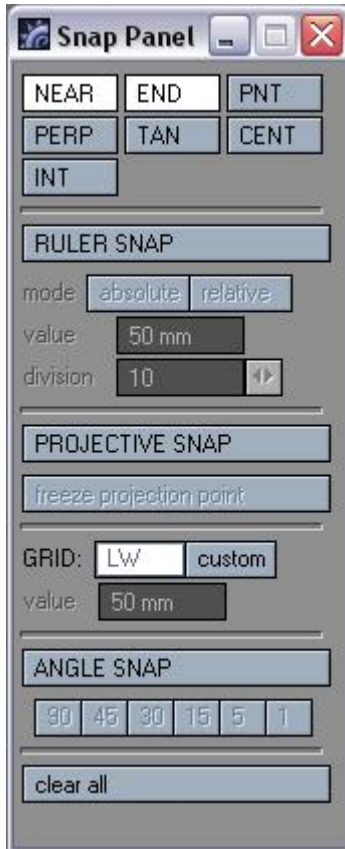


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LWCAD Basics

Snap system



LWCAD since version 2 contains a complete snap engine which is fully integrated into all LWCAD tools. Snap modes are adjustable through the “Snap Panel”.

Current version supports only polygons and NURB curves.

First section contains seven buttons for seven basic snap modes:

NEAR – snap to nearest geometry

END – snap to nearest ‘segment end’ of curve or ‘edge end’ of polygon

PNT – snap to nearest point

PERP – snap to nearest geometry which is perpendicular to previous handle of current tool

TAN – snap to nearest geometry which is tangent to previous handle of current tool

CENT – snap to center of nearest geometry

INT – snap to intersection of curves. Currently works only with NURB curves in orthogonal view.

Second section contains ruler settings.

RULER SNAP button enables ruler snap mode.

Ruler mode works only with conjunction of snap to near or projective snap. It can work in **absolute** or **relative** mode.

Absolute mode allows you to set dimension of ruler step by the **value** control. Relative mode divides the ruler by defined **division** count.

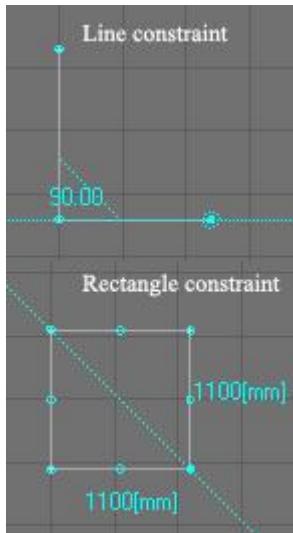
Third section contains projective snap settings. **PROJECTIVE SNAP** button enables that mode. This mode creates perpendicular and tangent helper lines whose starts from projection point. Projection point is automatically assigned from last successful snap on geometry. Button **freeze projection point** makes that projection point fixed in case it is needed.

Fourth section is overloading of native grid snap. When **GRID** mode is custom, then you can set your desired grid **value**.

Fifth section contains angle snap settings. **ANGLE SNAP** button enables that mode. Angle snap value can be set as 90, 48, 30, 15, 5 and 1 degree.

Last **clear all** button disables all snap settings

Constraint mode



Every tool which is adjustable also by handles supports constraint mode. There are two types of constraint modes. Both operate with holding <ctrl> key, while dragging tool handle in viewport.

Picture on the left illustrates both cases.

First example picture is an ortho constraint mode which works on the last added handle of the Line Tool. This ortho mode behaves depended on previous handle position.

Second example is the Rectangle tool which is constrained into square during constraint mode.

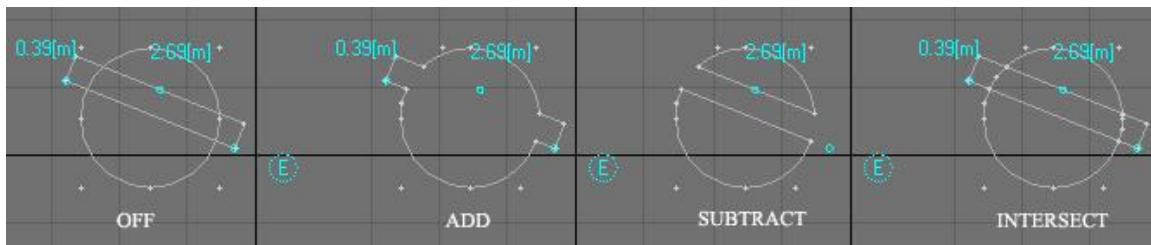
NURB Curves

LWCAD since version 2 is equipped with the industry standard NURB curves. LightWave native curves are no longer supported.

Real-time Curve Booleans

Each curve based primitive tool has possibility to turn on real-time curve Boolean mode. It works properly only with NURB curves which are placed in 2D orthogonal plane. Using curve Booleans on 3D object may result in corrupted object.

Following picture demonstrate how each mode affects rest of geometry in scene. Circle curve is affected by Rec3p tool:



Primitives

Primitives tab contains the tools for creating all basic geometric 2D primitives.

Line

Line is a multiple handle tool for creating lines and polylines. New point into line is added by each mouse click in viewport.

sketch color – defines sketch color of created line.

Curve Boolean – defines real-time curve Boolean mode.

Closed Line - ON/OFF check button which define whether line has connected first and last handle.

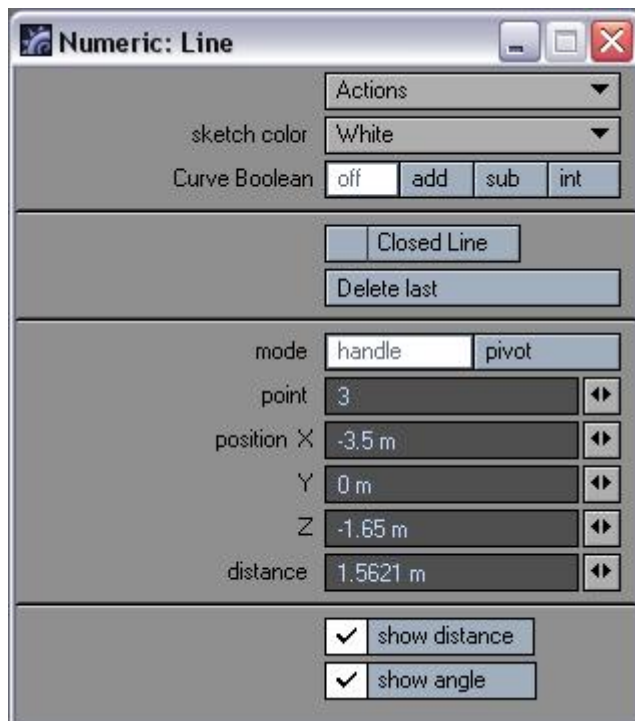
Delete last - removes last added handle.

mode – when handle mode is active then each handle is movable separately. When pivot mode is active then whole line is moved.

point – current active handle index

position - actual handle position

distance – adjustable distance for last edited end segment.



show distance - ON/OFF check button for viewing line segments distance in the viewport.

show angle - ON/OFF check button for viewing angle between line segments in the viewport.

Curve

Curve is multiple handle tool for creating NURB curves. It is almost same as Line tool. New point into curve is also added by each mouse click in viewport. Current version is restricted to maximum eight control points.

sketch color – defines sketch color of created curve.

Curve Boolean – defines real-time curve Boolean mode.

Closed Curve - ON/OFF check button which define whether line has connected first and last handle.

Delete last - removes last added handle.

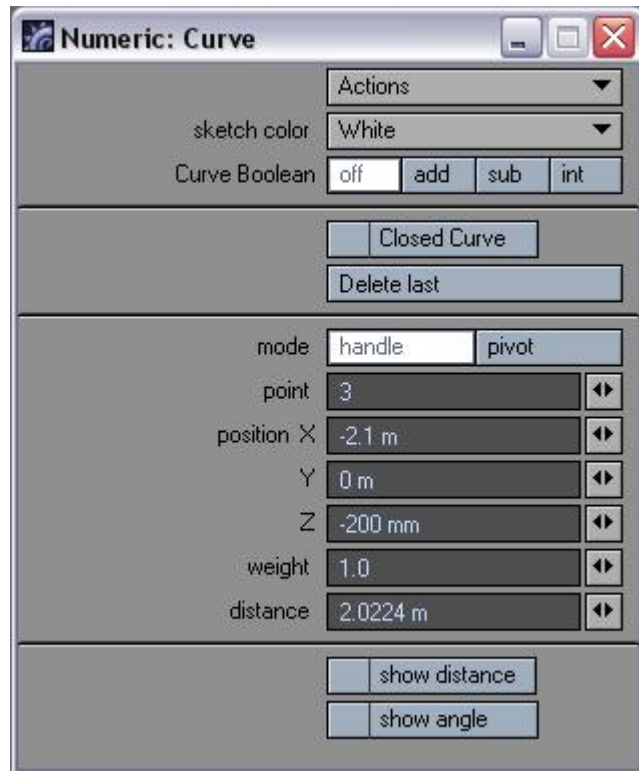
mode – when handle mode is active then each handle is movable separately. When pivot mode is active then whole line is moved.

point – current active handle index

position - current handle position

weight - current handle weight

distance – adjustable distance for last edited end segment. Distance is calculated only between handles not on the curve.



show distance - ON/OFF check button for viewing line segments distance in the viewport.

show angle - ON/OFF check button for viewing angle between line segments in the

Arc

Arc is a four or six handles tool for creating precise arc sections.

Tool works in two basic modes. **4point** mode allows controlling start, end, center and middle point of arc section. **tangent** mode just adds four additional handles for adjusting arc endpoint's tangents.

This tool is restricted for 2D use only.

sketch color – defines sketch color of created arc.

Curve Boolean – defines real-time curve Boolean mode.

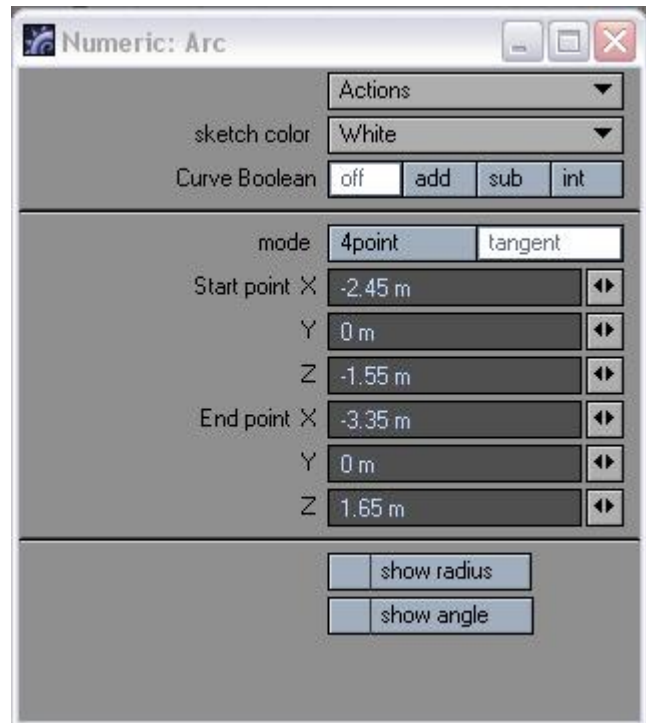
mode – switch between two basic tool modes

Start point - arc start point handle

End point - arc end point handle

show radius - ON/OFF check button for viewing arc radius in the viewport.

show angle - ON/OFF check button for viewing arc angle in the viewport.



Arc angle

Arc angle tool is a five handles tool for creating precise arc sections. This arc mutation allows setting of inner angle.

This tool is restricted for 2D use only.

sketch color – defines sketch color of created arc.

Curve Boolean – defines real-time curve Boolean mode.

Start point - arc start point handle

End point - arc end point handle

Middle point - arc middle point handle

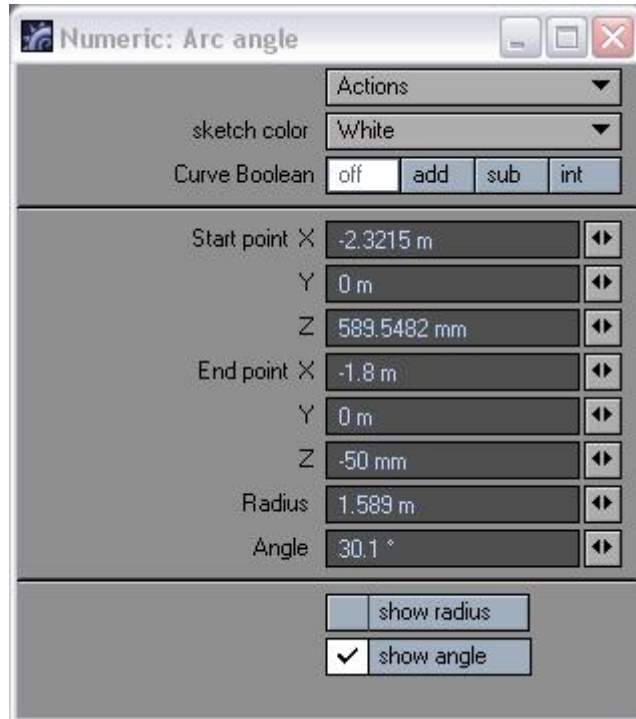
Center - arc center handle

Radius - arc radius parameter

Control point per turn - defines intensity of the points to create arc curve.

show radius - ON/OFF check button for viewing arc radius in the viewport.

show angle - ON/OFF check button for viewing arc angle in the viewport. parameters.



Circle tool

Circle tool is a three handle tool for creating precise NURB circles.

Tool has the selectable pivot point, which can be changed with double mouse click.

This tool is restricted for 2D use only.

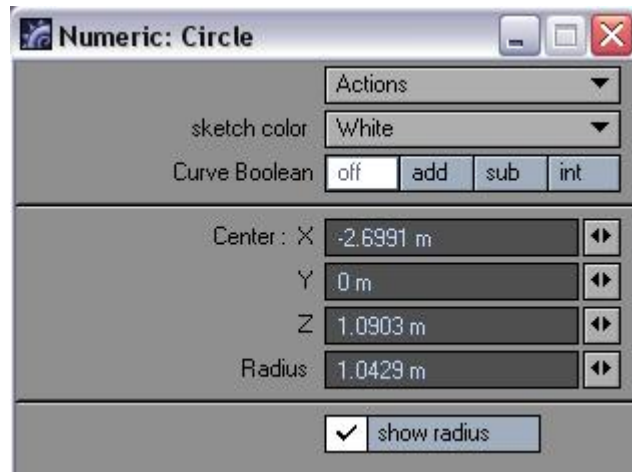
sketch color – defines sketch color of created circle.

Curve Boolean – defines real-time curve Boolean mode.

Center - circle center handle

Radius - circle radius parameter

show radius - ON/OFF check button for viewing radius in the viewport.



Ellipse

Ellipse tool is a five handle tool tool for creating precise NURB ellipses.

Tool has the selectable pivot point, which can be changed with double mouse click.

This tool is restricted for 2D use only

sketch color – defines sketch color of created ellipse.

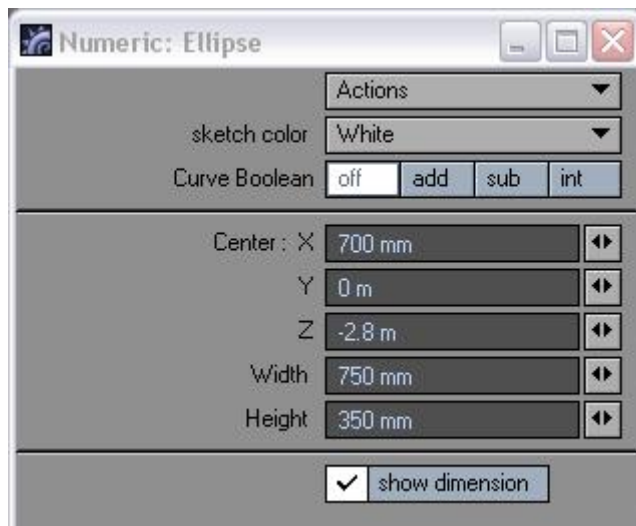
Curve Boolean – defines real-time curve Boolean mode.

Center - ellipse center handle

Width - ellipse width parameter

Height - ellipse height parameter

show dimensions - ON/OFF check button for viewing ellipse dimensions in the viewport.



Rectangle

Rectangle is an eight handle tool for creating rectangles.
The tool has the four corner handles and the four side handles.
This tool is restricted for 2D use only

sketch color – defines sketch color of created rectangle.

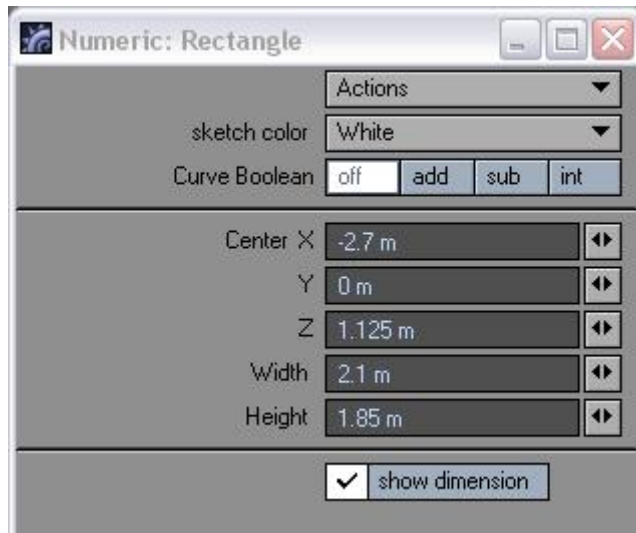
Curve Boolean – defines real-time curve Boolean mode.

Center - rectangle center

Width - rectangle width parameter

Height - rectangle height parameter

show dimensions - ON/OFF check button for viewing rectangle dimensions in the viewport.



Rec3p

Rec3p tool is a three handle tool for creating arbitrary oriented rectangles.
This tool is restricted for 2D use only.

sketch color – defines sketch color of created rectangle.

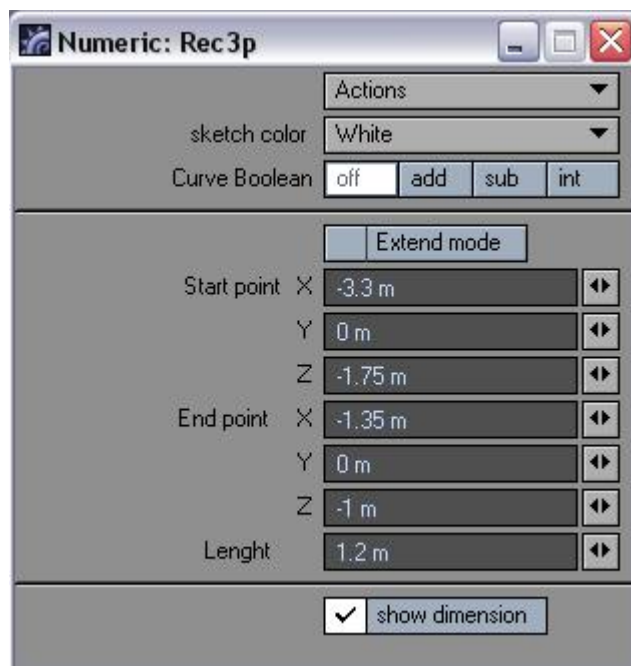
Curve Boolean – defines real-time curve Boolean mode.

Start point - rectangle start point handle

End point - rectangle end point handle

Length - rectangle height parameter

show dimensions - ON/OFF check button for viewing rectangle dimensions in the viewport.



Primitives II

It is the additional set of the primitive tools with some specialized shapes. Series of three pattern tools are able to draw an unlimited count of the user defined arbitrary shapes.

Wall

Wall is a multiple handle tool for creating curve based 2D walls. It is derived from Line tool and behaves almost the same.

This tool is restricted for 2D use only.

sketch color – defines sketch color of created line.

Curve Boolean – defines real-time curve Boolean mode.

side - defines wall offset orientation

offset – defines wall thickness

Closed Wall - ON/OFF check button which define whether wall has connected first and last handle.

Delete last - removes last added handle.

mode – when handle mode is active then each handle is movable separately. When pivot mode is active then whole line is moved.

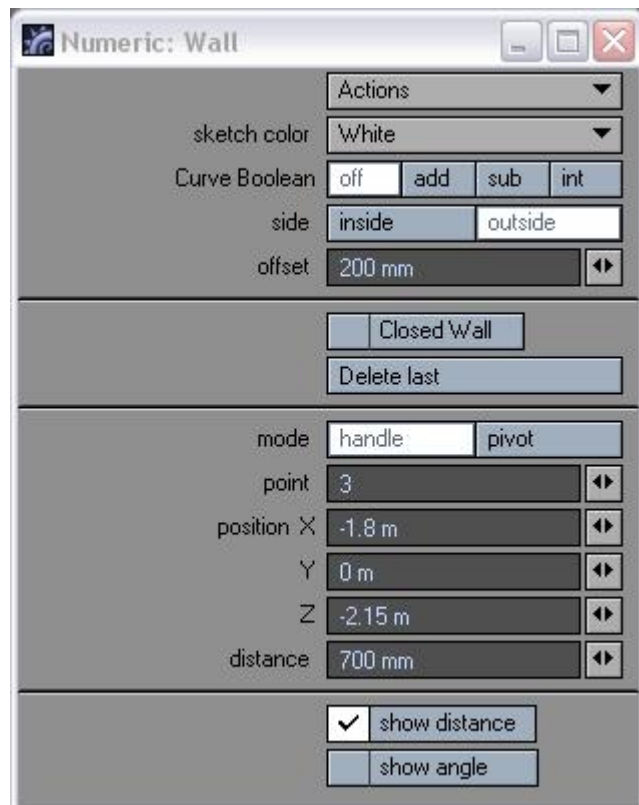
point – current active handle index

position - actual handle position

distance – adjustable distance for last edited end segment.

show distance - ON/OFF check button for viewing line segments distance in the viewport.

show angle - ON/OFF check button for viewing angle between line segments in the viewport.



NGon

NGon is a two handle tool. It creates symmetric n-sides curve based objects. Tool has the selectable pivot point, which can be changed with double mouse click. It is restricted for 2D use only.

sketch color – defines sketch color of created ngon.

Curve Boolean – defines real-time curve Boolean mode.

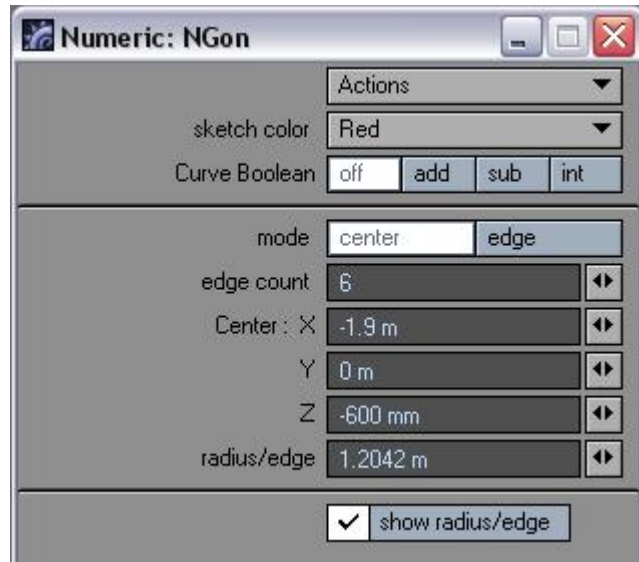
mode – defines chosen tool mode.

edge count – defines a count of *object sides*

Center - circle center handle

radius/edge – ngon radius or edge dimension depend on tool mode

show radius/edge - ON/OFF check button for viewing radius or edge length in the viewport



Star

Star is a two handle tool. It creates symmetric n-sides star objects. Tool has the selectable pivot point, which can be changed with double mouse click. It is restricted for 2D use only.

sketch color – defines sketch color of created star.

Curve Boolean – defines real-time curve Boolean mode.

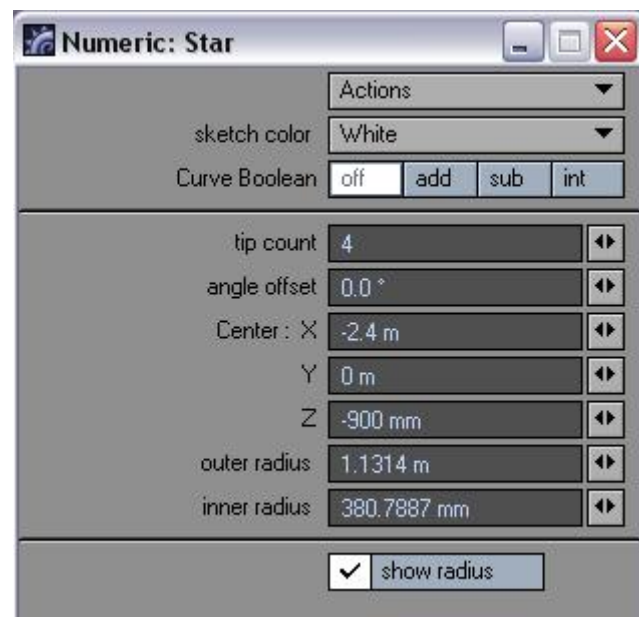
tip count – defines count of star's tips

Center - star center handle

outer radius – inside star radius

inner radius - outside star radius

show radius - ON/OFF check button for viewing radius in the viewport



Pattern 1D

Pattern 1D is a three handle tool for drawing with arbitrary oriented 1D curve shapes. It is derived from Rec3p tool and behaves very similar. Desired curve shape can be chosen from Shape Library which is available through the numeric panel.

This tool is restricted for 2D use only.

sketch color – defines sketch color of created rectangle.

Curve Boolean – defines real-time curve Boolean mode.

count – defines multiplicity of the shape.

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

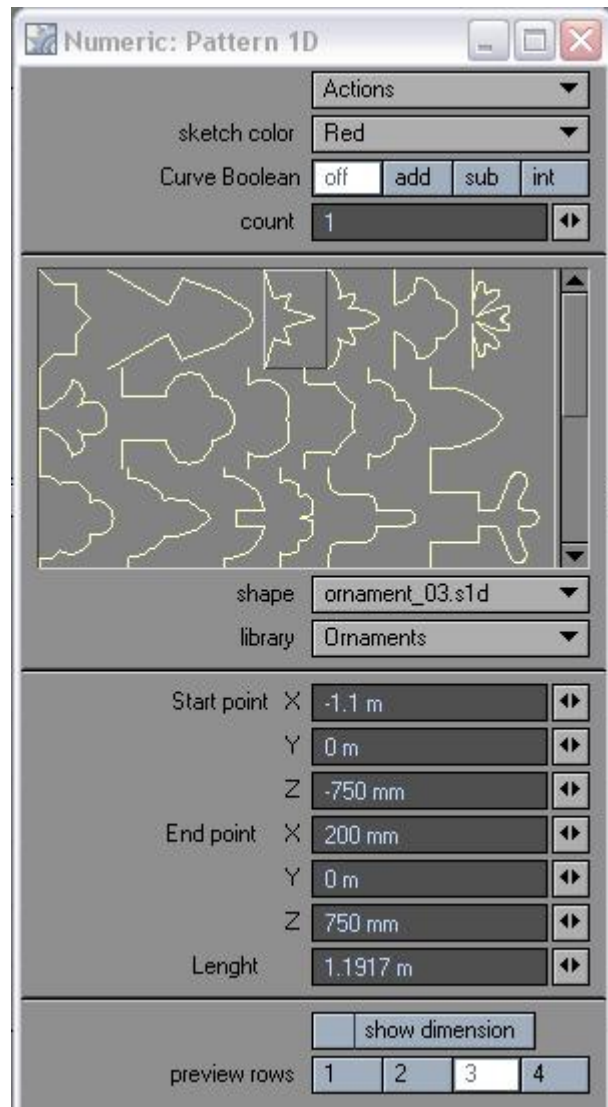
Start point - start point handle position

End point - end point handle position

Length - shape height parameter

show dimensions - ON/OFF check button for viewing tool dimension in the viewport.

preview rows – defines the count of shape rows visible in preview window



Pattern 2D

Pattern 2D is a five handle tool for drawing with 2D curve shapes.

Desired curve shape can be chosen from Shape Library which is available through the numeric panel. It has a selectable pivot point. User can change it with a double click.

This tool is restricted for 2D use only.

sketch color – defines sketch color of created pattern.

Curve Boolean – defines real-time curve Boolean mode.

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

flip horizontal – flips selected shapes left-right

flip vertical – flips selected shapes up-down

set original dimension – sets tool handles position upon on the original shape dimension

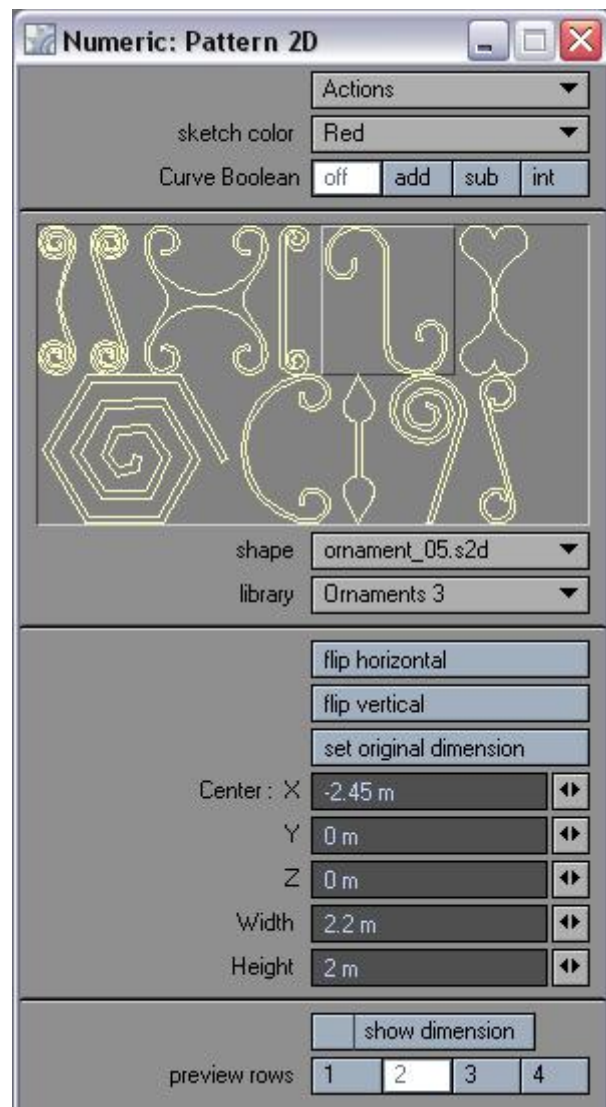
Center - rectangle center

Width - rectangle width parameter

Height - rectangle height parameter

show dimensions - ON/OFF check button for viewing tool dimensions in the viewport.

preview rows – defines the count of shape rows visible in preview window



Pattern 2D rot

Pattern 2D is a two handle tool for drawing with 2D curve shapes with arbitrary rotation. Desired curve shape can be chosen from Shape Library which is available through the numeric panel. One of two handles is always selected as pivot point. User can change it with a double click.

This tool is restricted for 2D use only.

sketch color – defines sketch color of created pattern.

Curve Boolean – defines real-time curve Boolean mode.

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

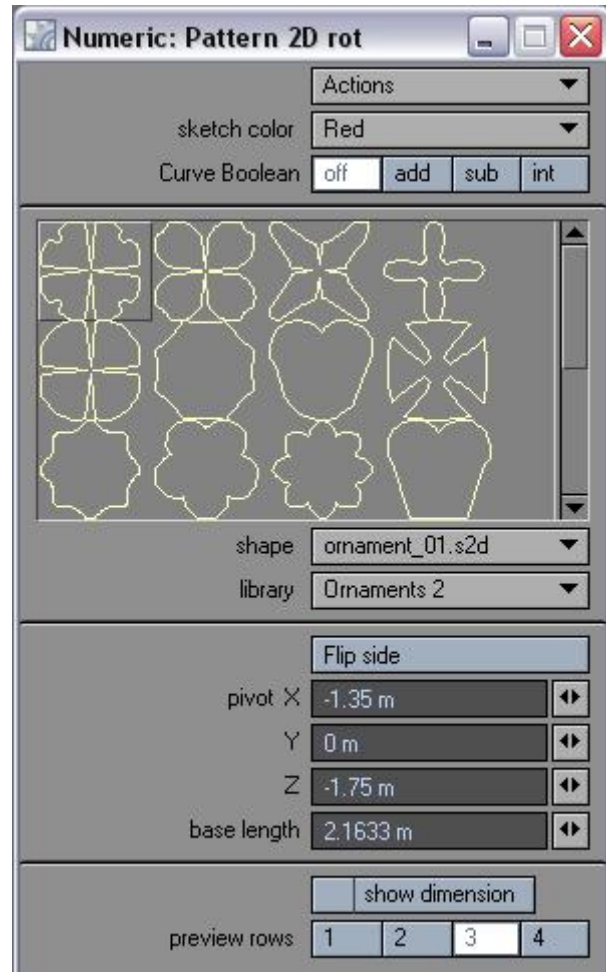
Flip side – flips pattern position around the handles

pivot – defines pivot handle position

base length – defines distance between the handles

show dimension - ON/OFF check button for viewing dimension in the viewport.

preview rows – defines the count of shape rows visible in preview window



Shape Library 2

Shape Library is the collection of 1D and 2D NURB curves. It has default position on your drive in the "...\LightWave\Programs\Presets" folder.

It is necessary to check that preset path in the LWCAD Options panel after installation! Because Shape Library since LWCAD 2 supports only NURB curves, therefore it is not backward compatible with the previous version 1.x !

Each shape file contains following important information:

- name**
- library version**
- library type (1D or 2D)**
- original dimension**
- NURB curve data**

Shape files are platform independent text files. Therefore you can exchange your shapes between Macintosh and Windows platform.

add to 1d lib & add to 2d lib

Those two tools are able to add 1d or 2D shapes into the Shape Library. Both have the identical numeric panels therefore following description is valid also for 2D version.

add shape – adds curve from scene into shape library
shape name – is user input for desired shape name

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

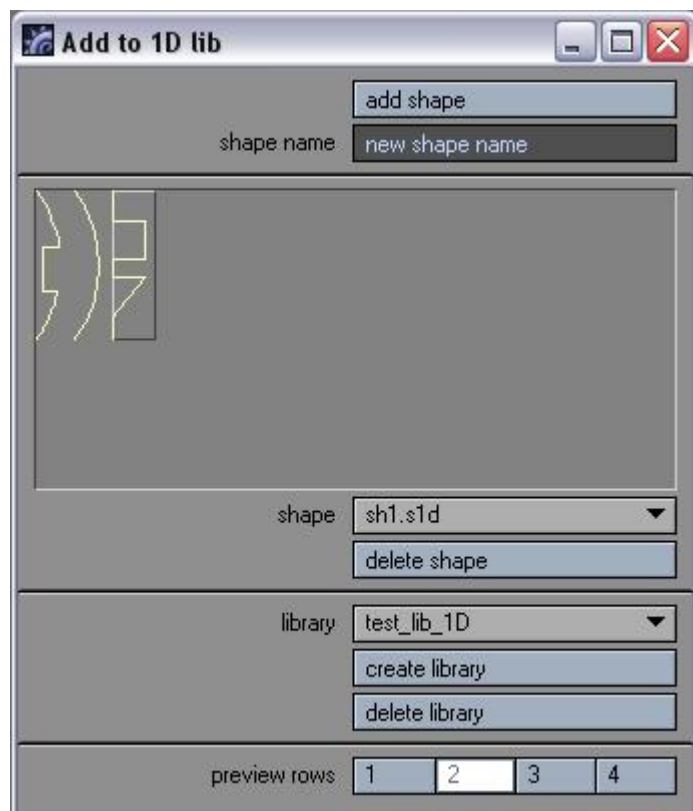
delete shape – removes current selected preset in library

library – defines current selected shape library

create library – creates new empty library

delete – remove current selected empty library

preview rows – defines the count of shape rows visible in preview window



Edit

Edit section contains standard CAD toolset for editing NURB curves.

Del Segment

Del Segment tool removes segments from curves, lines and poly-lines by clicking on them. It is very fast way how to remove NURB segment from scene.

Trim

Trim operation removes clicked curve part which is intersected with the nearest boundary curves. This tool is restricted for 2D use only.

Extend

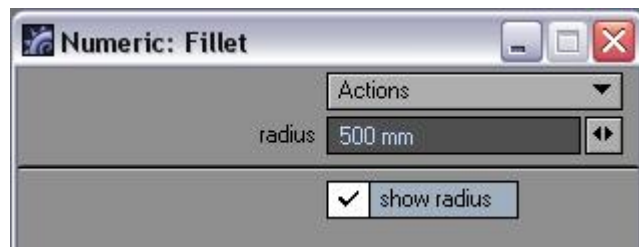
Extend operation prolongs clicked curve ends into nearest boundary curve. This tool is restricted for 2D use only.

Fillet

This tool is a standard CAD fillet operation between two NURB open curves. First and second phase is selecting the proper curve ends. Third is adjusting radius parameter. Both curve ends must have their projected tangents on the same orthogonal plane.

radius – defines arc radius between curves

show radius – ON/OFF check button for viewing dimension in the viewport.



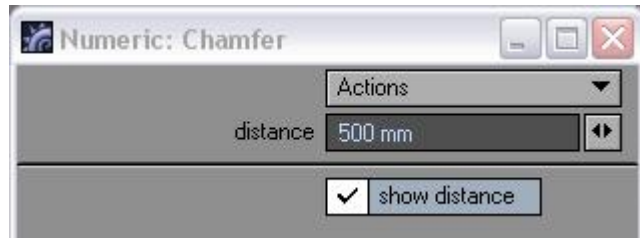
Chamfer

This tool is a standard CAD chamfer operation between two NURB open curves. First and second phase is selecting the proper curve ends. Third is adjusting distance parameter.

Both curve ends must have their projected tangents on the same orthogonal plane.

distance – defines distance from the point where chamfer begins to the imaginary intersection point of projected curves' ends

show distance – ON/OFF check button for viewing dimension in the viewport.



Blend

Blend tool creates a smooth connection between two curves' ends. It works also in three phases. First and second phase is selecting the proper curve ends. Third phase is adjusting blending amount. Tool has no parameter for this just two handles which defines amount for each curve.

This tool works also in 3D and It has no restrictions.

Offset

Offset tool is only for single curve use. This tool has two phases. First phase is selecting curve with mouse click. Second phase is adjusting offset parameter. It can be adjusted with handle in viewport or through the numeric panel

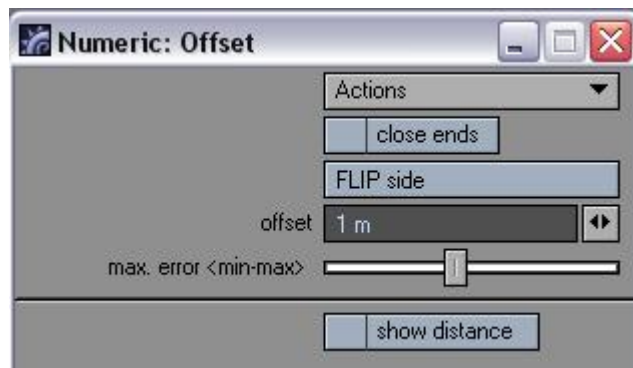
close ends – ON/OFF check button for connecting old and new offset curve.

FLIP side – flips offset orientation

offset – offset distance parameter

max. error – defines maximum permitted error for offset operation

show distance – ON/OFF check button for viewing dimension in the viewport.



Mass Edit

Join - Explode Curves

Those two commands can join and explode NURB curves. Join operation makes from many connected curves single curve. Explode operation divides each curve's segment into separated curves.

Boolean 2D

Boolean 2d is an interactive tool which makes global intersections of curves and lines in the viewport. It automatically recognizes the plane of the actual geometry. Tool works with the two modes "Self-intersect" and "outline".

Mass Round

Curve Round is a multiple handle tool which creates fillet or chamfer operation on each corner point in the viewport. Every point on the curve which is surrounded by the line segments is considered as a corner point and the round tool makes a handle on this place. Handles can be controlled globally or individually by numeric panel or by moving mouse with LMB in the viewport.

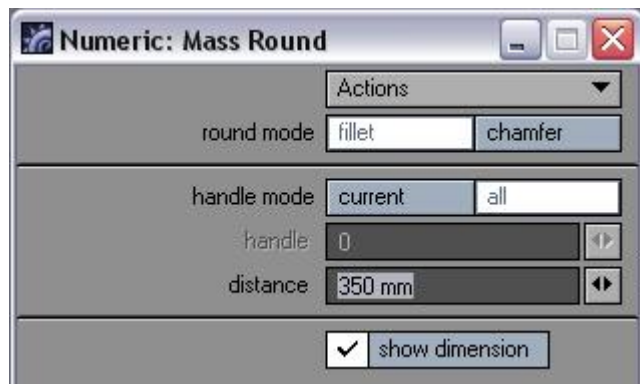
round mode - defines method for rounding corners.

handle mode – defines which handle is active, single or all of them

handle - actual handle index

distance - actual handle distance parameter

show dimensions - ON/OFF check button for viewing distance values in the viewport.



Mass Offset

This tool makes global offset for all curves, lines and poly-lines in the viewport. Offset value is adjustable by left-right moving mouse in the viewport with LMB or through the numeric panel.

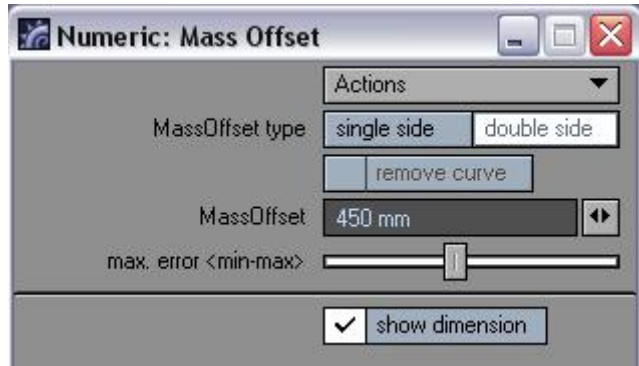
MassOffset type – defines offset mode.

remove curve - removes old curves, only when “single side” mode is active

MassOffset – offset value

max. error – defines maximum premitted error for offset operation

show dimensions - ON/OFF check button for viewing offset distance in the viewport.



Reduce Lines

Reduce Lines eliminate redundant points on poly-lines which are surrounded by parallel segments.

Connect Curves

This command makes the line connections between every nearest opened ends of curve. Intersections are not taken into account.

Merge Curves

Merge Curve removes identical redundant curves from scene. If the two or more curves has the same point positions, this command keeps only one and delete rest of them.

Convert

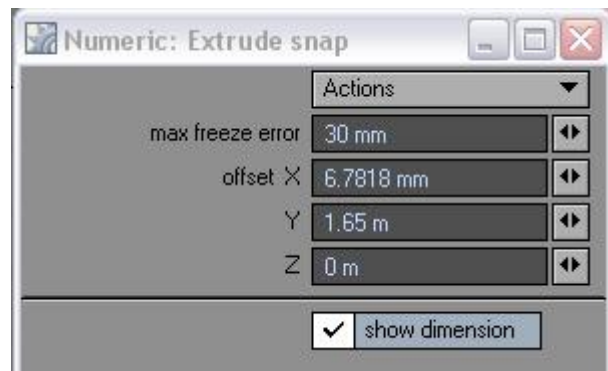
Extrude snap

Extrude snap tool is overloading of the original Extrude tool in LightWave. This new tool supports snap modes and NURB curves. Extruded polygons are automatically aligned.

max freeze error – defines curve detail which affects polygon density of the extruded poly

offset – defines extrude offset

show dimension - ON/OFF check button for viewing extrude offset distance in the viewport.



Curve To Poly

Curve to Poly tool converts curves into polygons. It is primarily designed for conversion of complicated curve based floor plans into polygonal form.

Highly recommended is using Boolean 2D operation with self-intersect option before. Next recommended is also using complementary 'Analyze Curves' tool. It is useful for finding hidden disconnections between curves whose might result in wrong conversion result.

This tool is restricted for 2D use only.

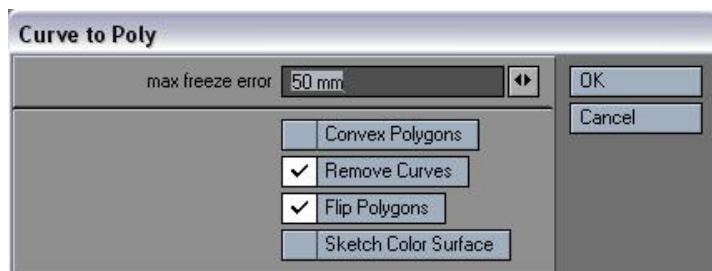
max freeze error - defines curve detail for conversion

Convex Polygons – defines whether converted polygons must be only convex

Remove Curves – removes original curves after conversion

Flip Polygons – this parameter defines polygons orientation after conversion

Sketch Color Surface – if active then polygon surfaces are created from sketch color information of the original curves.



Poly To Curve

Poly to Curve operation converts every polygon edge into line curve. Redundant curves are deleted then.

Curve To LWcur

Curve To LWcur is backward support for existing curve based tools in LightWave. This operation converts Nurb curves into old curves.

Analyze

Distance

Distance tool is a two handle tool for measuring dimensions in the scene.

distance - absolute distance value between handles

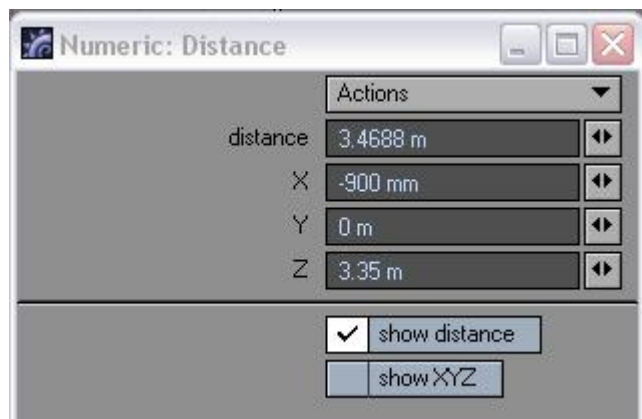
X- x axis distance between handles

Y- y axis distance between handles

Z- z axis distance between handles

show distance - ON/OFF check button for viewing in the viewport.

show XYZ - ON/OFF check button for viewing X,Y,Z distance in the viewport.



Angle

Angle tool is a three handle tool for measuring angles in the scene. It works in 2D orthogonal viewport and since LWCAD 2 also in 3D.

angle - measured angle parameter

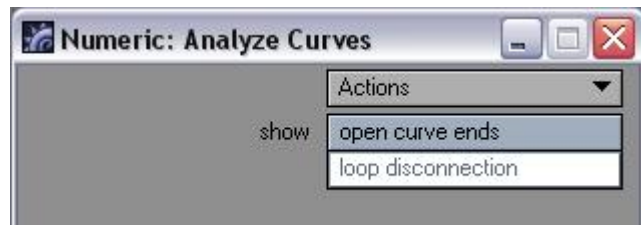


Analyze Curves

Analyze Curves tool is very useful for discovering hidden flaws in the curve based object. It shows all opened curves ends which are not connected to other curves. If this disconnection is very small it can be invisible by user. Those invisible disconnections then can cause a wrong result after conversion to polygons.

open curve ends - all open curve ends in the viewport are marked with green helpers

loop disconnections - all unconnected open curve ends in the viewport are marked with green helpers



Snap Modify

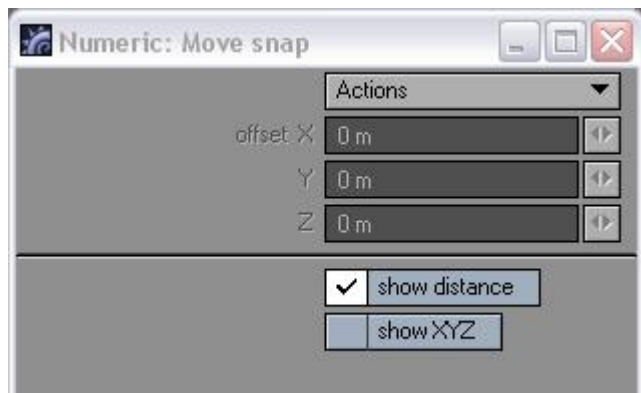
Move Snap

Move Snap is a two handle tool which precisely translates selected geometry. It works in all viewports.

offset – defines move vector

show dimensions - ON/OFF check button for viewing move distance in the viewport.

show dimensions - ON/OFF check button for viewing XYZ distance in the viewport.



Drag Snap

Drag Snap is a multiple handle tool which precisely translates points in the objects. It is the very effective tool for connecting objects.

handle position - drags vector for actual handle

actual handle –current handle index

show dimensions - ON/OFF check button for viewing handle distance in the viewport.

show dimensions - ON/OFF check button for viewing handle XYZ distance in the viewport.

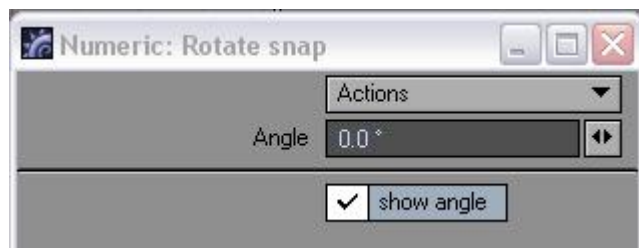


Rotate snap

Rotate Snap is a three handle tool which precisely rotates selected geometry. It works in 2D as well as in 3D viewports. Rotation plane in 3D viewport is calculated from handles position.

Angle – defines rotation parameter

show angle - ON/OFF check button for viewing angle parameter in the viewport.



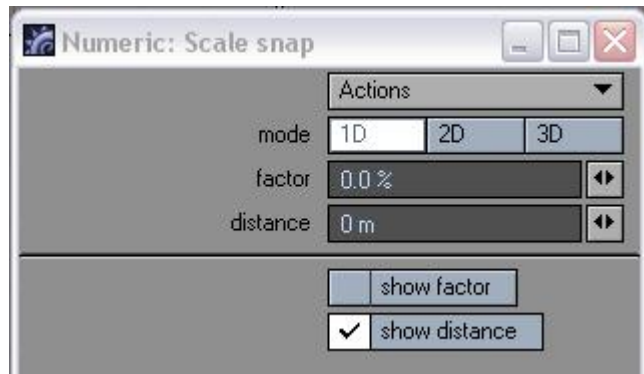
Scale snap

Scale Snap tool precisely scales or stretches selected geometry. It works in 2D and 3D viewports.

mode - tool has a three modes:
1D - stretch object along the line
2D - scale object in the plane
3D - scale object in 3d space
Factor - scale or stretch ratio
distance – defines desired distance
after scale operation

show factor - ON/OFF check button
for viewing scale parameter in the
viewport.

show distance - ON/OFF check button for viewing scale distance in the viewport.



Snap Multiply

Vector Clone

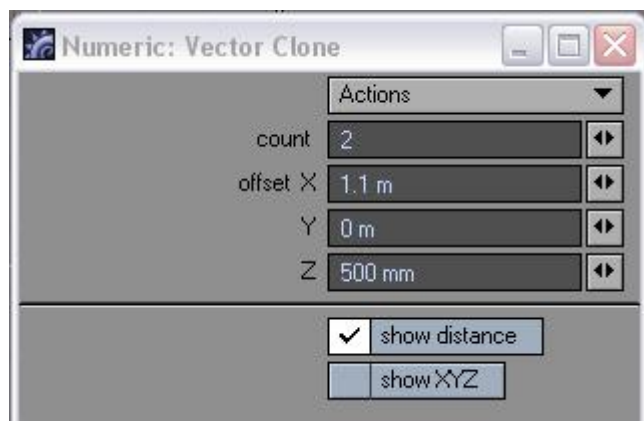
Vector Clone is an interactive tool for multiplying geometry along defined vector. It supports all geometry elements used in LightWave.

count – defines number of desired clones

offset - defines clone vector

show distance - ON/OFF check
button for viewing clone vector
distance in the viewport.

show XYZ - ON/OFF check button
for viewing XYZ distance in the
viewport.



Array Clone

Array Clone is an interactive tool which creates clones along X,Y and Z axis. It supports all geometry elements used in LightWave.

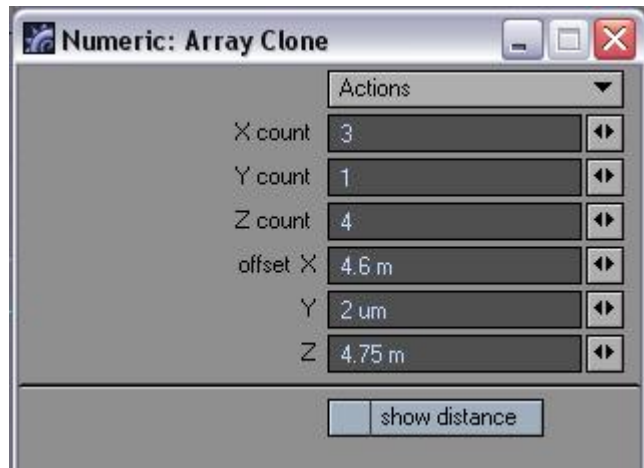
X count – defines number of desired clones along X axis

Y count – defines number of desired clones along Y axis

Z count – defines number of desired clones along Z axis

offset - defines clone distance for each axis

show distance - ON/OFF check button for viewing distances in the viewport.



Rail Clone

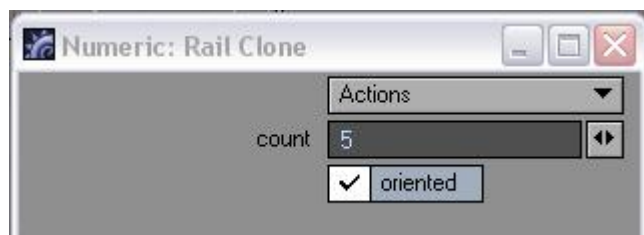
Rail Clone is an interactive tool for cloning objects along the curve.

It supports all geometry elements used in LightWave.

But rail curve must be NURB curve. LW curves are not supported. It can be placed in background or primary layer. In case it is in primary layer it must be unselected.

count - defines number of clones along the curve

oriented – defines whether the clones have aligned orientation along the curve or not.



Mirror Clone

Mirror Clone is an interactive tool which creates precise mirrored clones. It supports all geometry elements used in LightWave.

It works with two handles in the 2D viewport and with three handles in the perspective viewport. Two handles defines mirror line and three handles defines mirror plane.

Drill

DArc

Arc is a four or six handles tool for slicing, cutting or drilling polygons with arc section. Tool works in two basic modes. **4point** mode allows controlling start, end, center and middle point of arc section. **tangent** mode just adds four additional handles for adjusting arc endpoint's tangents.

surface – defines the surface for new created polygons after drill operation
mode – defines current real-time drill mode
max freeze error – defines detail of curve for conversion

mode – switch between two basic tool modes

Start point - arc start point handle

End point - arc end point handle

show radius - ON/OFF check button for viewing arc radius in the viewport.

show angle - ON/OFF check button for viewing arc angle in the viewport.



DCircle

Circle tool is a three handle tool for slicing, cutting or drilling polygons with circle. Tool has the selectable pivot point, which can be changed with double mouse click. This tool is restricted for 2D use only.

surface – defines the surface for new created polygons after drill operation
mode – defines current real-time drill mode
max freeze error – defines detail of curve for conversion

Center - circle center handle

Radius - circle radius parameter

show radius - ON/OFF check button for viewing radius in the viewport.



DEllipse

Ellipse tool is a five handle tool for slicing, cutting or drilling polygons with ellipse. Tool has the selectable pivot point, which can be changed with double mouse click. This tool is restricted for 2D use only

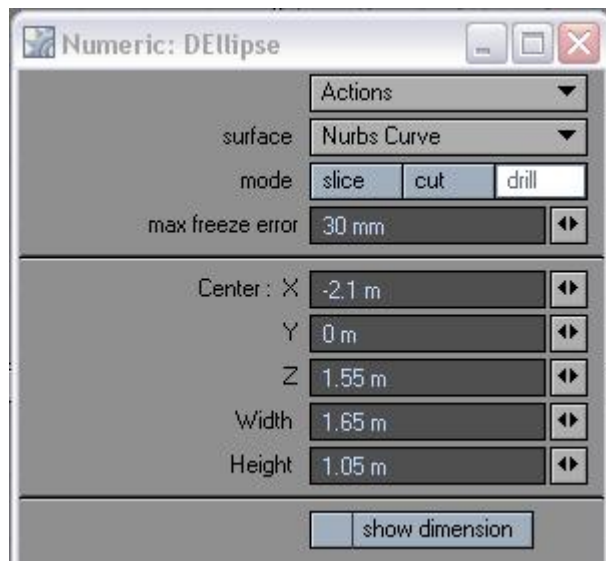
surface – defines the surface for new created polygons after drill operation
mode – defines current real-time drill mode
max freeze error – defines detail of curve for conversion

Center - ellipse center handle

Width - ellipse width parameter

Height - ellipse height parameter

show dimensions - ON/OFF check button for viewing ellipse dimensions in the viewport.



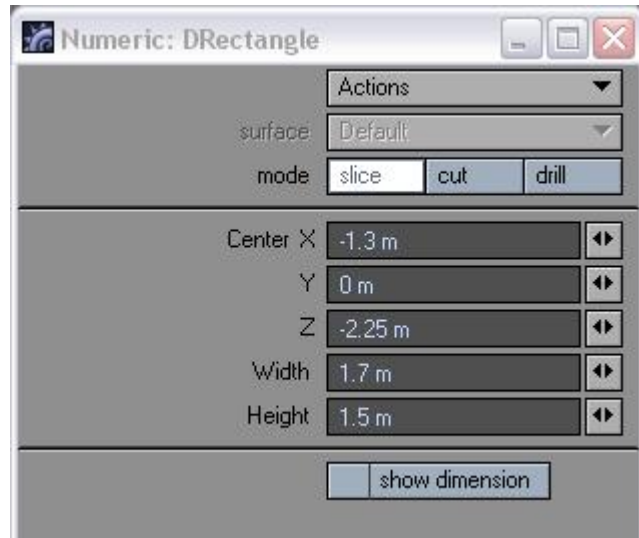
DRectangle

Rectangle is an eight handle tool for slicing, cutting or drilling polygons with rectangle. The tool has the four corner handles and the four side handles. This tool is restricted for 2D use only

surface – defines the surface for new created polygons after drill operation
mode – defines current real-time drill mode

Center - rectangle center
Width - rectangle width parameter
Height - rectangle height parameter

show dimensions - ON/OFF check button for viewing rectangle dimensions in the viewport.



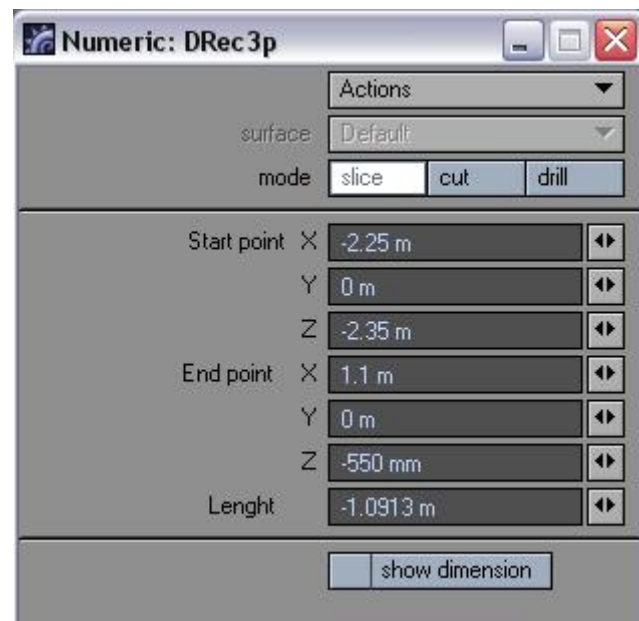
DRec3p

Rec3p tool is a three handle tool for slicing, cutting or drilling polygons with arbitrary oriented rectangle. This tool is restricted for 2D use only.

surface – defines the surface for new created polygons after drill operation
mode – defines current real-time drill mode

Start point - rectangle start point handle
End point - rectangle end point handle
Length - rectangle height parameter

show dimensions - ON/OFF check button for viewing rectangle dimensions in the viewport.



DPattern 1D

Pattern 1D is a three handle tool for slicing, cutting or drilling polygons with arbitrary oriented 1D curve shape. It is derived from Rec3p tool and behaves very similar. Desired curve shape can be chosen from Shape Library which is available through the numeric panel.

This tool is restricted for 2D use only.

surface – defines the surface for new created polygons after drill operation

mode – defines current real-time drill mode

max freeze error – defines detail of curve for conversion

count – defines multiplicity of the shape.

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

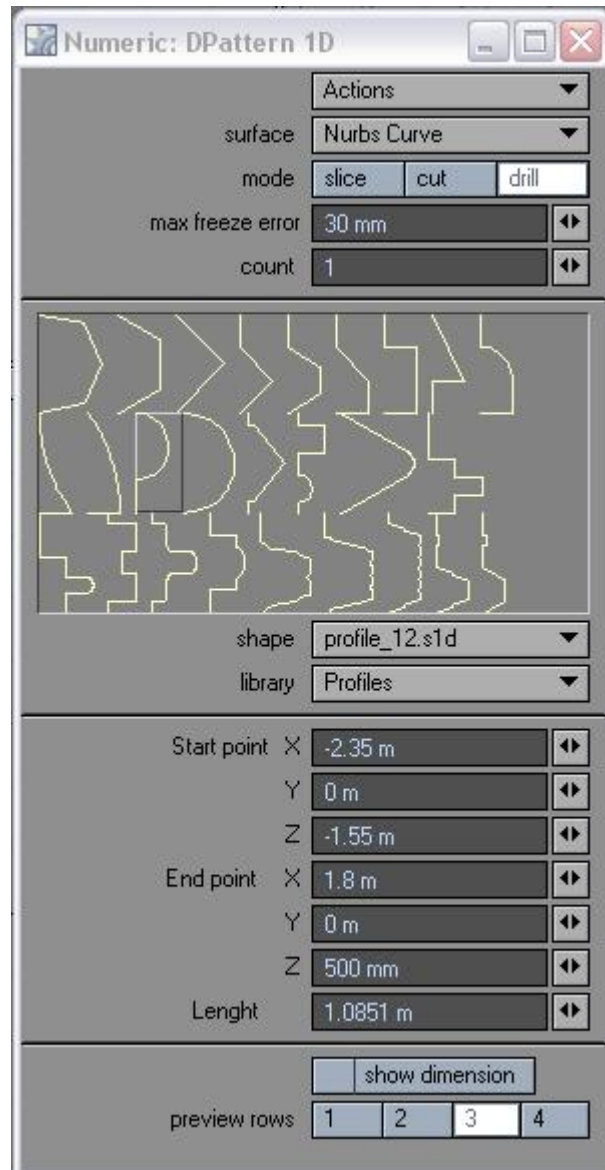
Start point - start point handle position

End point - end point handle position

Length - shape height parameter

show dimensions - ON/OFF check button for viewing tool dimension in the viewport.

preview rows – defines the count of shape rows visible in preview window



DPattern 2D

Pattern 2D is a five handle for slicing, cutting or drilling polygons with 2D curve shape. Desired curve shape can be chosen from Shape Library which is available through the numeric panel. It has a selectable pivot point. User can change it with a double click. This tool is restricted for 2D use only.

surface – defines the surface for new created polygons after drill operation

mode – defines current real-time drill mode

max freeze error – defines detail of curve for conversion

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

flip horizontal – flips selected shapes left-right

flip vertical – flips selected shapes up-down

set original dimension – sets tool handles position upon on the original shape dimension

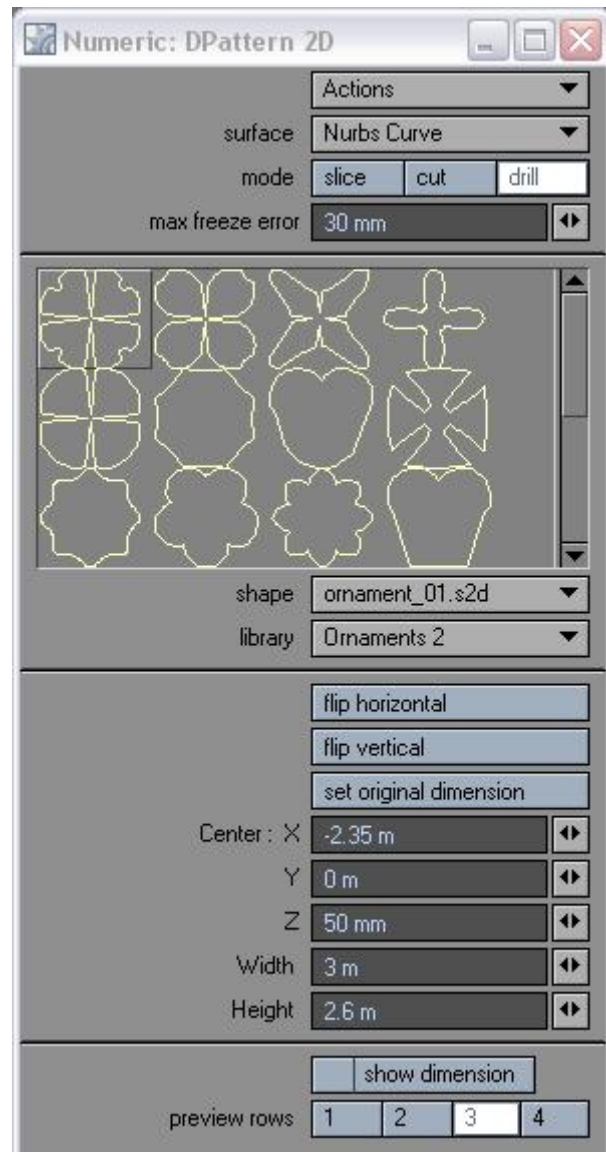
Center - rectangle center

Width - rectangle width parameter

Height - rectangle height parameter

show dimensions - ON/OFF check button for viewing tool dimensions in the viewport.

preview rows – defines the count of shape rows visible in preview window



***D*Pattern 2D rot**

Pattern 2D is a two handle tool for slicing, cutting or drilling polygons with 2D curve shape with arbitrary rotation.

Desired curve shape can be chosen from Shape Library which is available through the numeric panel. One of two handles is always selected as pivot point. User can change it with a double click.

This tool is restricted for 2D use only.

surface – defines the surface for new created polygons after drill operation

mode – defines current real-time drill mode

max freeze error – defines detail of curve before conversion to polygons

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

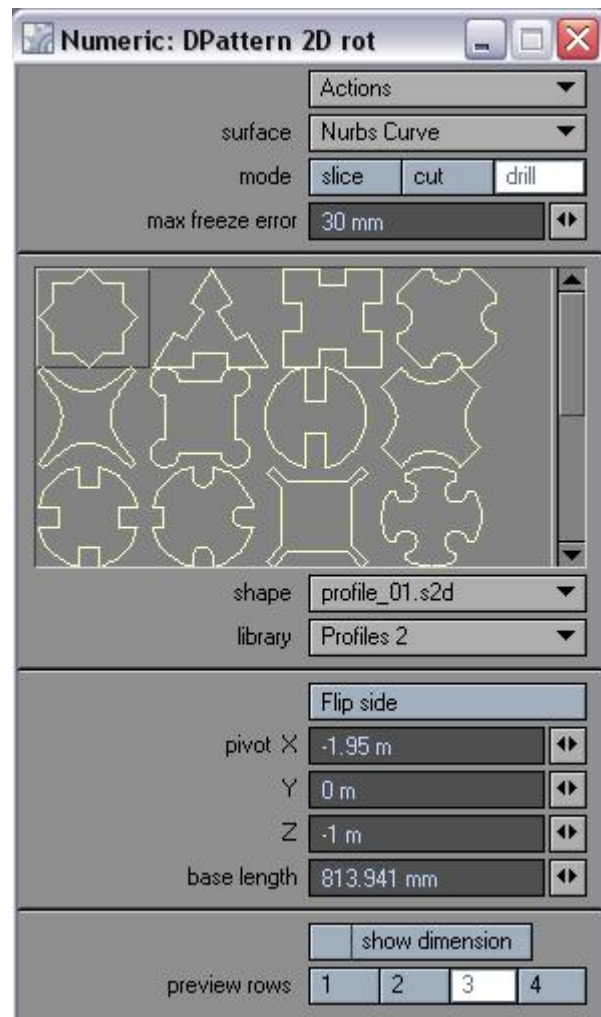
Flip side – flips pattern position around the handles

pivot – defines pivot handle position

base lenght – defines distance between the handles

show dimension - ON/OFF check button for viewing dimension in the viewport.

preview rows – defines the count of shape rows visible in preview window



Polygon Detail

Engraver

Engraver is an excellent tool for creating details on objects. It very easily creates a cornice or wall molding. Tool can be used only on four point polygons. If more four polygons are connected into uniform array then this considered as one **area** and engraver use it as a single entity.

It can operate on multiple areas in one shot. Tool uses Shape Library 1D.

close ends - ON/OFF check button for closing the holes which are created when the tool rip the mesh.

base polygons - aligns or removes area polygons.

max freeze error – defines detail of curve before conversion to polygons

count – number of shapes used per area

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

mode - defines which area is adjusted, single or at once

offset - parameter of the shape height on area

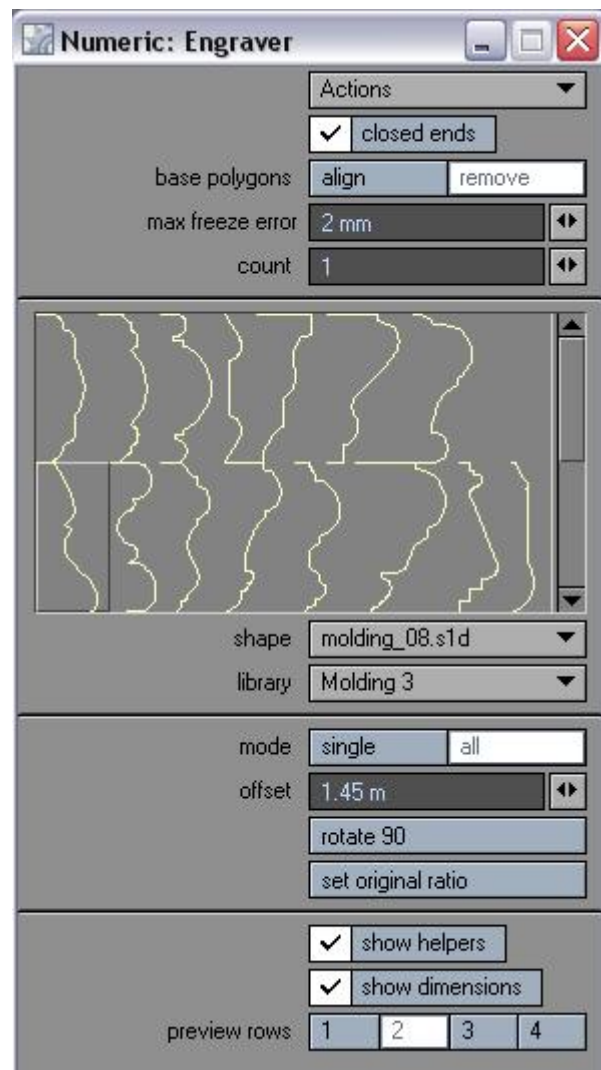
rotate base 90 - flips shape orientation

set original ratio - sets original shape ratio adjusted to current dimension

show helpers - ON/OFF check button for viewing area helpers in the viewport.

show dimensions - ON/OFF check button for viewing offsets for each area in the viewport.

preview rows – defines the count of shape rows visible in preview window



Profiler

The Profiler is universal tool for extruding arbitrary profiles along the curve. It can operate with one or more curves in one shot. Extruded shape is used from Shape Library 2D.

close ends - ON/OFF check button which define whether profile's ends are closed or not.

shape pivot – defines shape position on rail curve. Center option places shape as centered on curve and 1,2,3,4 options into corner points.

rail curve max freeze error - defines rail curve detail

shape curve max freeze error - defines shape curve detail

Shape Library thumbnail – this mini-window shows available shapes in current library.

shape – defines current selected preset in library

library – defines current selected shape library

mode - defines which radius is adjusted, single or all at once

width - defines radius value

angle - defines rotation of shape around the rail curve

rotate 90 profile - adds 90 degrees to angle value

flip horizontal – flips selected shapes left-right

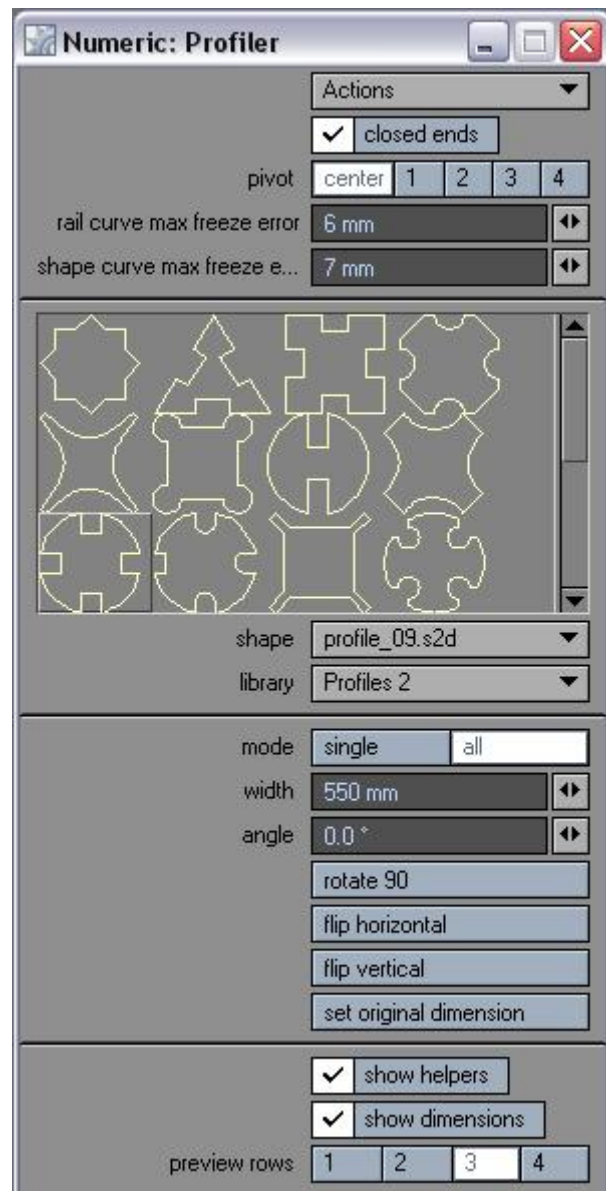
flip vertical – flips selected shapes up-down

set original dimension – sets width upon on the original shape dimension

show helpers - radius handle is visualized with green rectangle.

show dimensions - ON/OFF check button for viewing radius value in the viewport.

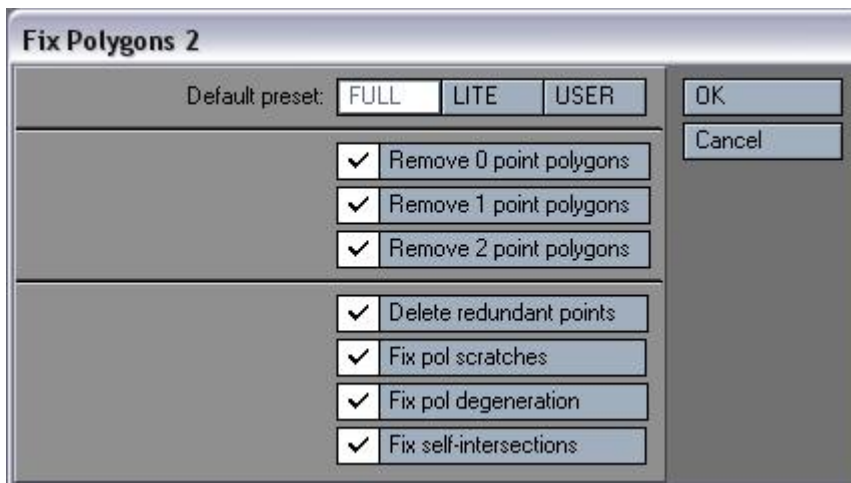
preview rows – defines the count of shape rows visible in preview window



Fix Polygons

Fix Polygons 2

Fix polygons is an adjustable multi-command for correction polygon errors and simplifying complicated polygons. Every step takes one undo, except for remove 0,1,2 point polygons where all three take one undo. Therefore, in the worst case, this multi-command can take maximum five undo steps. Tool is working only in the primary layer.



The panel has seven parameters:

Remove 0,1,2 point polygons

Every polygon with 0,1,2 points is removed from layer.

Delete redundant points

This step merges points in every polygon. Points are merged only within each polygon separately.

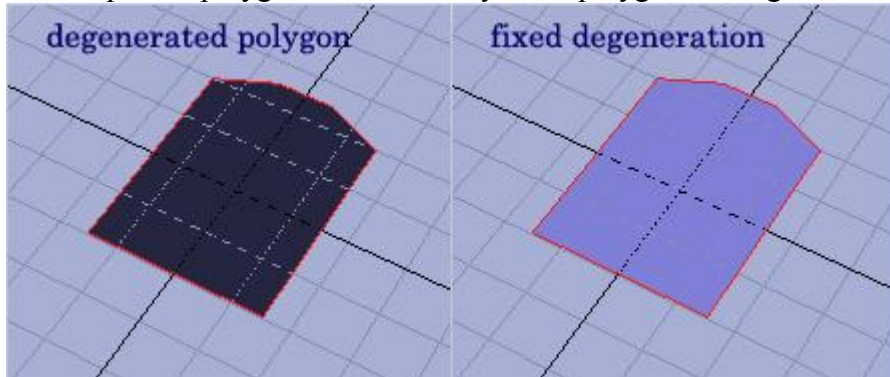
Fix pol scratches

This step removes all scratches in polygon.



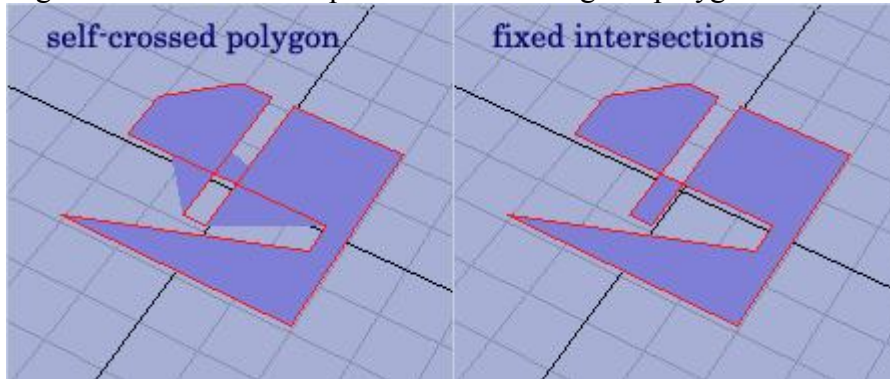
Fix pol degeneration

This step fixes polygon normal. Every fixed polygon has regular normal.



Fix self-intersections

This step fixes self-intersected polygon. Fixed polygons don't have self-intersected edges. Side effect of this phase is that also regular polygons with holes are fixed.

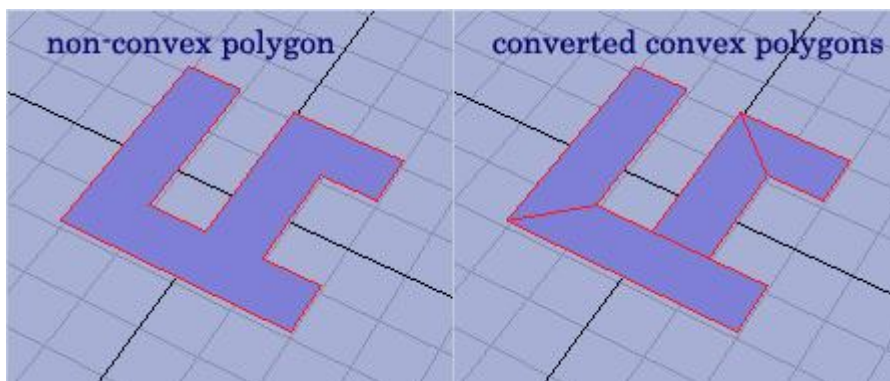


Make Convex - Make Quad

Non-convex polygons used in LightWave can sometimes makes the visible errors in the viewport. Those errors are very unpleasant and very common.

Make Convex command reduces those non-convex polygons into convex. Those converted polygons are viewed correctly then.

Make Quad converts multiple point polygons into four point polygons.



Cap Hole Tool 2

Cap Hole is an interactive tool to solve all types of holes. It works in three phases. First phase localizes hole. Then localized hole is merged. If hole is not solved with the merge phase, then third phase closes hole with the patch. All three phases runs in the real time and every change has an immediately effect in the viewport. Tool works only in the primary layer.

Show open edges

Open edges on the polygons are marked with the green lines. If the parameter is "NO HOLE" then open edges are marked only if object doesn't have a regular hole.

Open edges count

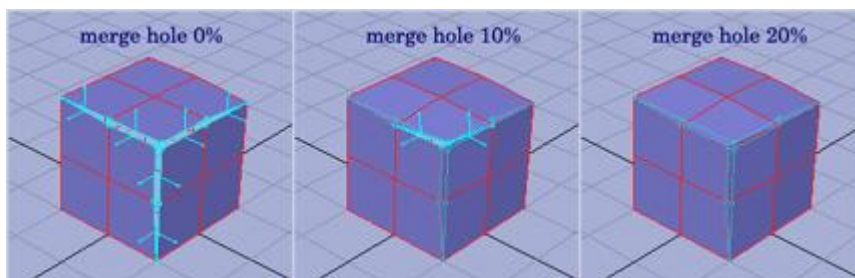
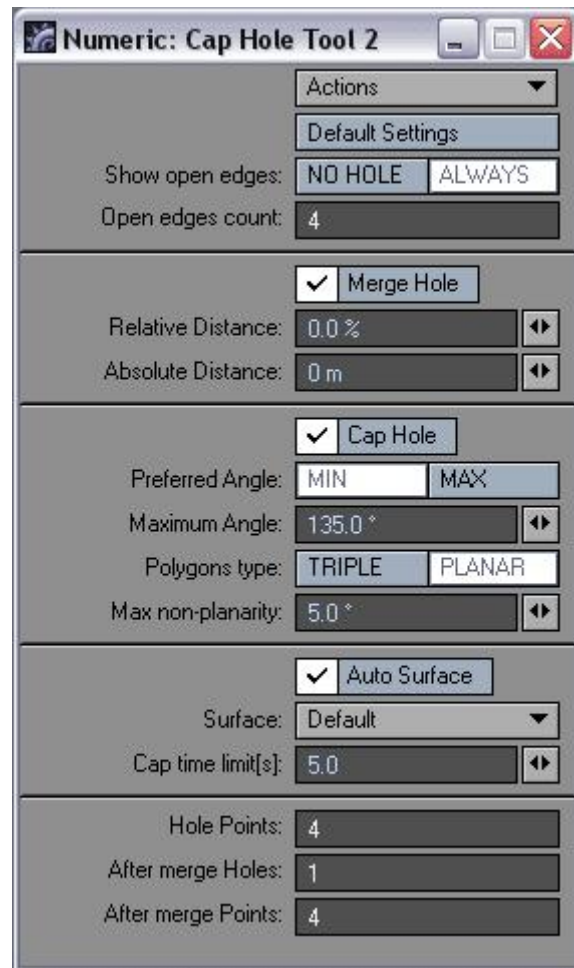
Open edge's count in actual layer.

Merge hole

ON/OFF parameter enable/disable merge hole phase.

Relative/Absolute distance

Merge hole base parameter. Higher values could solve also small cracks in objects.

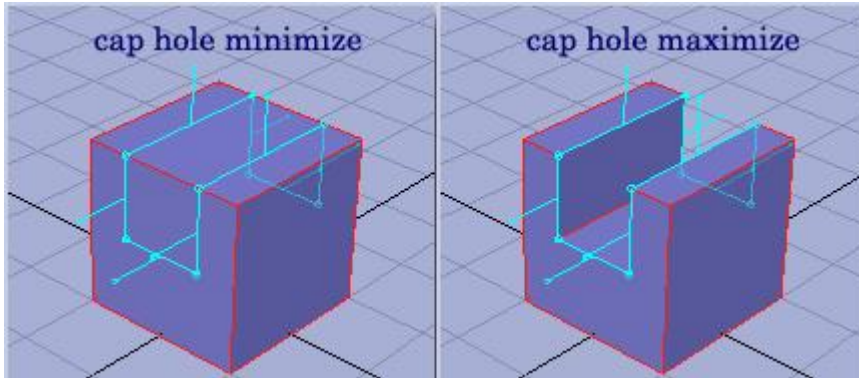


Cap hole

ON/OFF parameter for cap hole phase.

Preferred angle

Cap hole algorithm has two basic modes. Difference between them is illustrated on the following picture.

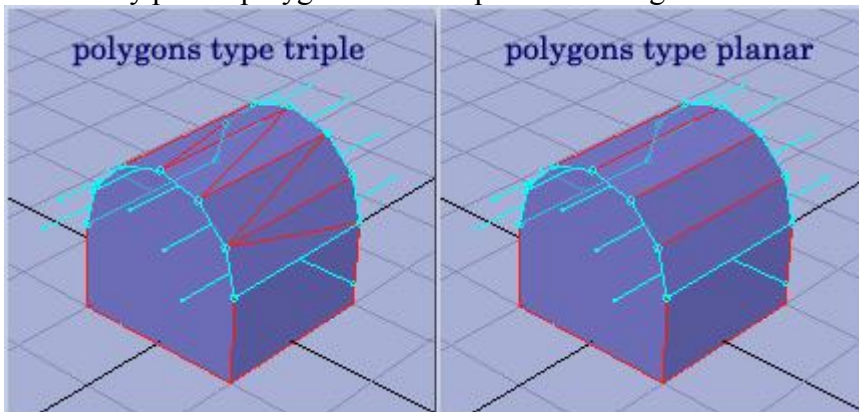


Maximum angle

Maximum angle parameter is the maximum acceptable angle between normal of adjacent cap's polygons and original polygons situated on the boundary of the hole.

Polygons type

Polygons used for covering hole could be planar or triangles. Planar holes are always covered by planar polygons and this parameter is ignored.



Max non-planarity

Maximum allowed polygon's non-planarity.

Auto surface

ON/OFF parameter for automatic surface.

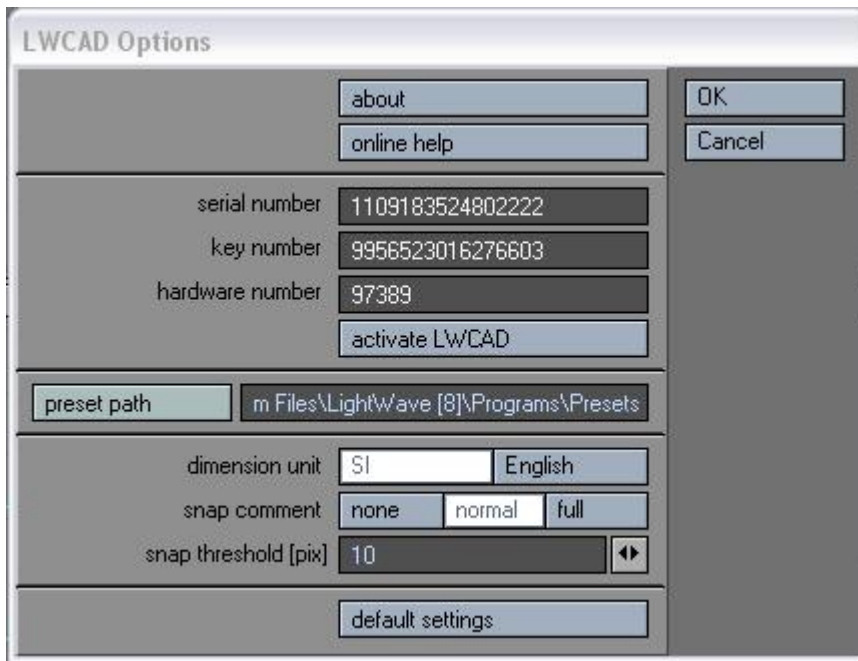
Cap time limit

Maximum time for cap hole algorithm.

Options

LWCAD Options

LWCAD Options panel contains basic global option parameters.



about – panel with version and build number.

online help –web version of the current manual

serial number – serial number for the current installed license

key number – unlock code obtained from wtools3d.com server

hardware number – number generated from attached dongle

activate LWCAD – **read install notes how to use this option!**

preset path - preset path location for Shape Library tools. It has default position on your drive in the “...\LightWave\Programs\Presets” folder.

dimension unit – switch between dimension units type

snap comments – defines how much information is shown in viewport after snap event

snap threshold – user defined snap distance in viewport

default settings - sets factory settings

DXF Import-Export

This duo of commands serves as a gate between LightWave and professional CAD programs.

Imported geometry is stored in current selected layer and layer information from DXF file is transformed into sketch color information.

When exporting, all geometry in selected layer is exported and each sketch color is exported as different layer.

DXF Import:

Supported entities:

3DFACE	- triangle or square polygon
ARC	- circle arc
CIRCLE	- circle
ELLIPSE	- ellipse or elliptic arc
LINE	- simple line
POLYLINE	- polyline or polyface mesh
LWPOLYLINE	- polyline or polyface mesh
SPLINE	- spline curve with maximal degree 6

In imported dxf file can be blocks. Blocks will be replaced by geometry witch they are assembled. Every unsupported entity or parameter is ignored

DXF Export:

Exported entities:

3DFACE	- triangle or square (more than four point polygon is triangulated). Indexation of complex meshes will be not preserved.
SPLINE	- every curve will be stored as spline with appropriate parameters