Museum of Skin Instruments

By

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Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Master of Architecture

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Date of Defense

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Skin is a very broad topic that allows discovering and exploring all the possibilities of what skin can be. Furthermore, skin is much known for its flexibility that can shape and wrap almost every object we can think of. At the beginning of my thesis research about skin, I thought I knew enough about it to start, but I discovered later on that skin is not a surface. Moreover, I directed myself into exploring more and more about skin and its characteristics. I built many models to help me understand some of the natural identity of skin and related materials. Those models became a concept for my project—a museum of skin instruments—in Alexandria, Virginia where I implied the mechanism of different skin instruments in each building. Exploration and experiments were the key to develop my design process.
Acknowledgments

Behind every work, there are people who dedicate themselves to help others; educate them and open their eyes to the notion of architecture. Therefore, I would like to take the opportunity to thank my committee members: Dr. Paul Emmons, Prof. Jaan Holt and Prof. Ron Kagawa for their help and cooperation. I also like to acknowledge my former committee members who supported me: Dr. Marco Frascari and Prof. Ray Mullican. I also dedicate this work to my family who supported me during my study in the United States and abroad, to all my friends and to my love. Thank you all.

Antoun
1. **What is Skin?**

Skin is the largest organ of human beings. Skin protects the body from numerous bacteria and chemicals that may harm the human body and cause infection. The skin also protects the inner tissues from strong sunlight. Moreover, it regulates the internal temperature of the body within normal levels. The skin has three layers of tissue: (1) epidermis, (2) dermis, and (3) subcutaneous tissue. (Fig.1) This multi-layered organ has different properties: it can be thin or thick, stretched or loose, rough or smooth, depending on the area that covers it. (Fig.2)
1. Pealing the **SKIN** of The Earth:

The face of the earth is studied by changes made by cutting paper board into stripes and pushing each one individually to create different elevations. Light flows through the slices and casts different shadows. The drawing shows the changes in section and elevation between the flat and deformed surfaces.
2. **Skin Penetration**

Three rows are cut and treated with different materials. The first row is penetrated with a piece of board, the second with a piece of glass, and the third with a piece of wood. Each of these three materials has a different width and thickness that allow light to go through the openings.
3. Connection between Skin Colors

This model resembles the connection between people in terms of skin color. Each string is a different color like the skin and is connected between the nails that are the people.

4. Folding Skin

This model is made with fabric that is folded to show flexibility.
5. Slicing With Glass

This model is sliced irregularly to create different surfaces. Pieces of glass with different sizes were integrated to support and differentiate the openings. Glass is also reflects the light that penetrates through the openings.
6. Carving Skin

This model is sliced irregularly to create different surfaces. Pieces of glass with different sizes were integrated to support and differentiate the openings. Glass also reflects the light that penetrates through the openings.
7. MRI: Chest Section

This MRI image is taken through the chest. I used this section as an enclosure. This enclosure has three main parts: the skin, the ribs, and the lungs. I imagine the skin as the roof, the ribs as the structure and the lungs where the people are who need to be protected inside it.
8. Chest X-Ray

This is an X-Ray through the chest showing the ribs that are the structure to protect the organs. This model is to resemble the lung that can breath and inflate in the chest.
9. Skin of The Site

This model shows the pealing technique of the site by pealing the skin of the site which is the skin of the chest. It penetrates it through the site in different locations in strips. The end of each strip is left free in order to pull it or push back to change the site topography.
10. Stretching The Skin

This model experiences the stretching technique of a skin. Each side of this latex material is stretched and stapled at the bottom of this board. The staples acts as tension cables that hold the tensile structure.
11. Skin In Tension

This model expresses the skin in tension. It is hung on the top from two sides and attached with a heavy weight at the bottom that stretches the nylon. Whenever the cube rotates it changes the form of the skin.

12. Connecting The Dots

These circles are made of leather. They are punched and stapled together. Each circle is stapled from four sides. It is very flexible and can cover any object and shape its form.
The **Skin Instruments**

**Concept and Mechanism**

After the exploration stage where I experienced all types of ideas about skin, and since the skin topic is very wide open, I decided to narrow it down to be focused on Skin instruments. Since I personally Play the Tabla, I used skin Instruments as a source for my new design. I started my design by studying the skin Instruments, how they work, and their construction. Moreover, I divided them into three categories:

1. **Stretched Skin Instruments** like drums, banjos, tupl, and tablas.
2. **Skin Strings Instruments** like rabab and qanun.
3. **Inflated Skin Instruments** like bagpipes.

Furthermore, each type of these instruments is built and played differently, but they all are constructed of skin.
The site

The surroundings

During my studies at the Washington Alexandria architectural consortium (WAAC), I was interested in this city especially; King St. that leads to the waterfront. This street is very walkable and active. There are lots of shops, restaurants, and bars. Therefore, I choose the end of King Street to be my site, where there is a parking lot and park. Moreover, I decided to continue the King St. path and make it turn around my building. Therefore, I preserved the view from the site. For instance, when someone approaches the site he/she will see Maryland and if he/she looks back will see the Masonic temple. It is like framing the view of the site through King Street.
Aerial View

It is very important to keep the King Street extension open through the site. I also used stone to pave the King St. extension which is the original pavement for the streets in Alexandria. Wood docks were built above the water where people can moor their boats and access the site. It also organizes the circulation around the site and allows people to walk around and enjoy the view.
The Site

Waterfront
The Program

The first step was to set up a program for my project in order to know how to start the design process. The program has three buildings; each one embodies and expresses one category of skin instruments; the drum building, the strings building, and the bagpipe building. The strings’ building is the main one. It has an instrument shop where the instruments can be made, a bookstore, a café, exhibition spaces, a media room, services, offices, and a theater that is built over the water and creates a space for renting canoes and boats. Concrete walls, tension cables, vertical trusses, and roof trusses were used to support the structure. The roof is a membrane stretched over the roof trusses. It spans from the side walls to the middle wall. The middle wall has a copper channel on the top to drain the water collected to the river.
The Program

The drum building is round like a drum and supported by concrete columns. The roof is also stretched with tension cables and attached to an adjustable detail connection. It has exhibition spaces and services. The ground and the fourth floors have glass walls, the second has translucent fiberglass walls called “Kalwall,” and the third has concrete walls to give some massive presence to the drum. When it rains, the rain would sound on the stretched roof giving the effect of the drum. The roof on the model is made of sewn deerskin and stretched with strings and staples.
The bagpipe building has a pneumatic roof structure that sits inside a steel ring. The steel ring is supported by round concrete columns. Moreover, two mechanical rooms located in the second floor feed the roof with air through the columns. It also has exhibition spaces and services. (I used a soccer ball to make the roof since it is an inflated object).
Museum of Skin Instruments

Ground Floor
Museum of Skin Instruments

Third Floor
Museum of Skin Instruments

East Elevation

North/South Section A-A
Museum of Skin Instruments

East/West Section B-B

South Elevation
Wall / Drainage Section
Scale: 1/8" = 1'-0"

Step Detail / Elevation
Scale: 3/4" = 1'-0"

Detail Elevation
Scale: 1/4" = 1'-0"

Wall Section - Drum Building
Scale: 1/16" = 1'-0"
Stair of Strings

This stair is located in the main lobby of the main building. It has its own steel frame and is held by tension cables from top to bottom. The steps are made of glass and supported by steel members. This steel frame is on wheels, so it can be moved and relocated along the edge of the second floor. Since it is supported by a cable system, it becomes the harp of the building that can sound when someone hits it.
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Note: All text and images are by author unless otherwise noted.
Education and Certification:

Master of Architecture (M.Arch. Design Concentration) - 2005
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Associate Degree in Architecture and Civil Engineering - 1998
Engineering Intermediate Institute - Damascus University

Work Experience:

Daniels Design and Remodeling Inc.
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March 2004 - May 2005

Bonstra Architects, PC
1710 Connecticut Ave, NW - Suite 400
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April 2003 - January 2004

Dean: Gregory K. Hunt FAIA (The Catholic University of America)
Pryzbyla Center Model (Bohlin Cywinski Jackson Architects)
March 2002 - September 2002

Shinberg, Levinas Architectural Design
November 2001 - January 2002
HONORS AND AWARDS:

WTC Memorial Competition - Entry
Project exhibited at The National Building Museum "Modeled Space - Space Modeled.
Washington Monument Competition - Entry
Member in "The Honor Society in Architecture and Allied Arts"
(Tau Sigma Delta) since Spring 2002
Dean’s List (Fall 01 - Spring 02 - Fall 02)

COMPUTER SKILLS:

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Chief Architect 8,9
Adobe Photoshop 6,7
3D Studio Viz 4, 5
3D Studio Max 3, 4, 5

EXTRA CURRICULAR ACTIVITIES:

Professional Model Making
High Quality Drafting (Ink, Pencil)
Drawing and Rendering (All Media)
Professional Musician (Oriental Drum)
Photography (35mm, Digital, B&W)