CountV



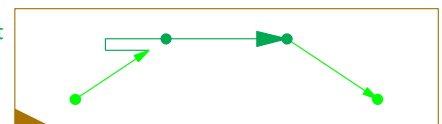
ContourRecessType



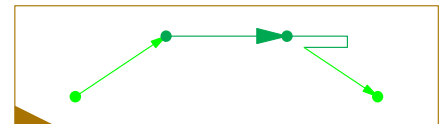
The processing at the vertices
has to be specified by the machine



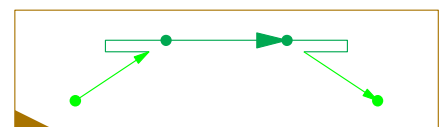
passOverStart



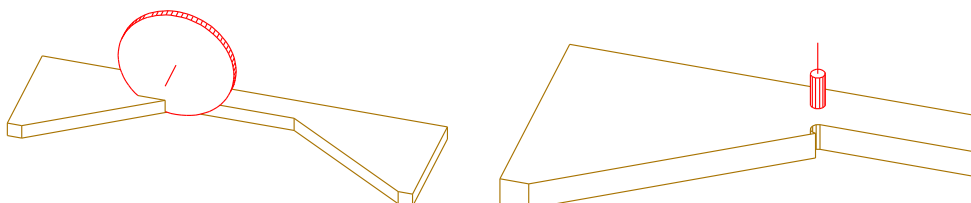
passOverEnd



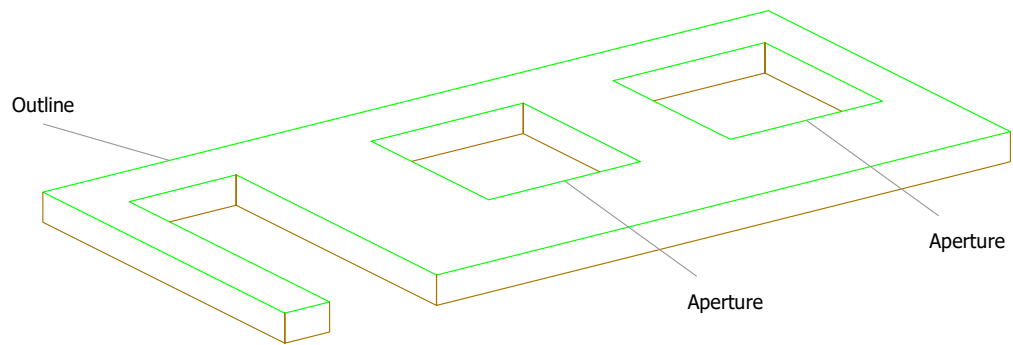
passOverAll



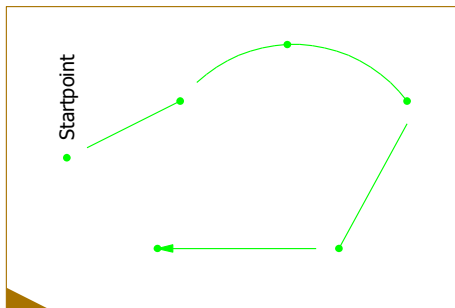
The machineside decides, how the RECESS is worked out. Examples:



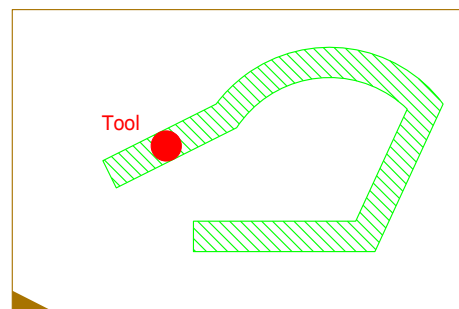
Aperture



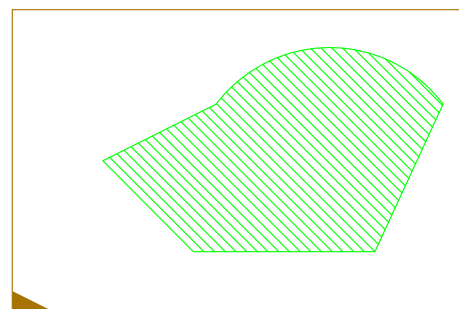
CounterSink



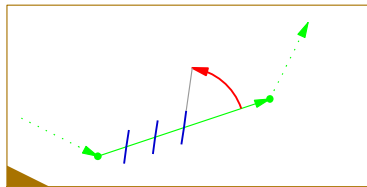
CounterSink = no



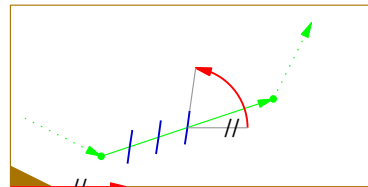
CounterSink = yes



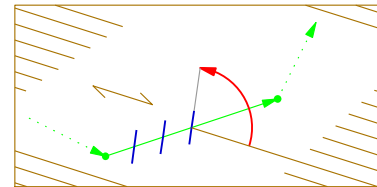
Contour -> CrampContourType -> CrampAngleRefType



enumeration value = segment



XVector enumeration value = part



enumeration value = grain

PatternContour

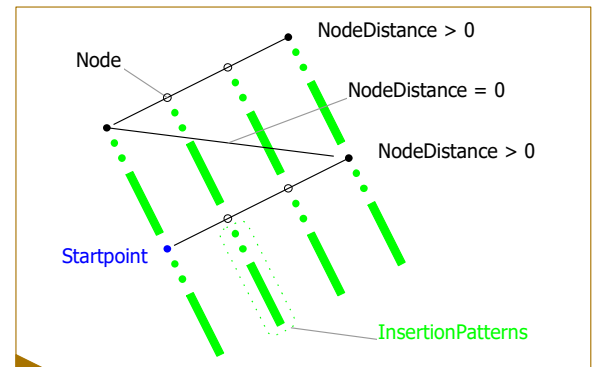
The PatternContour consists of

- A contour <Contour> with nodes on segments
- A list of processings with their relative positions <InsertionPatterns>

The <InsertionPatterns> is placed at each node of the <Contour>.

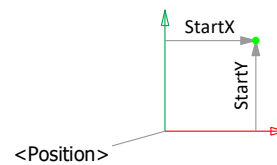
Example here:

- A contour with 3 segments
- A InsertionPatterns with 3 processing (2 x drilling, 1 x slot)



Each processing in the <InsertionPatterns> consists of

- A position <Position>
- Geometry with usual parameters

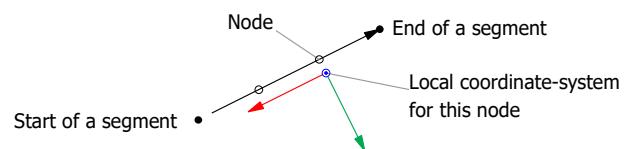


The parameters of the processing refer to <Position>

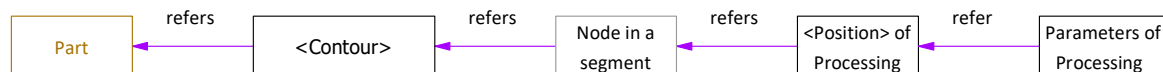
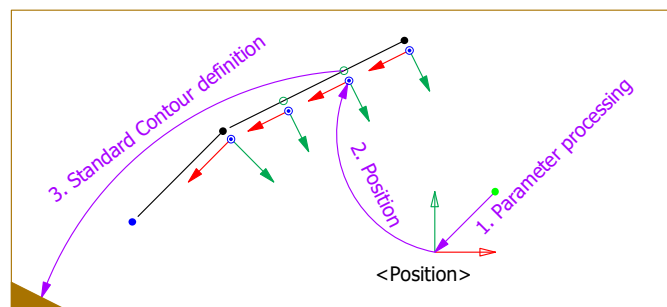
The <Position> refers to the local coordinate-system of a node.

Each node has a local coordinate-sytem.

- Position of the node
- X-direction: From actual segmentpoint to previous.
- Y-direction: Perpendicular to X, lying in plane of contour.



Hierachy of references / transformations



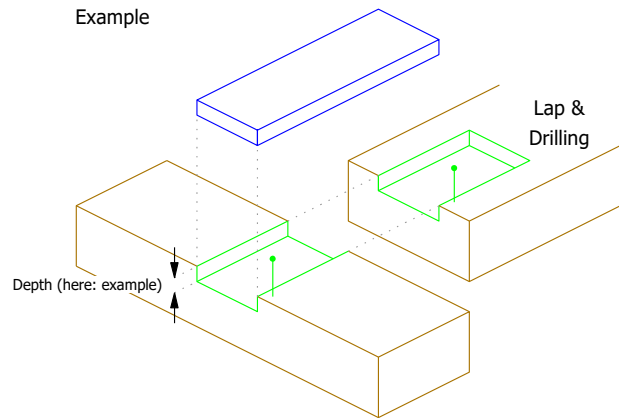
Connector

The Connector consists among others of

- A list of processings <Processings> = optional
- A <ConnectorInfo> which consists of = required
 - A <Type>
 - A <Position>
 - 0..n <ConnectorParameter>

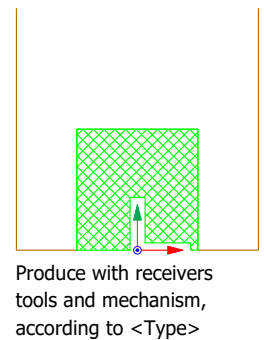
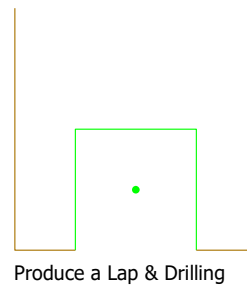
The <ConnectorParameter> contains additional parameters for the specific connector.

Example: Depth

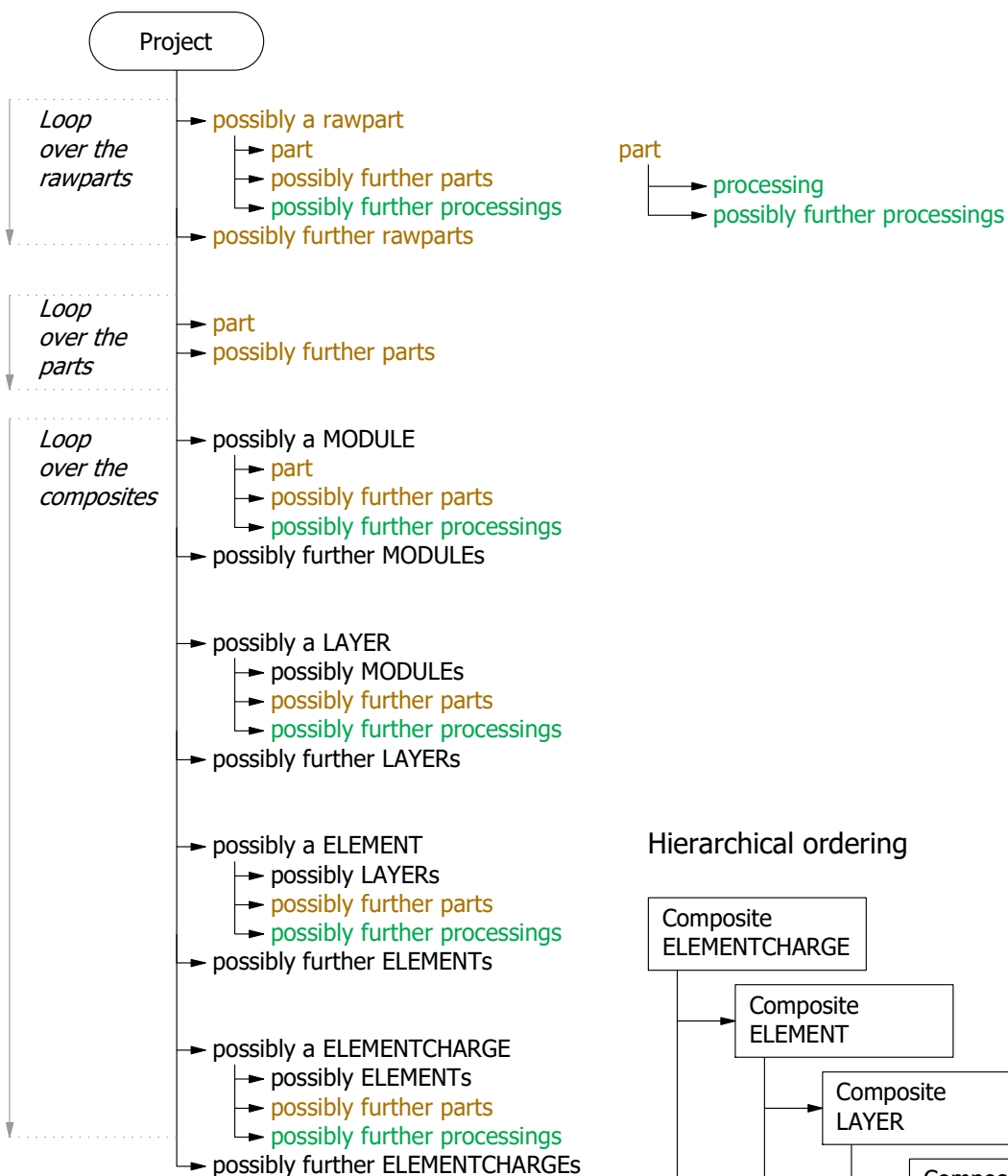


Possibilities

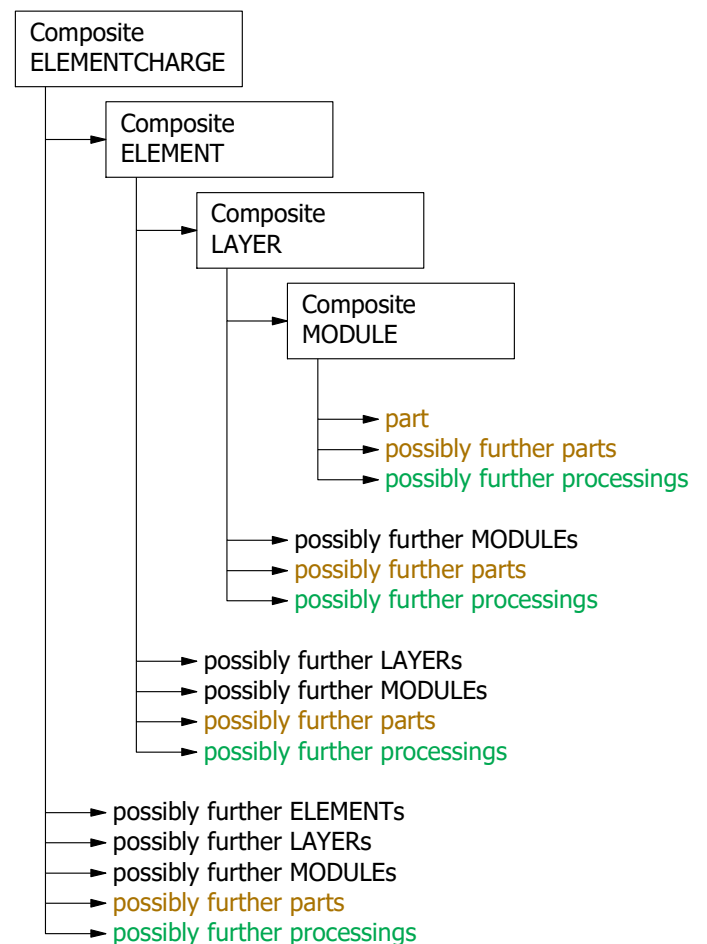
Receiver knows the <Type>	<Processings>	The receiver has to work like this
Yes	exist	according to the type or processings Lap & Drilling
Yes	not exist	according <Type>
No	exist	processings Lap & Drilling
No	not exist	Error, receiver should get information about <Type>



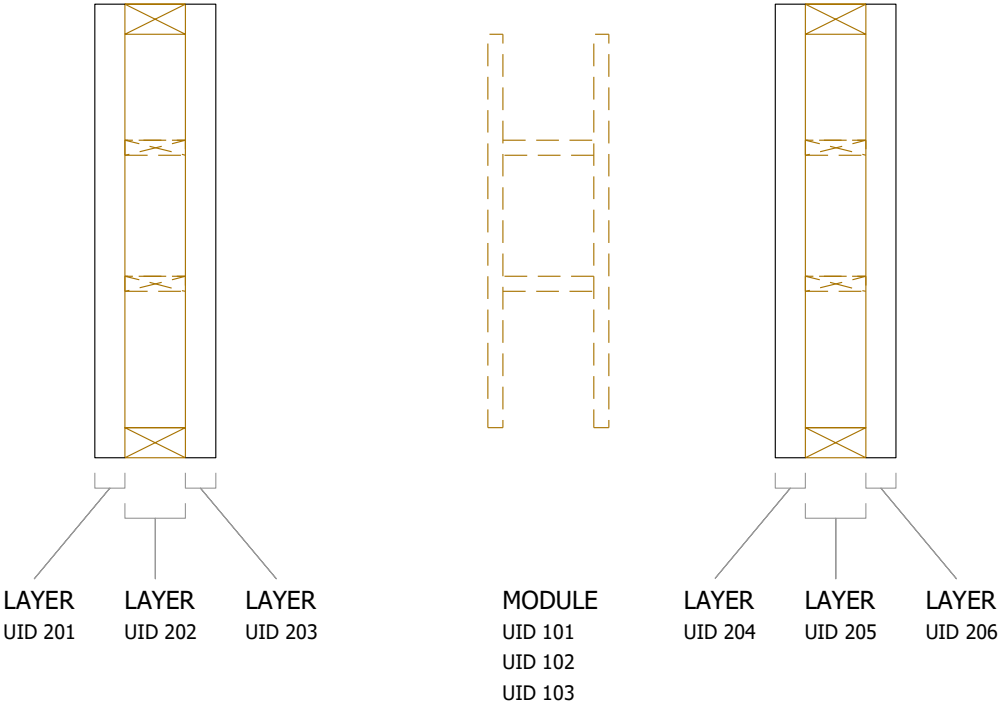
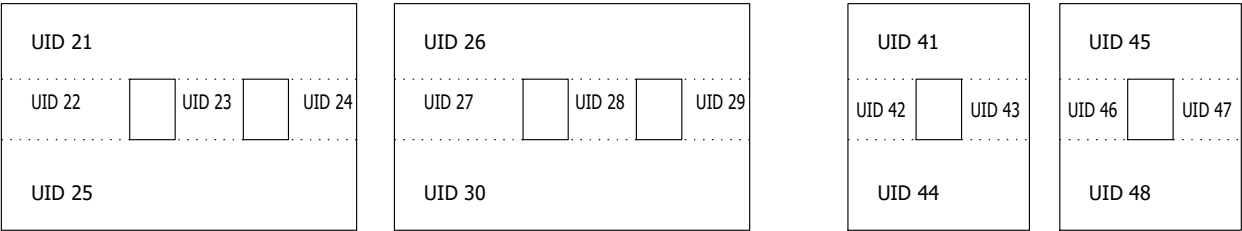
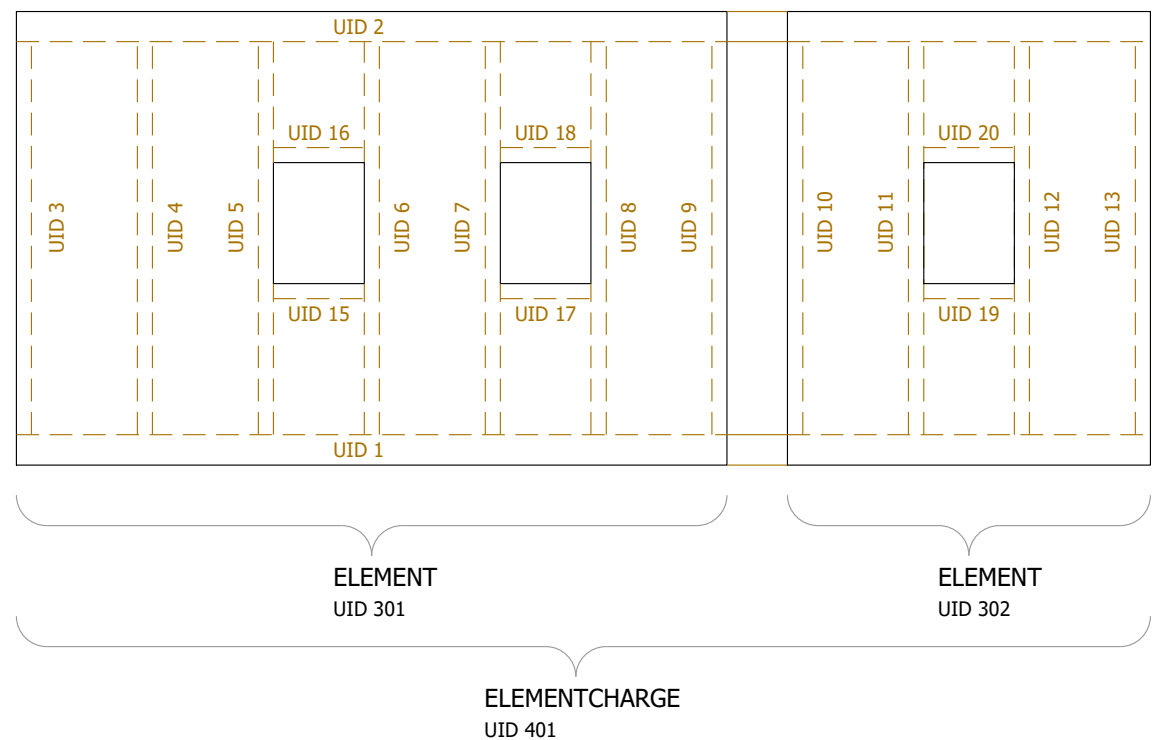
Listing in the BTLX-File

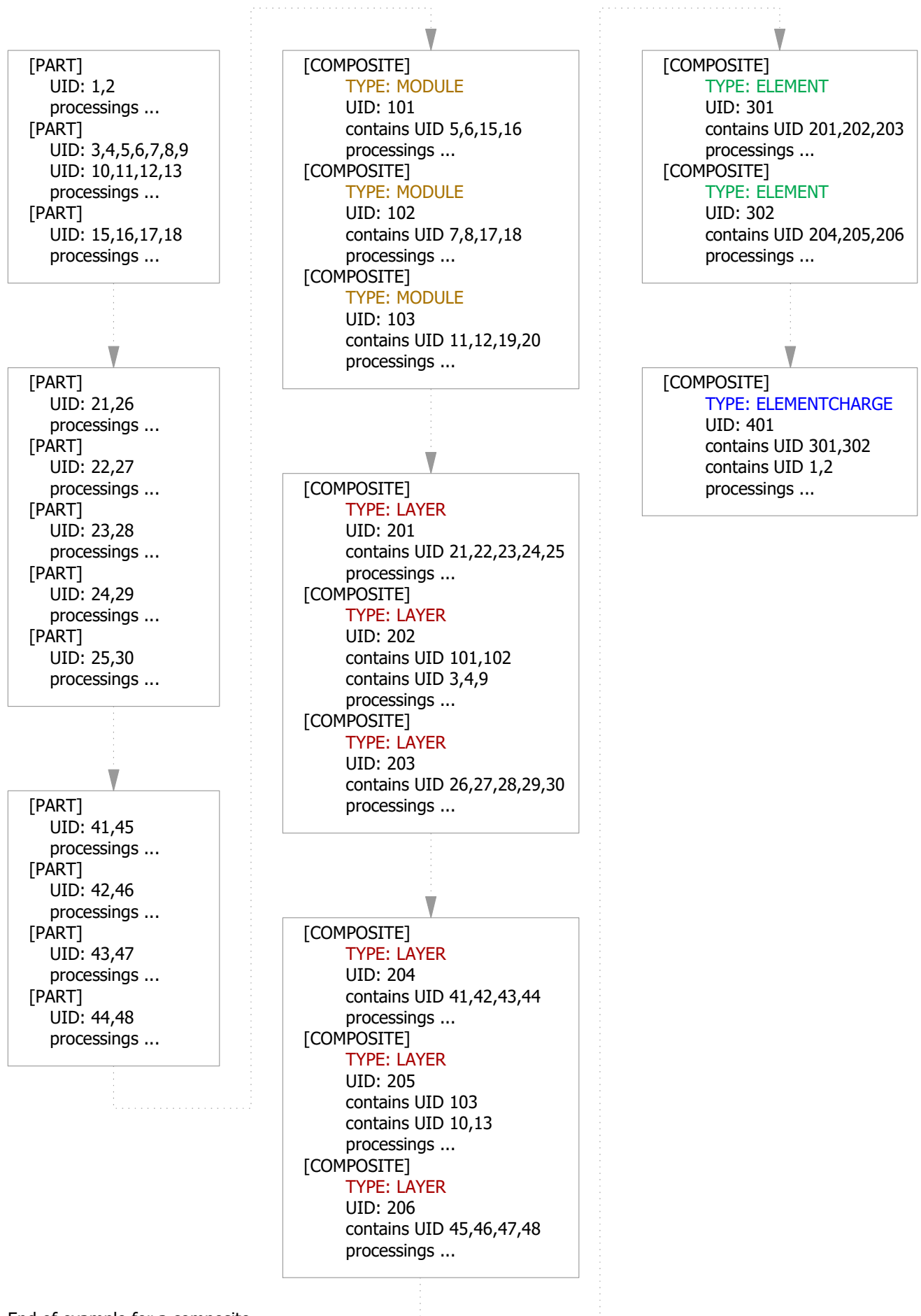


Hierarchical ordering

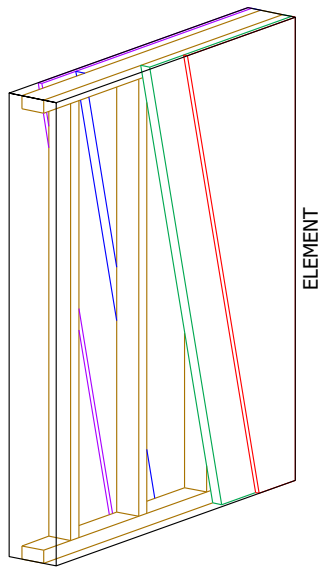


Example for a composite

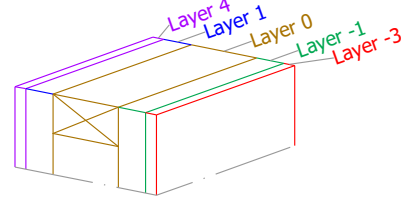
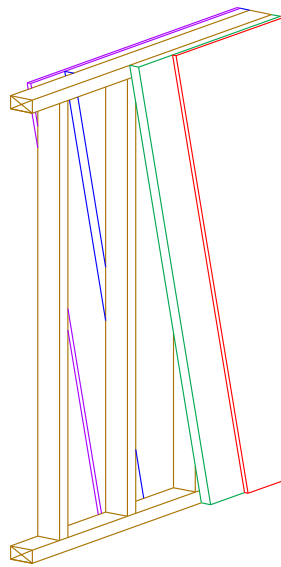




Example ELEMENT with LAYERS



Example LAYERS



Each ELEMENT must have a LAYER 0.

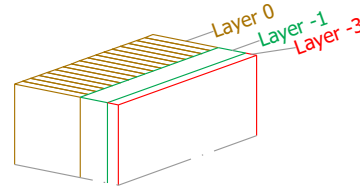
The LAYER numbers must be unique.

In the [COMPOSITE]s with "TYPE: ELEMENT" the Attribute "REFERENCESIDE:" must be set.

LAYER with number = 0: On center of ELEMENT

Positive LAYER numbers: On REFERENCESIDE of ELEMENT

Negative LAYER numbers: On opposite REFERENCESIDE of ELEMENT

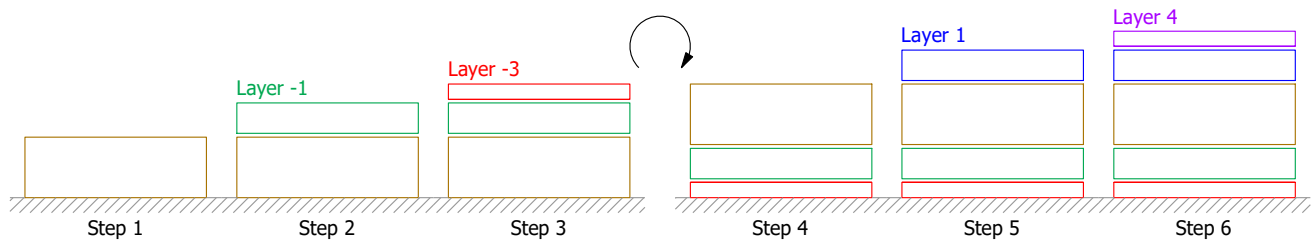


dito

Example productions steps on machine

The machine decides the order of production and the count of steps.

LAYER 0 defines the start situation.



or

