

# **Facade Technologies User's Manual**



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## ABOUT

Facade Technologies is a design & draft plug-in for Rhinoceros. The plug-in includes easy to use tools of certain parametric approaches of Salon Technologies LLC.

FT practices on architecturally and technically challenging projects and have a particular interest in developing new facade systems and in the use of complex geometries.

FT works for innovative technical solutions and optimization of unorthodox designs for digital fabrication. Our work is informed by a specific response to climate and to the technical performance of the external envelope.

FT follows principles of rapid prototyping as a method of developing facade systems that can be manufactured quickly and with a high degree of accuracy and precision.



## LICENSE AND SUPPORT



Our goal is to provide architects, engineers and other professionals a 3-D tool for exploring, developing, and communicating ideas and designs. We release our plug-ins under Attribution-NonCommercial-NoDerivs license. This license is only open for non commercial use.

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No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material.

If you want to use FT for commercial projects, contact us and we will gladly provide you with our help and service. Contact us directly: [facadetech@salon2.info](mailto:facadetech@salon2.info)

## COMPATIBILITY

Facade Technologies is available for 64 bit Windows and requires Rhinoceros 5 SR8. If FT does not work on your platform, please contact us.



## INSTALLATION

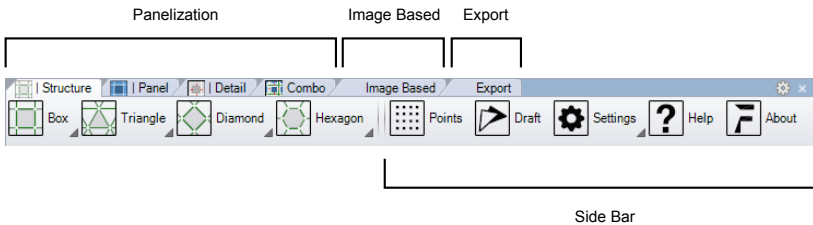
Download or plug the Flash Drive and simply double click the 'Setup.rhi' file and follow the instructions of the installer. Please contact us in case of a problem.

## INTERFACE

There are 3 phases to interact with FT;  
the Toolbar, the Command Line, the Parameter Window

### Toolbar

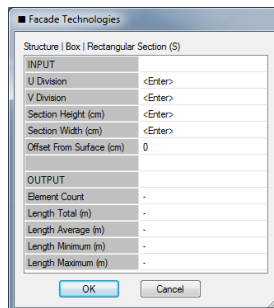
Click the a command the toolbar.



Select the input/option according to command line.

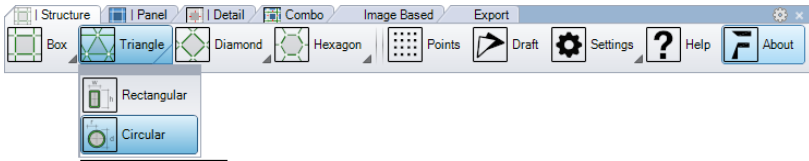


Set the parameters via the parameters window. As you enter new values to the parameters window, it keeps to pop until no new value is entered and generates a report automatically.



## TOOLS / PANELIZATION / Structure

Under the Structure tab, first choose the pattern - box, triangle, diamond, hexagon - then choose the structural members hollow section type - Rectangular / Circular -.



Select the structural member longitudinal type -straight/curved- via the command line.

Select Member Type <Straight> ( S traight C urved ):

Enter the values via the parameter window.

**Facade Technologies**

Structure | Box | Rectangular Section (S)

INPUT	
U Division	<Enter>
V Division	<Enter>
Section Height (cm)	<Enter>
Section Width (cm)	<Enter>
Offset From Surface (cm)	0
OUTPUT	
Element Count	-
Length Total (m)	-
Length Average (m)	-
Length Minimum (m)	-
Length Maximum (m)	-

OK Cancel

**Facade Technologies**

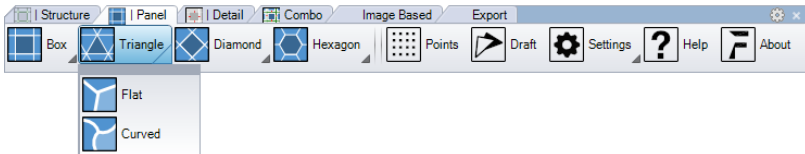
Structure | Box | Rectangular Section (S)

INPUT	
U Division	12
V Division	12
Section Height (cm)	6
Section Width (cm)	4
Offset From Surface (cm)	0
OUTPUT	
Element Count	312
Length Total (m)	1,412.35
Length Average (m)	4.53
Length Minimum (m)	2.90
Length Maximum (m)	6.31

OK Cancel

## TOOLS / PANELIZATION / Panel

Under the Panel tab, first choose the pattern - box, triangle, diamond, hexagon - then choose the panel surface type - Flat / Curved -.



Enter the values via the parameter window.

**Facade Technologies**

Panel | Triangle | Flat

INPUT	
U Division	<Enter>
V Division	<Enter>
Panel Offset (cm)	<Enter>
Offset From Surface (cm)	0
OUTPUT	
Element Count	-
Area Total (m²)	-
Area Average (m²)	-
Area Minimum (m²)	-
Area Maximum (m²)	-

OK Cancel

**Facade Technologies**

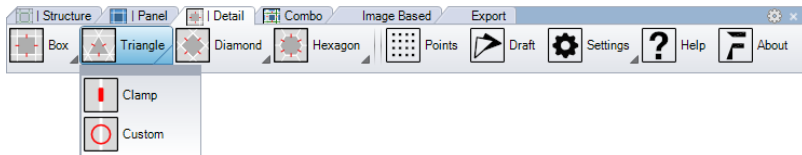
Panel | Triangle | Flat

INPUT	
U Division	12
V Division	12
Panel Offset (cm)	0.2
Offset From Surface (cm)	0.8
OUTPUT	
Element Count	144
Area Total (m²)	2,734.03
Area Average (m²)	18.99
Area Minimum (m²)	13.27
Area Maximum (m²)	24.71

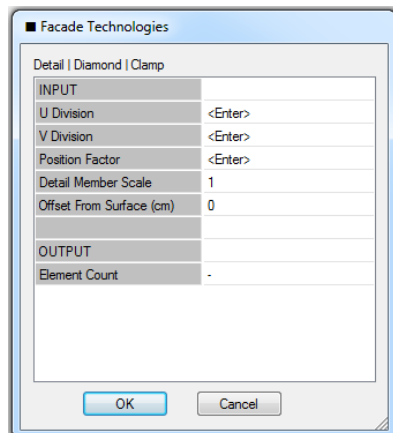
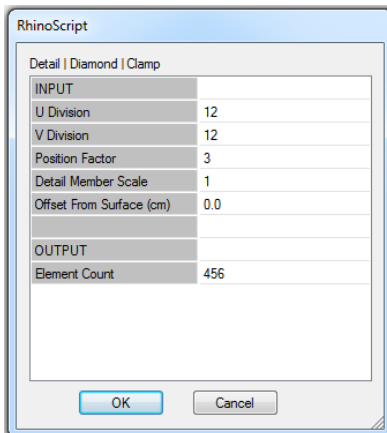
OK Cancel

## TOOLS / PANELIZATION / Detail

Under the Detail tab, first choose the pattern - box, triangle, diamond, hexagon - then choose the detail type - Clamp / Custom -.

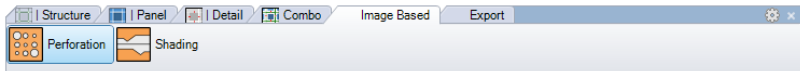


Enter the values via the parameter window.

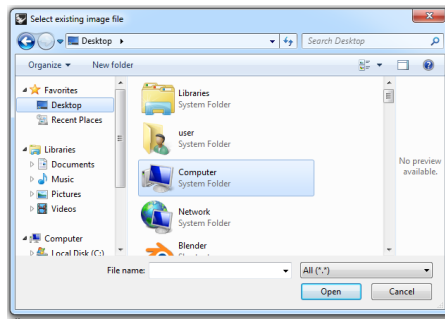


## TOOLS / IMAGE BASED / Perforation

Under the Image Based tab, choose the command Perforation.



As soon as the command button is clicked, the 'Image Select Window' appears. Find the destination of the image file and select it. Higher image resolution requires higher CPU power. (Suggested image resolution is 800 x 600 or lower)



Then enter the maximum radius of the holes and select the input surface to be perforated. (The input surface must be planar.)

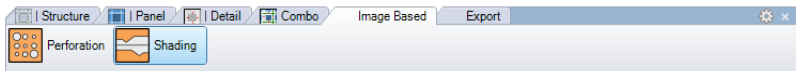
maximun radius of circle <20>:

input surface:

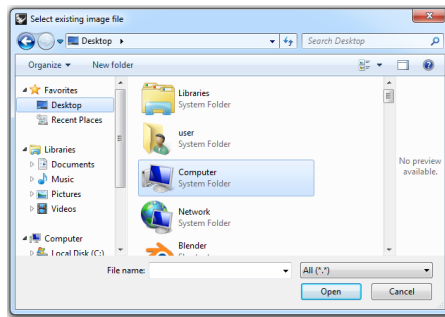


## TOOLS / IMAGE BASED / Shading

Under the Image Based tab, choose the command Shading.



As soon as the command button is clicked, the 'Image Select Window' appears. Find the destination of the image file and select it. Higher image resolution requires higher CPU power. (Suggested image resolution is 800 x 600 or lower)



Enter the x and y pixel resolutions to derive data from the image.

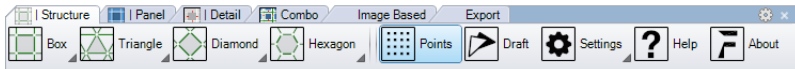
input every x pixels in width u want to look at from the image <1>:

Enter the shaders depth value.

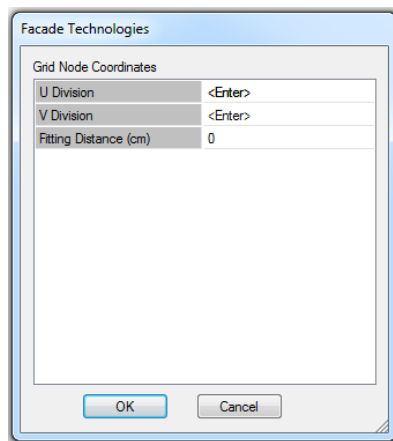
input shades depth <7>:

## TOOLS / SIDE BAR / Generate Points

Under the Side Bar, choose the command Points.



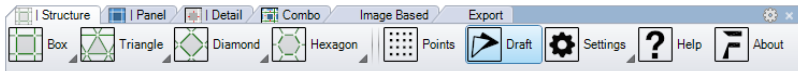
As soon as the command button is clicked, select the input surface and the parameter window appears.



Enter the values of the UV grid that you want to be generated on the surface.

## TOOLS / SIDE BAR / Draft

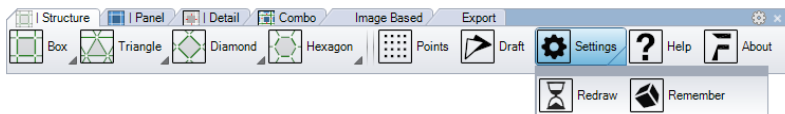
Under the Side Bar, choose the command Draft.



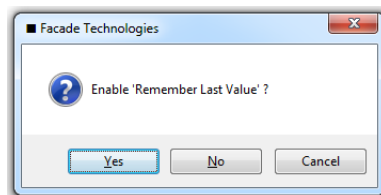
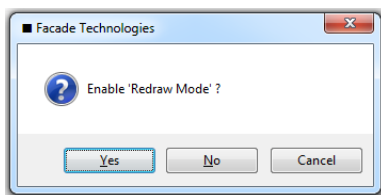
As soon as the command button is clicked, select the panel surfaces to be unrolled and anotated.

## TOOLS / SIDE BAR / Settings

There are two setting options in FT; 'Redraw Mode' and 'Remember Last Value'

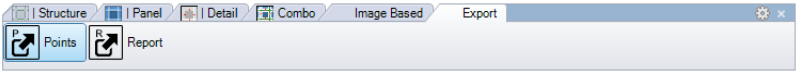


You can enable either mode by pressing 'Yes' or disable it by pressing 'No'.

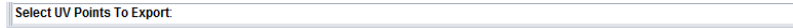


TOOLS / EXPORT / Points

Under the Export tab choose the command 'Points'.



Then select the point object group that had been created with 'Generate Points' command.

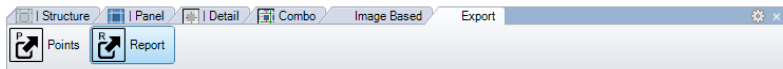


Then Microsoft Excel automatically runs and creates a spread sheet document that contains the point coordinate matrix. (Microsoft Excel is required to be installed for this feature.)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	0, 0	-6,755, 1,311-6,217, 0	982-5,678, 0, 654-5,139, 0	326-4,601, 0, -2-4,062, 0	-331-3,524, 0, -651-3,285, 0	-984-2,447, 0, -1,3-1,968, 0	-1,6-1,370, 0, -1,9-831, 0	-2,297					
2	-1,370, 0, -1,9-831, 0	-2,297-7,090, 0, 1,84-6,557, 0	1,51-6,024, 0, 1,21-5,491, 0	905-4,958, 0, 592-4,425, 0	279-3,892, 0, -35-3,358, 0	-344-2,825, 0, -66-2,292, 0	-974-1,759, 0, -1,288						
3	-2,292, 0, -974-1,759, 0	-1,2-1,228, 0, -1,6-493, 0	-1,934-6,886, 0, 2,02-6,359, 0	1,71-5,831, 0, 1,45-5,303, 0	1,11-4,776, 0, 858-4,248, 0	559-3,721, 0, 261-3,193, 0	-38-2,665, 0, -337						
4	-3,193, 0, -38-2,665, 0	-337-2,138, 0, -631-1,610, 0	-934-1,083, 0, -1,2-555, 0	-1,531-6,683, 0, 2,25-6,160, 0	1,91-5,638, 0, 1,61-5,116, 0	1,44-4,594, 0, 1,11-4,072, 0	840-3,550, 0, 556						
5	-4,072, 0, 840-3,550, 0	556-3,028, 0, 272-2,505, 0	-12-1,983, 0, -294-1,461, 0	-584-939, 0, -864-417, 0	-1,144-6,479, 0, 2,44-5,962, 0	2,15-5,446, 0, 1,91-4,929, 0	1,61-4,412, 0, 1,389						
6	-4,929, 0, 1,61-4,412, 0	1,38-3,896, 0, 1,11-3,379, 0	851-2,862, 0, 582-2,346, 0	312-1,829, 0, 43-1,312, 0	-224-796, 0, -495-279, 0	-765-6,275, 0, 2,61-5,764, 0	2,41-5,253, 0, 2,164						
7	-5,764, 0, 2,41-5,253, 0	2,14-4,742, 0, 1,91-4,230, 0	1,61-3,719, 0, 1,44-3,208, 0	1,11-2,697, 0, 891-2,188, 0	637-1,674, 0, 382-1,163, 0	128-652, 0, -127-341, 0	-382-6,072, 0, 2,881						
8	-141, 0, -382-6,072, 0	2,88-5,566, 0, 2,61-5,060, 0	2,44-4,554, 0, 2,11-4,049, 0	1,91-3,543, 0, 1,64-3,037, 0	1,44-2,531, 0, 1,11-2,026, 0	961-1,520, 0, 721-1,014, 0	482-508, 0, 242						
9	-1,014, 0, 482-508, 0	242-3, 0, 2-5,868, 0	3,01-5,368, 0, 2,84-4,867, 0	2,61-4,367, 0, 2,41-3,867, 0	2,11-3,367, 0, 1,91-2,866, 0	1,71-2,366, 0, 1,51-1,866, 0	1,21-1,365, 0, 1,061						
10	-1,866, 0, 1,21-1,365, 0	1,04-865, 0, 835-365, 0	610 135, 0, 385-5,664, 0	3,21-5,169, 0, 3,01-4,675, 0	2,81-4,180, 0, 2,61-3,685, 0	2,41-3,190, 0, 2,21-2,695, 0	2,01-2,201, 0, 1,821						
11	-2,695, 0, 2,01-2,201, 0	1,81-1,706, 0, 1,61-1,211, 0	1,44-716, 0, 1,189-221, 0	979 273, 0, 768-5,461, 0	3,54-4,971, 0, 3,34-4,482, 0	3,11-3,992, 0, 2,91-3,503, 0	2,71-3,014, 0, 2,523						
12	-3,503, 0, 2,71-3,014, 0	2,51-2,524, 0, 2,31-2,035, 0	2,11-1,546, 0, 1,91-1,056, 0	1,71-567, 0, 1,543-78, 0	1,347 412, 0, 1,151-5,257, 0	3,74-4,773, 0, 3,51-4,289, 0	3,31-3,805, 0, 3,166						
13	-4,289, 0, 3,31-3,805, 0	3,11-3,321, 0, 2,91-2,837, 0	2,81-2,354, 0, 2,61-1,870, 0	2,41-1,386, 0, 2,21-902, 0	2,078 418, 0, 1,897 66, 0	1,716 550, 0, 1,534-5,053, 0	3,91-4,575, 0, 3,750						

## TOOLS / EXPORT / Report

Under the Export tab choose the command 'Report'.



Then select the text object reports that had been created with any panelization command.

Structure | Box | Rectangular Section (S)

U Division	= 12
V Division	= 12
Section Height (cm)	= 6
Section Width (cm)	= 3
Offset From Surface (cm)	= 8
Element Count	= 312
Length Total (m)	= 1,412.35
Length Average (m)	= 4.53
Length Minimum (m)	= 2.90
Length Maximum (m)	= 6.31

Panel | Triangle | Flat

U Division	= 12
V Division	= 12
Panel Offset (cm)	= 0.2
Offset From Surface (cm)	= 0
Element Count	= 144
Area Total (m²)	= 2,734.03
Area Average (m²)	= 18.99
Area Minimum (m²)	= 13.27
Area Maximum (m²)	= 24.71

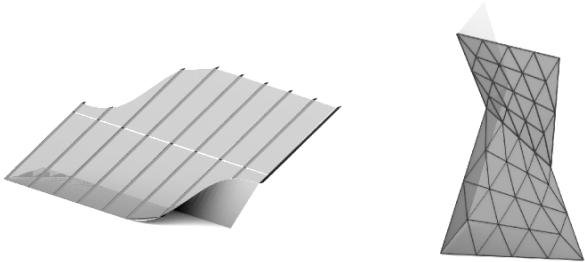
Detail | Box | Custom

U Division	= 12
V Division	= 12
Position Factor	= 3
Detail Member Scale	= 1
Offset From Surface (cm)	= 0.0
Element Count	= 624

Then Microsoft Excel automatically runs and creates a spread sheet document that contains the point coordinate matrix. (Microsoft Excel is required for this feature.)

Project Name	
Project Name	
1 Bill of Quantities	4/4/2014 01:17:20
2	
Panel   Triangle   Flat	
U Division	= 12
V Division	= 12
Panel Offset (cm)	= 0.2
Offset From Surface (cm)	= 0
Element Count	= 144
Area Total (m²)	= 2,734.03
Area Average (m²)	= 18.99
Area Minimum (m²)	= 13.27
3 Area Maximum (m²)	= 24.71
4	

**GENERATED EXAMPLES / Flat Surface Variations**



**SURFACE**

<b>U Division :</b>	8	6
<b>V Division :</b>	4	6
<b>Pattern :</b>	Box	Triangle

**STRUCTURE**

<b>Section Type :</b>	Rectangular	Rectangular
<b>Section Width (cm) :</b>	12.0	8.0
<b>Section Height (cm) :</b>	6.0	14.0
<b>Section Radius (cm) :</b>	-	-
<b>Pattern :</b>	Box	Triangle

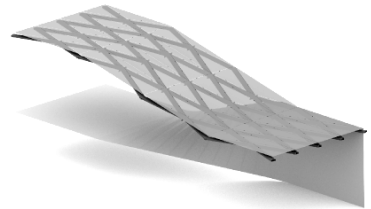
**BOARDS**

<b>Width (cm) :</b>	2.2	1.8
<b>Border Offset (cm) :</b>	0.3	0.2
<b>Joint Type :</b>	Clamp	Clamp

**FITTING**

<b>Structure Fitting :</b>	Outer	Middle
<b>Board Fitting :</b>	Outer	Outer

## GENERATED EXAMPLES / Single Curved Surface Variations



### SURFACE

<b>U Division :</b>	6	8
<b>V Division :</b>	6	4
<b>Pattern :</b>	Cross Box	Cross Box

### STRUCTURE

<b>Section Type :</b>	Rectangular	Rectangular
<b>Section Width (cm) :</b>	8.0	12.0
<b>Section Height (cm) :</b>	14.0	6.0
<b>Section Radius (cm) :</b>	-	-
<b>Pattern :</b>	Diamond	Diamond

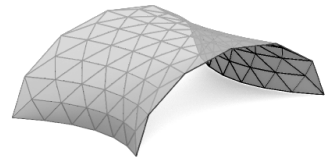
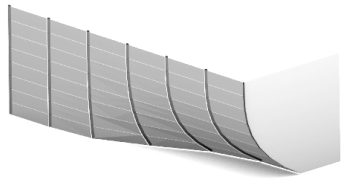
### BOARDS

<b>Width (cm) :</b>	1.8	2.2
<b>Border Offset (cm) :</b>	0.2	0.3
<b>Joint Type :</b>	Clamp	Clamp

### FITTING

<b>Structure Fitting :</b>	Middle	Outer
<b>Board Fitting :</b>	Outer	Outer

## GENERATED EXAMPLES / Double Curved Surface Variations



### SURFACE

U Division :	6	6
V Division :	1	6
Pattern :	Box	Triangle

### STRUCTURE

Section Type :	Rectangular	Circular
Section Width (cm) :	4.0	-
Section Height (cm) :	10.0	-
Section Radius (cm) :	-	5.0
Pattern :	Box	Triangle

### BOARDS

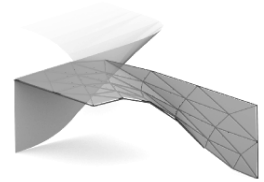
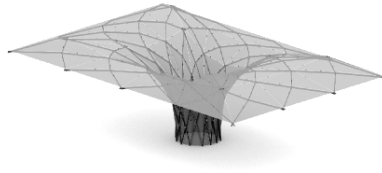
Width (cm) :	2.2	1.8
Border Offset (cm) :	0.3	0.2
Joint Type :	Custom	Clamp

### FITTING

Structure Fitting :	Outer	Middle
Board Fitting :	Outer	Outer



## GENERATED EXAMPLES / Double Curved Surface Variations



### SURFACE

U Division :	14	4
V Division :	6	8
Pattern :	Cross Box	Triangle

### STRUCTURE

Section Type :	Circular	Rectangular
Section Width (cm) :	-	6.0
Section Height (cm) :	-	8.0
Section Radius (cm) :	4.0	-
Pattern :	Diamond	Triangle

### BOARDS

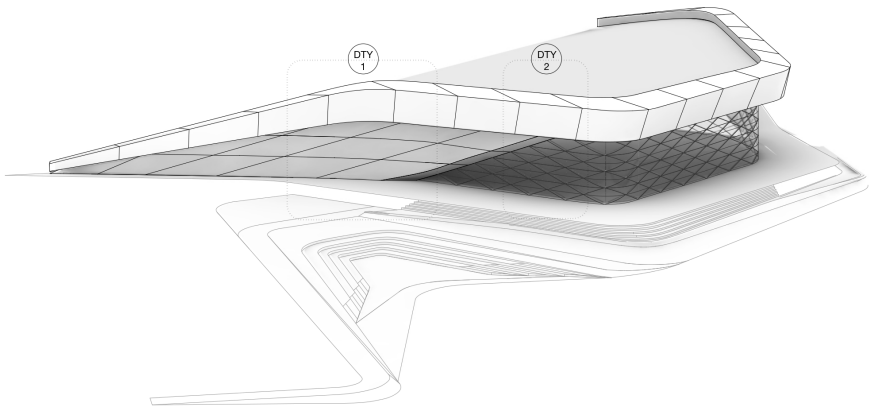
Width (cm) :	1.6	2.0
Border Offset (cm) :	0.5	0.5
Joint Type :	Clamp	Clamp

### FITTING

Structure Fitting :	Outer	Outer
Board Fitting :	Outer	Outer

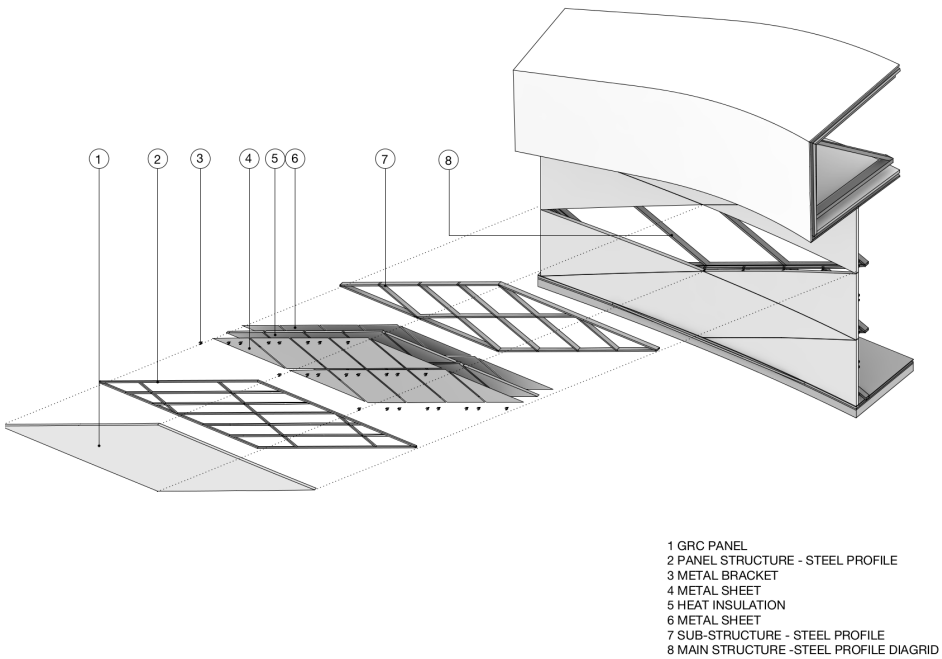
## ARCHITECTURAL MODELS

You can develop constructional elements free from orthangonal and static frames. The constructional models able you to create and analyze 3-Dimensional integrity of structural and performative layers. Designers can crossbreed layers of different patterns to generate endless combinations. These architectural models help designers to test various aesthetic and performative possibilities.

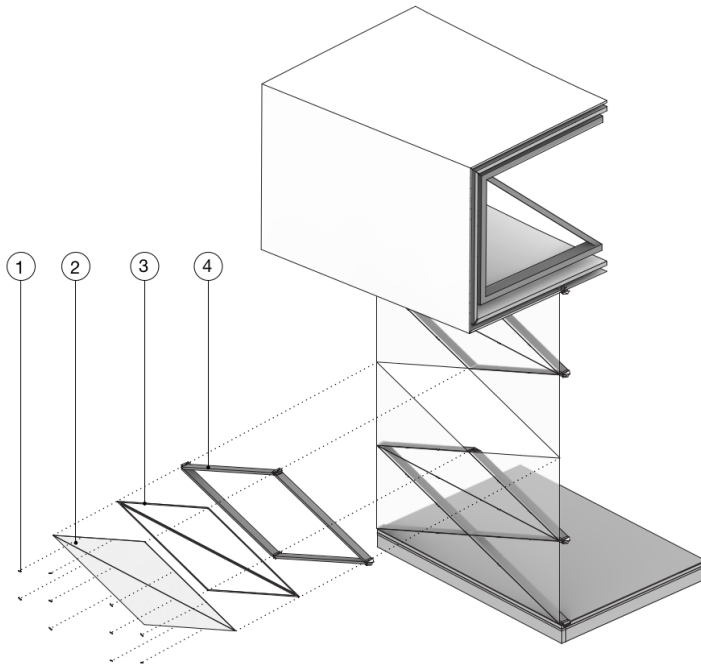


Case Study Architectural Model

## DETAIL MODELS / GRC Detail Model



## DETAIL MODELS / Glazing Detail Model



- 1 FIXING DETAIL
- 2 DOUBLE GLAZING
- 3 ELASTIC STRIP
- 4 ALUMINIUM MULLIONS

## AUGMENTED STRUCTURES

Role: Parametric Design & Structural Modeling & Digital Fabrication

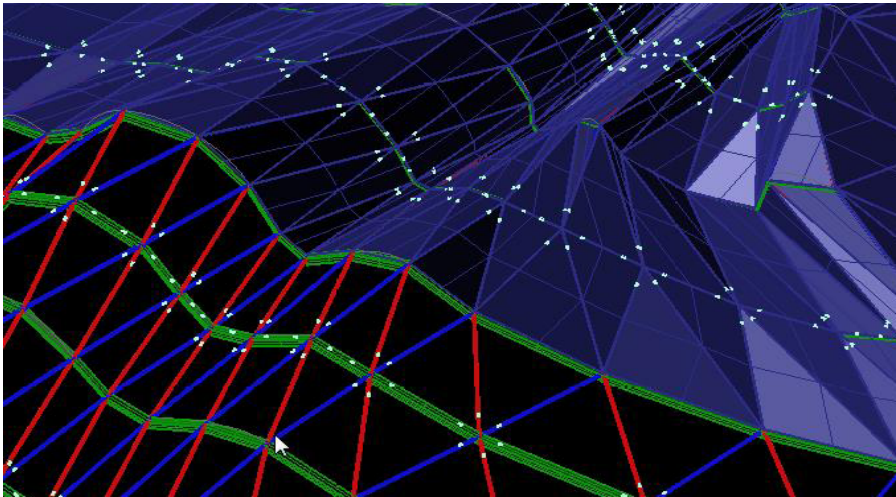
Architectural Design: Salon Architects

Location & Date: Istanbul – 2011

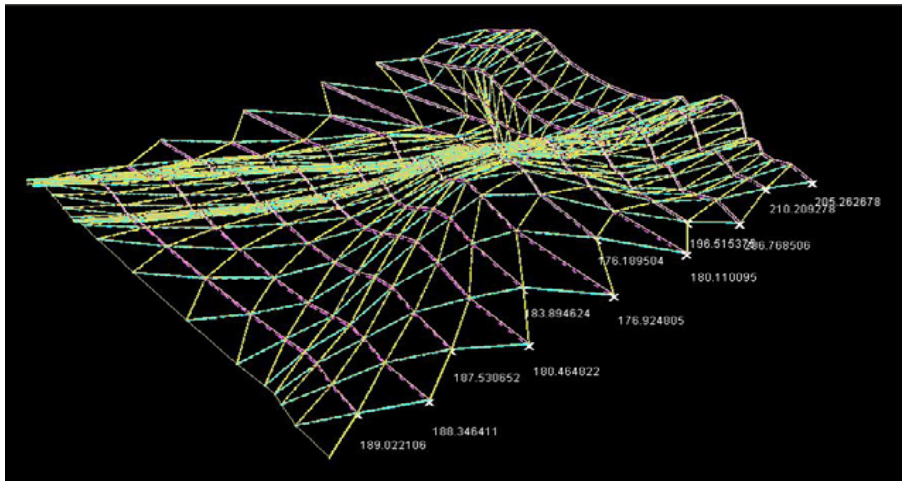


The project brings together disparate disciplines like sound, architecture and the visual arts which influence one another to such a degree that it is impossible to separate them. While the project reexamines the world in visual and aesthetic terms, in its capacity as an “interdisciplinary transformation” project it also questions the point where art and architecture stand today and the point they might reach in future.

AUGMENTED STRUCTURES



Connection Details



Dimension of the structural elements

## GATE

Role: Parametric Design & Digital Fabrication

Architectural Design: Salon Architects

Location & Date: Istanbul – 2011



An interior LED screen is filtered twice to shape the light inside the space. The first layer is a white diffuser; the second layer is a parametrically patterned image of a forest visualized by linear cuts. Metal plates are cut precisely with CNC according to the application drawing.

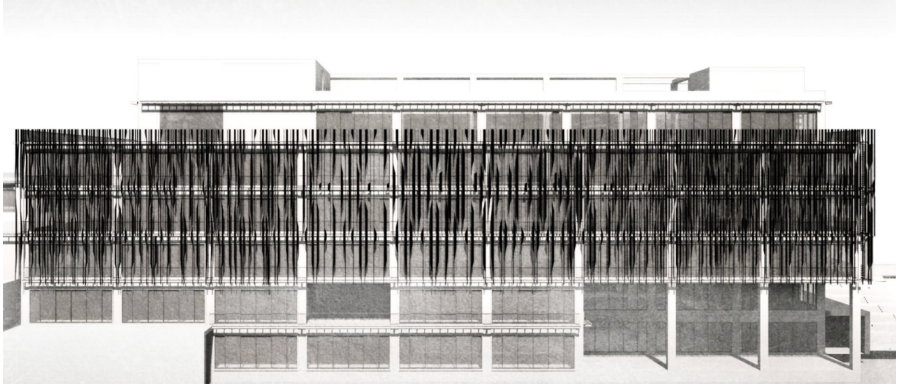


## FOLD FACADE

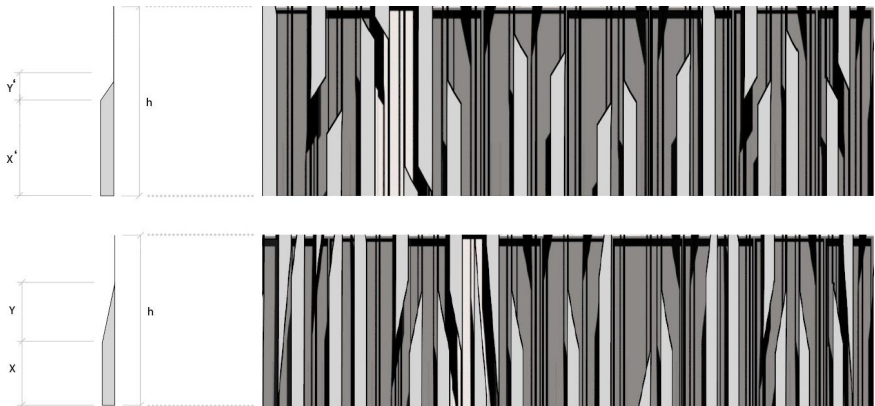
Role: Facade Development

Architectural Design: NSMH

Location & Date: Istanbul – 2013



Western facade of the building is designed with the 'Fold Facade' technique which is developed by Salon Technologies. Identifying the design input for the technique, the criteria were; day light, overall mass composition and interior use variations of the facade. Then open-close area proportions of the facade fragments are decided in terms of these parameters. The facade panels are 3 times folded stripes. The application drawing for cutting and folding can be obtained easily and precisely.



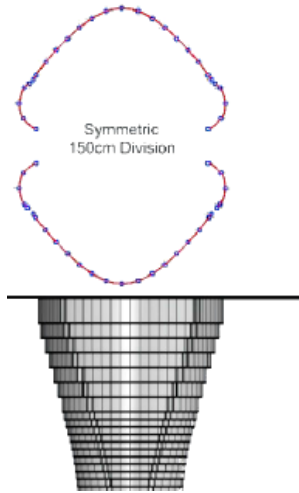


## RADIO-TV TOWER FACADE

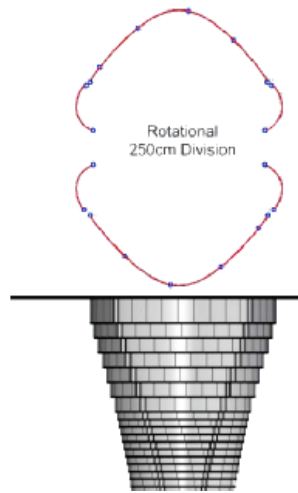
Role: Facade Development

Architectural Design: Salon Architects

Location & Date: Istanbul – 2013



Division Type: Symmetric  
Panel Width: 150 cm

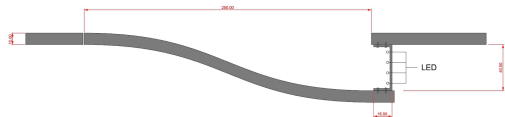


Division Type: Rotational  
Panel Width: 250 cm

In this project, different facade panelling options that are adaptable to the form of the tower are generated. During this process the optimization of the panel sizes was an important input. GRC Panel sizes are decided according to the production and transportation limits. The unique sizes of the panels and the moulds can be produced by the software as well.



250 cm Panel, Crease



250 cm Panel, Crease Detail

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