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THE INFLUENCE OF MATERIALS IN FURNITURE DESIGN

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INTRODUCTION

Selecting a thesis project for my Masters Degree was a difficult task. It had to be related to my field of study, yet be a project that was not simply a rehashing of the work I had done during the first two quarters of my graduate year. To get the most out of a Thesis related to Design Applications (Three Dimensional Design), I wanted to combine in my Thesis research in materials, process methods of materials, and design. There had to be an integration between design and material. Each would influence the other and it would be my task to select an area of study that would allow me to consider both material related to design and design related to material.

My choice of topic was furniture design. More specifically, how materials influenced furniture design. My plans included research that involved seeking out pieces of furniture that have won acclaim for their unique use of material. Selecting what I considered unusual materials that furniture could be made of, I began my search. Practically every book on furniture in the libraries were looked at. Starting with "Furniture" as my main heading of interest in the Art Periodical Index, I went through all the sub-headings that suggested an article about or pictures of furniture that were extraordinary, not so much
for their design but for the material of which they were made.

As with most research, one thing led to another and many times, I could feel myself being side-tracked, or found myself spending too much time on a subject that really was not pertinent to my Thesis. I discovered that the material best related to my topic could be seen and possibly photographed. The Museum of Modern Art in New York City has a permanent display of famous chairs and tables, many of which were firsts in terms of the materials that they were made of. A Thonet rocker and a Mies Van der Rohe tubular stainless steel chair were but two examples of a material influencing a chair design. Some furniture manufacturers had showrooms in New York City that had furniture on display made from unusual materials.

I spent four days in New York City visiting the Museum of Modern Art, America House, The Museum of Contemporary Crafts and a number of furniture showrooms. I also spent some time in some of the more modern buildings merely walking about looking at some exquisite modern furniture. Those four days in New York City did more for me than two weeks in the library.

I was fortunate to be able to photograph the furniture display in the Museum of Modern Art, although I was not permitted to get very close to the furniture itself. The only showroom where I was allowed to take pic-
tures was Laverne Incorporated, located in the Decorative Arts Building. Mr. Laverne permitted me to wonder around and take pictures, but I had to sign a statement stating that the photographs would be used only for my thesis. I was more than happy to sign.

The Laverne Gallery has some of the most unusual chairs that I had seen. Chairs made of clear plastic that were amazingly comfortable.

The trip terminated my research into what had been done, and what is being done today. I find that most furniture today is made from the standard materials, wood and metal. It is safe to say that the best designed furniture today is made of these materials.

What I wanted to do for my Thesis was locate an existing material that has been overlooked as far as design possibilities and work up some ideas on how this material would work as an integral part of a piece of furniture. I quickly realized that designing chairs in relation to material would be more worth-while than considering beds, tables, chests etc. By doing chairs only, my Thesis would have more of a continuity and I could compare one idea with another and decide which material showed the most potential in terms of chair design.

Actually, considering the time involved to do my thesis, I had to take the liberty of working backwards. That is, in most cases I had little knowledge of the
materials I was working with in designing my chairs. Ceramics in particular, was much of a mystery to me but I worked up ideas for chairs that I thought could be constructed in ceramic materials. One thing has to be said for my procedure and that is, I wasn't restricted in terms of design. My thinking was free wheeling and uninhibited. I figured I could make the proper revisions after consultation with people like Frans Wildenhain and Mr. Sekely.

I chose what I thought were materials that had latent design possibilities. Much to my surprise and dismay, all but one of my concepts had been tried in one form or another.

I developed sketches and elevations of all my ideas. In most cases I made revisions of ideas after talks with knowledgeable people.

Comprising the bulk of my Thesis is background material, which I feel is pertinent to my topic, namely, materials and their influence on furniture design, and my own concepts of materials influencing my chair designs. With most of my background material, I have included short comments, and each one of my chair concepts is explained quite thoroughly. Of course, I have included with my explanation of my work all the shortcomings of my projects, and of these, there are many.
BENTWOOD

Michael Thonet, a German, was the great innovator of the technique of bending wood and applying the bentwood to furniture. The Thonet rocker is typical of the elaborate furniture design that the bentwood allowed. Thonet developed the process for bending wood around 1850 and since then millions of pieces of furniture have been manufactured in bentwood. Thonet's simple side chair design is probably the best known and most widely used of all his furniture creations. Chairs, tables, beds and even coat and hat racks were done in bentwood. The rocker is typical of all of Thonet's furniture designs.

The invention of a process of bending wood, influenced Thonet, to some extent, to design his furniture as he did. The possibilities and limitations of the material dictated greatly how a piece of furniture would look.

The process of bending wood is actually simple. The wood is steamed until it is very flexible and then clamped into a frame and allowed to harden. Bentwood has proven to be ideal for furniture because of its strength and durability.

Thonet also developed the technique of bending laminated vaneer and used the technique in furniture with much the same design characteristic as the bentwood furniture.
An interesting article appeared in the New York Times magazine, January 11, 1951. It is a study of molded chairs that have been designed and built in the last hundred years.
1850-In later Thonet design of bent veneers, the technique begins to dictate the shape. Similar chairs are still made.

1874-Legs as well as body of chair by American Isaac Cole were made of bent veneer. Decorative details were chiseled.

1880-Single board of birch-wood was bent into this shape by Michael Thonet. Intricate design was carved out first.

1926-Bent sheet plastic back and plastic seat with a bent-wood rim were combined with metal base by Thonet Co.
1932-Wood base was favored in later Aalto Chairs. The seat and back of laminated plywood were bent and lacquered.

1936-Marcel Breuer experimented with plywood, developed this arm chair, cut out and then pressed into unusual shape.

1940-Leather webbing was combined with bent plywood legs and body frame by the Swedish designer, Bruno Mathsson.

1941-Eero Saarinen and Charles Eames won a Museum of Modern Art first prize with chair molded of wood and metal.
1947-Early use of molded plastic in England may be seen in a chair by Clive Latimer. It has graceful aluminum legs.

1948-Plastic reinforced by sisal fibers was material used for molded chair by Egmont Arens in brown, red, blue.

1948-Plastic reinforced with glass fibers was selected for brightly colored molded rocker made by Charles Eames.

1949-Single sheet of laminated plywood is molded into a graceful shape by Ray Komai. Chair has legs of steel.
MOLDED PLYWOOD

Alvar Alto designed this chair in 1934 entirely out of laminated wood. The design is typical of Alta's work which he intended for mass production. In this case the seat and back are formed from a single sheet of plywood with plys added where the weight of a seated person would be concentrated. (Note the thickness of the seat as compared to the back.) It is obvious that the character of the plywood was taken into consideration in this design. A tighter curve at the top or bottom or the seat may have caused the plywood to crack when weight was applied to the seat.
MOLDED PLYWOOD

The two side chairs illustrated were designed by Charles Eames. They are generally considered masterpieces of design and technical ingenuity. Every element in the chair is functional in one way or another and every element including the rubber supports under the seat and behind the back add to the comfort of the person sitting. The chairs are very flexible. The molded plywood seat and back are exceptionally comfortable and move slightly to allow changes in sitting positions.

The chair with the plywood legs proved less successful than the one with metal legs.
CHARLES EAMES
MOLDED PLYWOOD
CHAIR—METAL LEGS
TUBULAR STAINLESS STEEL

The Ludwig Mies Van der Rohe armchair made of stainless steel tube and leather is a masterpiece in furniture design. Mies Van der Rohe completely realized the possibility of stainless steel furniture for the home and made it a reality. He was honest with the material. The shape of the chair illustrated substantiates this fact. These photographs were taken in the Museum of Modern Art.
TUBULAR STEEL

Another Mies Van der Rohe design in tubular steel. The seat and back are made of woven wicker. This chair was photographed at Laverne Inc. in New York City.
TUBULAR STEEL

This Marcel Breuer design is also sold by Laverne. It was photographed at the Museum of Modern Art.

Like Mies Van der Rohe, Marcel Breuer found stainless tubular steel an ideal material for furniture. As with Van der Rohes' arm chair, the tubular steel influenced the lines of the Marcel Breuer side chair. The strength of the tubular steel and its ability to be bent are revealed by the single piece construction of this chair.
Also seen at the Museum of Modern Art is this couch designed by George Nelson. It is obviously more contemporary in design than the Breuer or Mies Van der Rohe chairs but it still utilizes tubular steel. Of course, many refinements have taken place in the methods of handling tubular steel. (Note the way the metal sections are connected.) Mr. Sekely said in effect when I asked him about this couch that the remarkable thing about this design is that it can be expanded to any length simply by adding more leg sections, something to be considered when designing furniture for airports or other types of terminals.
Sigurd Persson designed this tubular stainless chair that suggests the Thonet bentwood rocker. The tubular steel lends itself well to the supple S-shape design. A supporting rod under the wicker seat checks overspringiness.
STAINLESS STEEL

Designed in 1929 for the German Pavilion at the Barcelona Exposition, Ludwig Mies Van der Rohe's "Barcelona Chair" is generally regarded as a classic "Monumental" chair of the twentieth century. The stainless steel support suggests "chair" even without the cushions.

The workability of stainless steel allowed Mies Van der Rohe to achieve the delicate proportions of the legs and back and fine detail where they intersect while still maintaining maximum structural strength.
CAST ALUMINUM

Pictured is Charles Eames tantum seating design which utilizes cast aluminum for the seat and back support. The leg sections are also cast aluminum.

Aluminum would be the obvious choice of material for a furniture situation as this. Exceptional strength and durability were important factors to be considered in designs furniture for public places. Because the aluminum was die cast, Eames had some freedom in determining the form. The subtlety of line could no doubt be characteristic of the forms obtainable in cast aluminum.
PLASTIC

The "Tulip Chair" manufactured by Laverne.

This impressive chair is made of molded plastic with a white finished steel "see-through" base.
Kleykamp and MacDonald Associates of Providence, Rhode Island have worked on a number of experimental chairs. Shown here is a chair with a hollow shell seat formed by joining a top and bottom section of molded plastic. The sections bonded together form a hollow core which acts as an air cushion. The legs are welded steel and the seat is supported and held in place by giant suction cups. This possibly facilitates changing the position of the seat and back.
PLASTIC

Laverne Incorporated is manufacturing, what they call, "Invisible Chairs". They are made from clear plastic and the shapes are vacuum formed over a mold. The plastic chairs are crystal clear and are really quite comfortable, due mostly to the cushions.

The chairs are novel and were of great interest to me for my project, but they seemed to lack a warm quality and did not invite someone to sit in them.
STAINLESS STEEL AND LEATHER

Chairs manufactured by Laverne. In this chair design the character of leather is recognized and excepted. The leather is supple and formed to the contour of the person sitting in the chair. This is a comfortable situation if a person wishes to relax, but if support is needed in a chair, then this design would not be suitable.
These wire mesh furniture creations are the work of Denmark's Verner Panton, an architect for the past few years, who has turned to designing imaginative furniture. His choice of materials is often startling as are his shapes. Although his designs appear more witty than anything, they are products of strict utilitarian thinking.

Panton bends and twists wire and chrome-plated steel to create a pleasant airy feeling in his forms and compliments the structures with small, brightly colored foam rubber pads.
GLASS

These are two examples of how glass has been used in furniture, mainly in table design.

The coffee table by Isamu Noguchi, has two identical wood sections that, when combined as illustrated, form three legs which support the glass surface.

It has been a well known design since 1940, when it was introduced.

William Armbuster, an English Designer, introduced this glass topped table in 1937.
Ico Parisi-Armchair of Manila cane, with loose leather cushion.

Ico Parisi-Round seat of Manila cane, with loose leather cushion.
Carlo Hauner-Easy chair with tubular steel frame and colored plastic string seat and back.

Robert Mango-Chair with metal frame, knotted cord seat and back.
More of Verner Panton's furniture. These are the most startling designs I came across in my research. Hung from the ceiling, these lounge chairs can be adjusted to almost any height.

The multi-colored rest area is also Verner Panton's design. Although, the concept for this type of lounging arrangement is not new.