

## **A Study on the Transparency Appearing in Modern Furniture<sup>1</sup> -Focused on the Characteristics of Materials and Spaces-**

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### **ABSTRACT**

Expressing transparency has various significances in modern society because modern people want transparent objects and space due to the complication, numerous unreasonable facts and the lack of honesty in the society. It is necessary to summarize the processes of changes in transparent materials that have been substantially emerging in the areas of indoor spaces and furniture since the 1960s by organizing the concepts such as the characteristics of materials, the processes of development and the methods of shaping centering on representative artists and works. And the concept of transparency in terms of space enabled the expansion, overlapping and connection of spaces. It can be said that these factors express the openness, purity and non-materiality of spaces. It can also be connected to the thought of minimalism and this concept could be confirmed by analyzing the works of the famous designers leading the times.

**Key words:** Transparency, layer, material, furniture.

### **INTRODUCTION**

#### *The purpose and necessity of the study*

The invention of new materials and advanced technologies have brought large changes in furniture and space design industries and especially the concept of non-materiality that has replaced the concept of materiality forced the human living in the complicated modern times to require transparent walls, furniture etc. The non-materializing in spaces refers to the concept of making the boundaries in spaces obscure in spite of their physical existences thereby making people perceive spaces continuously, simultaneously and relatively. Since the modern age, the use of transparent materials in constructions and glass walls has been expressing the continuity of spaces and glass or transparent polypropylene have been emerging in all parts of the necessities of life, furniture etc and these will be very useful as alternative materials for future society and will be welcomed more as environmental friendly materials. It is expected that these will be combined with new technologies to be used in diverse expressions of continuity and interacting spaces. Here, this study is purposed to provide basic materials for the establishments of transparency as furniture designs with transparency, the wall structures and partitions emphasizing the continuity of spaces and open structures of furniture among the directions toward which space and furniture industries designs will advance. In addition, researches into transparent materials in the area of indoor-outdoor

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construction designs are active but in the area of furniture designs, concrete research data are quite insufficient. Hence, this study has been initiated in order to prepare a foundation for our furniture industry experiencing difficulties with the attack of low prices from foreign countries to be equipped with an advanced technology for competition.

#### *The method and scope of the study*

In this study, the processes of changes in transparent materials that have been substantially appearing in Western society since the 1960s will be examined by studying and researching into the characteristics of the materials, the process of development and methods of shaping through literature centering on representative artists and works and the theory will be established through the arrangement of the concept of transparency. The direction toward which the furniture industry of today and tomorrow should advance in our living spaces will be examined through the analysis and comparison of data. The scope of the study will include the range of transparent materials, referring to the essential nature of the materials, the spatial theory of Gyorgy Kepes and Colin Rowe, analyzing tendencies of major six designers and their works.

### THE DEFINITION AND EXAMINATION OF TRANSPARENCY

#### *The definition of transparency*

Transparency has a meaning opposite to that of opacity and it refers to the visible spatial delivery system crossing the attributes and subjects of an object seen through the boundary plane of the object and it has originated from the Latin words, Trans(across)+Parent(see). 'Transparent' in dictionaries means being clear in nature and state and refers to penetrating light and things. Also, transparency is a physical condition expressing the unique desire of the human seeking for the things that can be easily sensed or the things clear and it also represents the ethical characteristics such as cunning, excuse or hypocrisy.

In the area of spatial designs, transparency is represented in non-visualized boundaries, overlapped spaces, possibility of free changes in furniture and space plans, the reflection of high-tech society, natural inflows of light and eyes and the purity of transparent materials. Also, the transparency in spaces means the simultaneous perceptions of the spaces in different dimensions and this is consistent with the concept of synchronism appearing in the paintings of cubism. This type of space perception that enables the separation of layers, visual continuity, the sense of openness and the imagination of things on the back of something occurs with the involvement of



Fig.1. Frank O Gery. Conde Nast Cafeteria NY 1996-2000.

time. Transparency, also, creates the solid that can be grasped as void. The double-sided natures between visibility and invisibility, things and images and concepts and ideologies are the basic of many things in cultures. The designers in contemporary times reflect current times through the designs producing the effect of transparency and enable the people in contemporary times to overcome the fear of closure by securing their identity through reflected self.

The definition of transparency, therefore, will be regulated perceptual transparency through materials refers to the expression of transparency, and abstract transparency through spaces and spatial factors in this thesis.

As a representative work, a restaurant in New York designed by Frank. O. Gehry shown as (Fig. 1) has walls in some part of the building made transparent by maximally utilizing the characteristics of safety

strengthened glass which is a new material with the intention not to visually hide the beauty owned by the structure but to attempt to allow visual penetrations from each space to the other space.

*The theory of Gyorgy Kepes*

Transparency means the simultaneous perceptions of different spatial locations. Kepes explained the phenomenon where the sense of depth is created when planes are seen overlapped in two dimensional plane because spaces are made between the planes overlapped (Fig. 2) He says, “ The overlapping of planes expresses depth and this creates the sense of space.” in “The Language of Vision” providing a clear definition of another meaning of transparency. This means that the relationship of front and back will be formed when a plane would be overlapped with another plane and the relationship of front and back means that a space has been made. The formation of the order of front and back in a space means that a depth has been formed in the space.

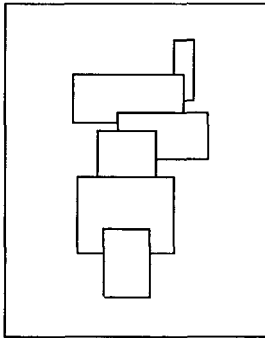


Fig.2. Overlapping space, Kepes, 1944.

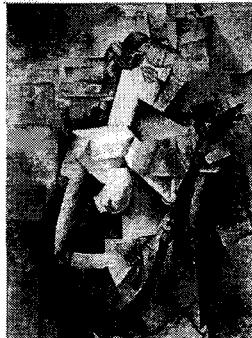


Fig.3. Pablo Picasso, Girl with a Mandolin, 1939.



Fig.4. George Braque, Violin and a Kettle, 1940.

*The theory of Colin Rowe*

Colin Rowe divided the concept of transparency into Perceptual transparency through materials (visible transparency) transparency and Abstract transparency through spaces (phenomenal transparency) phenomenal transparency. The literal transparency refers to the visible transparency. For example, clarity and the latter refers to the perceptual transparency different from a physical nature, that is, the transparency as the action to form the configuration and spatial layers implying or representing the plurality of objects.

C. Rowe explains transparency by comparatively analyzing the Picasso (Fig. 3) and Braque (Fig. 4). In each painting, the outlines of Picasso are very clear and independent from the background thus giving the person viewing the painting the feeling that a clear and transparent shape is standing out in a deep space but he will soon realize that the feeling represents the fact that there is no depth in actual space. But, the painting of Braque is understood in the reverse order.

The gaps between horizontal lines and vertical lines created by fractional lines and the planes intruding between the lines are elaborately combined to create the spaces that give no sense of depth at first glance but gradually give the feeling of the depth of depth. From the work of Picasso, we would have the feeling of seeing through the figures standing in a space with depth but from the work of Braque we cannot identify any objects physically clear in the space that has no depth, is even and expanded laterally.

## THE METHODS TO EXPRESS TRANSPARENCY

### *Perceptual transparency through materials (visible transparency)*

The transparency through materials refers to the expression of transparency using glass or other transparent materials and the materials used include glass, acrylic, wire, Fabric.

#### *Glass*

Glass is transparent, durable and has the characteristic to increase the effect of the brightness of light by refracting light rays. Also, it has the minimal form of material showing the physical properties by its existence itself and it exposes the physical properties of other materials together thus it is used as the purest material of furniture and spatial designs. Glass can be generally classified into transparent glass, translucent glass, colored glass and mixed glass and the mixed glass used in mixture amplifies further, the transparency in spaces through changes in its texture and method of expression. Glass has the double-sided nature that it is a visible object and at the same time is an invisible object. Also, the application of this pure physical property to designs is connected to the truthfulness and honesty of spaces to share the context.

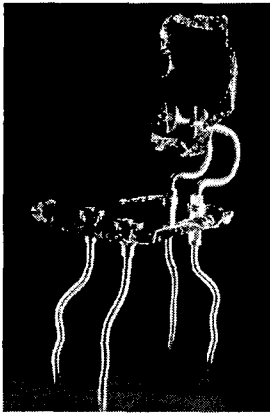


Fig.5. Dannt Lane,  
Etruscan Chair,  
Londen. 1984.

The major contents of glass are silicic acid and boric acid that are acidic oxides plus basic oxides and sub materials that are used depending of the functions in use include various oxidizers and colorings. To review the properties of glass, diversified stronger forms of glass are being developed through researches into its specific gravity and strength in terms of its dynamic properties and its physical properties in relation to heat and electricity enable the production of special glass by changing its surface tension and refractive index through adjusting its cooling speed. Its relation with light can be considered as being

**Karim Rashid** can be considered as a representative glass furniture designer. The use of transparent materials in what he designed seems like an attempt to change existing methods and it looks quite successful. He designed the glass furniture that would fit well to any living room. He uses diverse treatment techniques such as using translucent or opaque glass or expressing splendor by coloring. He uses thick strengthened glass with the thickness of 15-20mm and he also tries to modularize forms to enable bulk productions.

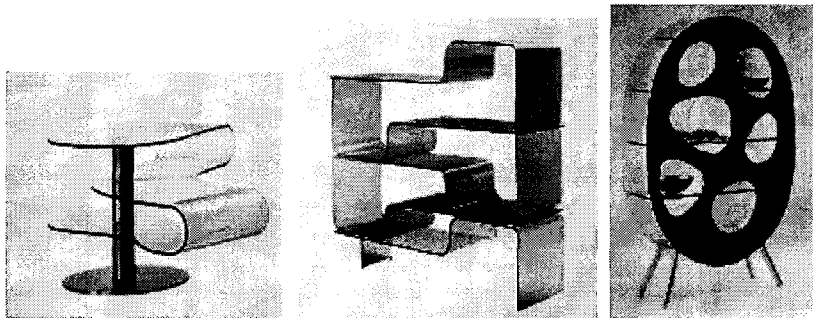


Fig.6. Karim Rashid. Shelf unit/ table, glass (acid. smoked. colored. tempered).

*Plastic and acrylic (Polymethyl Methacrylate, Methyl Methacrylic Acid)*

The term 'Plastics' has originated from the word 'Plasticity' and it refers to the high molecule organic compounds that are the materials generally formed into arbitrary forms by heat or pressure from the plastic fluid state of materials. Plastics are divided into thermosetting ones and thermoplastic ones. Especially, the thermoplastic ones have the advantage of recyclability.



Fig.7. Scolari, Lomazzi, Blow Chair, Italy, 1967.

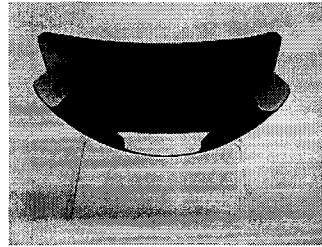


Fig.8. Christ Ghion. Armchair, Butterfly kiss Dacryl, Italy, 2005.

Among them, acrylic resin (Polymethyl methacrylate) which is one of thermoplastic plastic materials has the transparency of permeating 92% of natural light having higher light permeability than any other transparent material including glass and its hardness is high and its surface polish is excellent. Its strength is around 16 times of that of glass and it is lighter than glass by more than 50%. It is a thermoplastic resin beginning to be deformed from 85°C. It has the combustibility similar to that of wood that would be ignited from 400°C.

After the Second World War, new materials were appeared with economic prosperity in furniture field of the world. Especially, Polycarbonate was developed by Bayer in Germany in 1958 which is a transparent in clear color or light brownish color having the most excellent impact resistance. The plastic designs in 1990s were characterized by the emergence of Nude Tone plastics for the first time using the materials of Transparent Polycarbonate (PC) and Polypropylene. With the development of the material called Dacryl produced by mixing these strengthened Polycarbonate sheets, transparent, splendid and strong furniture designs are being released (Fig. 8). The representative artists who designed plastic chairs include Philippe Starck and Ron Arad.

**Philippe Starck** designed La Marie which is the first transparent chair in 1997 emphasizing the perfect geometric lines. This has brought about innovative changes to the advanced production method of the conventional Cartel Co. and the chairs of Philippe Starck. This was made of transparent polycarbonate using single mould method. This work was made emphasizing the transparency, lightness and luster that are the characteristics of polycarbonate and has the advantage of strong surfaces not being deformed by scratches or stains (Figs. 9, 10 and 11).

**Ron Arad** representative plastic chair designs include FPE (Fantastic Plastic Elastic) which is being evaluated as being a work that has brought about an innovative method in joining plastic and steel together. FPE was designed to have pliable curves extending very soft feeling and fantastic feeling. He also suggested a new possibility in terms of technology by making the work using extrusion without using screws at the joints on the body and legs. It is also evaluated as being excellent for the advantage of Stacking Chair (Fig. 12).

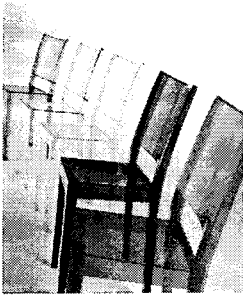


Fig.9. La Marie, Philippe Starck, Kartell, 1997.

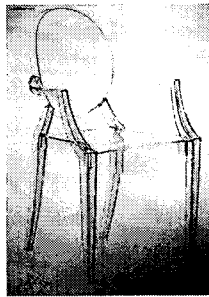


Fig.10. Louis ghost chair, Philippe Starck, Kartell, 2000.



Fig.11. The Ero's Swivel armchair, 1999.

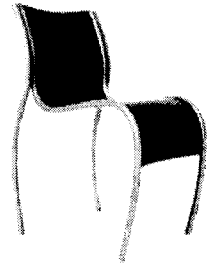


Fig.12. FPR chair, Ron Arad, Kartell, 1999.

*Wire (Stainless steel, Polished Aluminum, chrome plated, nickel plated etc.)*

This material that allows for visible transparency is made of steel and is metal plated or colored for protection and its structural forms involve diverse shapes and techniques ranging from classic forms to decorative forms. Representative designers include Marcel Wanders, Warren Platner, and Shiro Kuramata (Figs. 13, 14 and 15). Also, this material is not only applied to furniture design area but also expressed in buildings or other structures for various reasons and purposes. These expressions refer to the transparency using the material itself (Fig. 17).

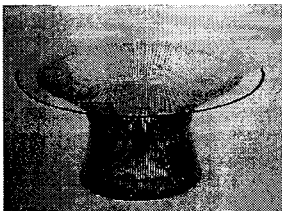


Fig. 13 Warren Platner, low table, bright nickel finished, 1966.

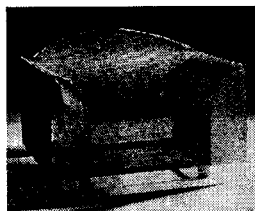


Fig. 14. Shiro Kuramata How high the moon, 1986.

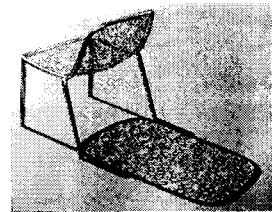


Fig. 15. Marcel Wanders, Diming flower chair, steel, chromed, 2006.

*Light*

The most important material to make forms visible is light and especially, the most essential factors necessary to render transparency in spaces are light and shadow. The depth of spaces can be perceived and the overlapping and the mutual penetrations between interiors and exteriors can be felt only when light exists. Sometimes, the shape of light and shadow emphasize the shape and form of materials that are more important than spatial factors. (Fig. 16) shows a simple table but the effect of the light permeating through the gaps emphasizes transparency. (Fig. 17) shows a stairway design emphasizing the mass of the body and on the other hand attempting to clearly express the lightness and permeability of hand rails.

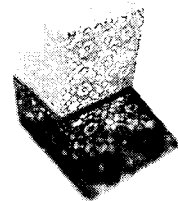


Fig.16. Marcel Wanders. moooi crochet table. 2005.

*Abstract transparency through spaces (phenomenal transparency)*

The transparency made using not only materials but also spaces and spatial factors can be considered as phenomenal transparency and the cases where transparency is made to be felt by using mass, overlapping, connections, expansions of layers are classified as spatial transparency. This means the perception of the transparency of spaces made by only the overlapping of planes or arrangements of pillars. The overlapping of linear factors brings about abstract transparency and figures 19 and 20 can be said to be representative examples. Figure 17 shows a sofa system for new generations and the core of this system is that it produces abstract transparency through the overlapping created by repeated arrangements giving the continuity allowing continuous connections and Figure 18 shows a stairway of a Prada shop serving complex functions naturally connecting the moving line of customers' shopping to the underground space in a different floor. Therefore, the stairway in the shop not only serves the role of furniture but also created a continuous moving between two floors as well as expressing phenomenal transparency with visually continued arrangements and allowing natural fusions in connections between spaces.

- **The expression of overlapping of the factors of plane** infuses vitality to the spaces that can be monotonous as a factor of spatial expression of transparency made by layers. Especially in walls, the overlapping with the plane in the back produces different effects of transparency depending on the shapes. (Figs. 21 and 24)

- **The overlapping of mass and form** is a method where a space encloses another space and a larger space encloses a smaller space contained in its volume. The relation between these two spaces may be the overlapping of a space and a space or may be a combination of the layers in the larger space and the mass of the smaller space. This begins with the enclosure of a space by another space. (Figs. 20, 22 and 23)

- **Connection and reflection** The transparency of sides are connected to each other by the repeating, visual development and penetrations of the factors composing the interior space and this expresses continuity and creates the sense of depth in spaces. In the method of connection through repeating, the repeated stream of void and solid makes a certain rule unifying the voids and solids.

- **The expression of openness** may be achieved by concentrating transparent materials to one place in a closed spaced or may be felt by the arrangement of void walls or spaces. The representative materials to pursue openness include the transparent or translucent materials such as glass, steel wire nets, acrylic. Openness expresses the sense of spatial expansion in indoors and the objects appropriately overlapped in open spaces rather help the perception of the depth of the spaces.

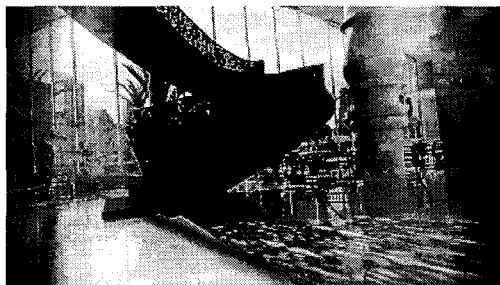


Fig.17. Marcel Wanders, stair case in Morgans Hotel, Miami, 2000.



Fig.18. And- Time for Conjunction, Sofa System, Cappellini, 2002.

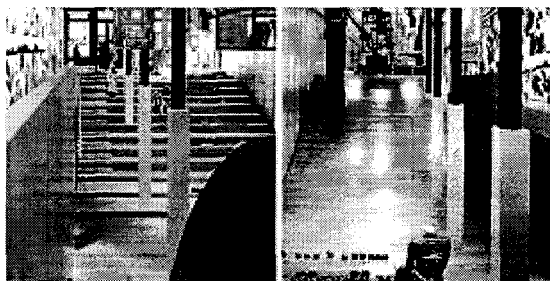


Fig.19. Overlapping of Mass, Prada Retail Shop, New York, 2001.

The partial openness as shown in (Figs. 24 and 25) creates an opening in a closed space allowing the transparency of the space that will enable the association and implication of spaces. But, only when light is considered together will the effect be obtained where the spaces will be made richer by the light flowing into the indoor varying over time.



Fig.20. Transparent Space curved glass, Italia, 2005.



Fig.21. Japanese Restaurant, a screen, 2006.

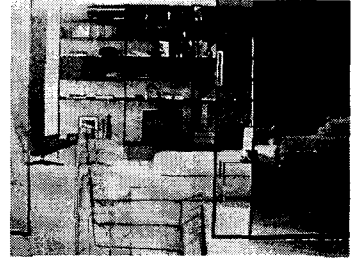


Fig.22. Overlap of Layers, Italy, 2005.

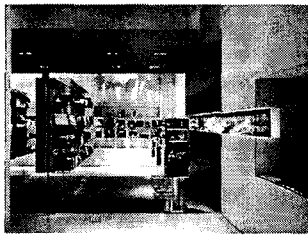


Fig.23. Overlap of mass, HBO\_Shop, New York, 2003.

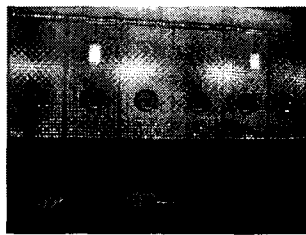


Fig.24. A screen of aluminum hurdle wall, Japan, 2005.

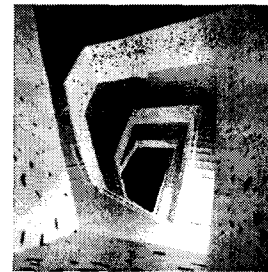


Fig.25. New York University, Steven Holl, Architects, 2005.

## CONCLUSIONS

Expressing transparency in the areas of spaces and furniture designs has various very important significances. Since modern society is complicated, unreasonable and lacking honesty, modern people tend to desire clear and transparent physical properties. It is considered that the Glass House of Philippe Johnson in 1947 exerted an influence on the development by now of the transparent materials used in construction, interiors, furniture and even in living necessities and the development of the expression methods to compose transparent spaces. Especially, the discovery of acrylic material that can be said to be a new material and the development of glass processing techniques enabled good expressions of transparency in terms of materials.

And the concept of transparency in terms of spaces enabled the formations those factors such as the expansion, overlapping and connection of spaces. And, it can be said that these factors express the openness, purity, non-materiality etc of spaces. It can also be connected to the thought of minimalism and this concept could be confirmed by analyzing the works of the famous designers leading the times.



Representative artists include Philippe Starck, Karim Rashid, Warren Platner, Marcel wanders, Ron Arad, and Steven Holl. To review their design philosophy, all of them make efforts leading or targeting new life styles of young people living the newest modern life like hunters seeking for new preys. It could be seen that they have already built up new trends in terms of forms, colors and new functions.

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