The role of the texture and floor in the architecture desirable for the blinds (with an environmental perception approach)

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Abstract: Human being and the surrounding environment are agents, dependant on each other. On the one hand human being as a living thing is threatened by agents and different diseases from the early minutes of birth until death and sometimes this causes disabilities. Blindness is one of these defects which results in the low level of eyesight or a complete blindness. Eyesight is the fundamental sense in environment perception. Thus, regarding the weakness or lack of this sense in a blind person, utilizing and reinforcing other senses by using suitable tools can help human being perceive the surrounding environment. In this research paper first we will describe blindness and the perception types of the blinds of the environment and then will describe the role of floor as one of the useful elements of building a space around the blinds. And then we will emphasize on the importance of this issue as one of the elements of spatial perception of the blinds by expressing the related rules and standards.
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1. Introduction

Human being uses different tools to reach the realities and effects of the surrounding environment, such as the 5 senses which help him/her to perceive the environment and the surrounding phenomena and carry on the perception process. Eyesight is the first and most important sense for this reason. Kalb Gatgo states in his book, "Towards a visual culture", that: "With eyesight, the infinites will be presented to us. Eyesight means richness and plenitude". On the other hand human being as a living thing is threatened by agents and different diseases from the early minutes of birth until death and sometimes this causes disabilities. Blindness is one of these defects which results in the low level of eyesight or a complete blindness. Eyesight is the main communication and environment perception sense, but it is not the only human communication sense. Architecture as a field, which is connected with all the people, can provide a suitable situation to exploit and optimize the blinds' perception of the environment by designing the desirable and standard locations for the blinds according to the related rules. An architect can supply a suitable approach to perceive the environment by the blinds through designing a suitable setting by using desirable and suitable elements for the users of that setting, who are undoubtedly deprived of the eyesight and use their other senses such as touch, hearing and … to perceive the area, and using suitable materials for suitable texture construction, which is compatible with touch and hearing senses, seems to be highly important.

2. Blindness

According to the statistics published by World Health Organization (W.H.O.), there are 40 to 45 million blinds and about 180 million partially-sighted (people with eyesight problems) in the whole world.

The most common description for blindness which is accepted by nearly all scientific committees and different organizations is as follows: "a blind person is someone whose eyesight is less than 20/200 although he/she is using ophthalmology facilities such as glasses in one or both of the eyes. In other words, the object which can be seen by an ordinary eyesight in a distance of 200 feet (about 70 meters), can be seen by a blind person in an only 20 feet distance (or about 7 meters) or closer. Also those people with eyesight defects whose related ratios are more than 20/200 and less than 20/70 are considered to be partially-sighted (Afrooz, 2007, P: 57).

Partially-sighted: a group of people which have eyesight deficiencies but their eyesight amount is more than 20/200 and less than 20/70 are considered to be "partially-sighted" (ibid, P: 58).

3. The blind and the environment (The blind's perception of the environment):

Francis D K Ching states that: "The space always surrounds us. We move inside the space, see the forms and objects, hear the voices, sense the

breeze and smell the odor of blossoms in the flower garden". On the whole, the effective factors in perception are classified into three levels of individual psychology factors, physical factors and cultural factors. Also several viewpoints have been suggested for environment perceptions which are considered to be among environmental capabilities posed by Gibson in which he states that: "some stimuli compositions cause the direct and sudden perception". Gibson believes our world is comprised of layers and different materials (glass, wood, …). The composition of these materials and layers, reveal some environmental capabilities (Mortazavi, 2001, PP: 72-73).

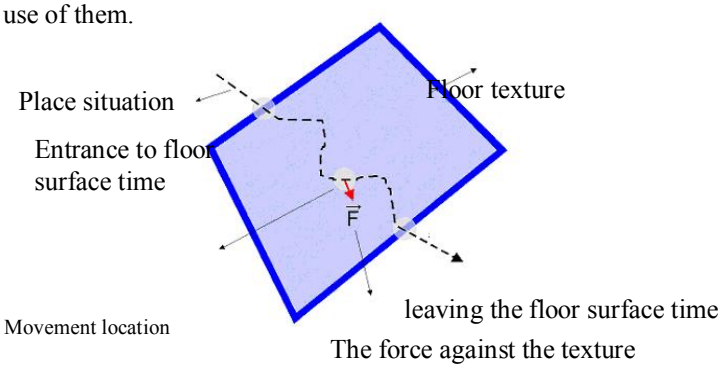
The human being's perception of the environment is carried out by 5 fundamental systems of hearing, touch, smell, taste and eyesight. Since the blinds are deprived of the most important environment perception system, the suitable use of other perception systems and paying attention to the signs and environmental information and the creation of a mental image of what happens in the surrounding, is considered to be a suitable guideline for environmental perception for the blinds.

Helen Keller has written in her book entitled "The world in which we live", that: "the blind people should use perception systems other than eyesight for movement. The blinds notice the different characteristics of the environment in comparison to the people with eyesight. The texture of movement route surfaces, environment's noises and even trivial things such as the changes in the temperature are very important for them to differentiate the route and the situations (Shafee, 2006, P: 145).

4."Texture" in designing architecture spaces related to the blinds:

4-1- The type of treatment with texture:

In fact texture is a characteristic of a surface which is known by touching. Texture is a representative of the surface whose knowledge is achieved by communication tools, especially labor force tools which is a sophisticated and tough job. This happens because of the forces and it has a close relationship with kinetic elements through human hands. The real characteristic of the materials stimulates the human perception. This perception is based on the coarseness level of the construction which is considered to be the most common characteristics of the surfaces. Although this criterion is not exact, it can be considered as a criterion for activity tool force identification. The figure below shows the graph for a model of connection through the texture in which a real object can have with different textures internally and at the edges. When the user touches the surface with a hand, three phases of different noises are created which are as follows: the entrance on surface floor time, moving on the floor time, the time leaving the surface floor. Thus, this incident can be managed to supply correct usage by adjusting the texture construction of the materials. By using this auxiliary model we can use every type of different textures and this is dependent on communications tools competencies and appropriate use of them.

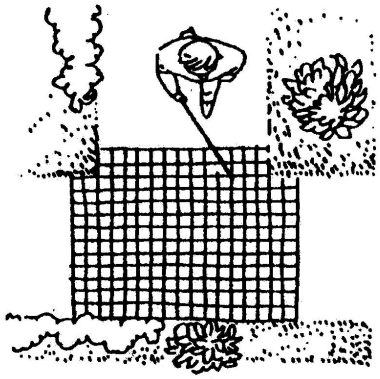


Connection through floor texture model (from the entrance until leaving floor surface)
Source: www.visioww.org

4.2. Entrance:

The pavements ending in entrances for the blinds should be marked with sensory signs. In conjunctures of the two pavements, floor should be implemented with different textures and colors to be identifiable by the blind and partially blind individuals.

The covering for pavements' floor should be of tough, fixed, non-slippery and soft materials.



Floor in the juncture of the two pavements for the blinds
Source: 104th Journal, Construction and Housing bureau – 2009

4.3. Routes:

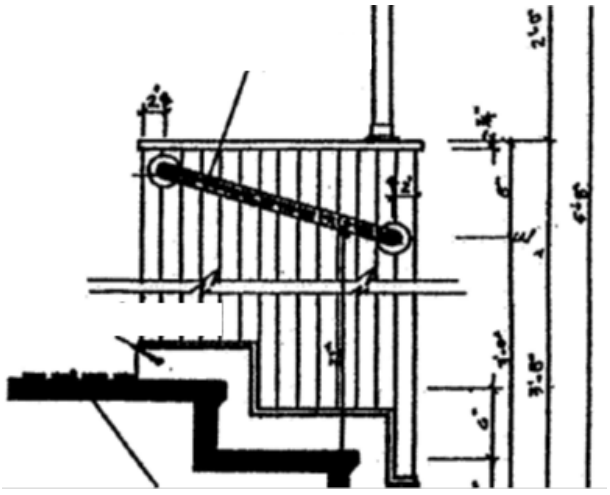
The floor in the halls should be non-slippery and we should avoid installing floor coverings with high piles.

4.4. Elevator:

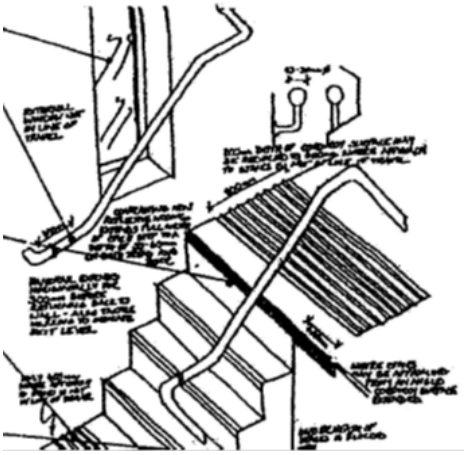
- The color and dyestuff in elevator doors should be selected in a way to be identified from the environment and surrounding walls. (To be used for partially-blind people)
- Waiting room should be identifiable from the elevator area. This can be achieved by changing the materials (for example, rug and wood to the wood)
- Internal walls should not reflex the light and they should use nontransparent colors.
- The floor should be opaque and non-slippery and its color should be differentiated from the walls.
- Not using light-reflexive materials such as metals (for example, Steel)

4.5. Stairs:

- Sense signs should necessarily be available on the floor before entering the stairs' grid to warn the blinds. (They should be specified textures such as striped, as a standard construction)
- Step's edge should be completely non-slippery and identifiable with color difference.
- Step's edge should be of materials which reflect the sound and continue through the whole step width.
- Step's floor coverage and the edge should be non-slippery and should not reflect the light and should be installed tightly.



Step details
Source: ibid



Step details
Source: ibid

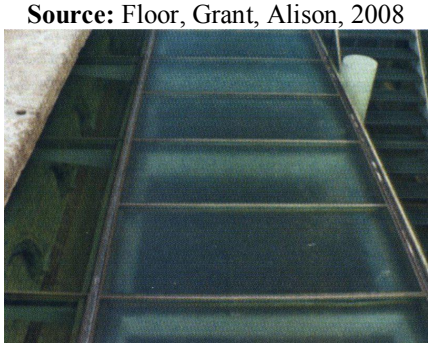
5.Regulations and standards of floor for the blinds

- The blinds can locate movements better in areas where the floor is tough because there exists the sound and a better accoustics.
- Suitable materials for pavement floor are: concrete, asphalt, cement paste, brick or soft mosaic.
- Matterials such as stone, sand, wood poweders or sandy blocks should not be used in flooring.
- In high traffic areas, we shouldn't use rugs.
- We should not use slippery layers in areas.
- Using floorings not stuck to the ground or not sequential is dangerous.
- Long floorings from the inner part of the building to the outer spaces with tight piles which are slippery, shouldn't be used.
- Floors with very thick and long piles or loosley woven should be avoided.
- Deep or soft layers shouldn't be used under the flooring.
- It is better to use ramp up to the floorting's edge.
- Using surfaces where the noise and its tone is heard if you put the feet on it, is appropriate for the blinds.
- Floorings of soft, tough, smooth and coarse material should either be up-slope oe down-slope to have appropriate directions.
- Apparent contrast between the floors and walls can enable the blinds to envision the size and shape of a room or an area.

If the friction coefficients of flooring materials are various, there would be the danger of slip. This is very dangerous for people with movement or eyesight defects. For example, if in a rotating route the material changes from vynil into the rug, there is

a danger of fall because of great differences in the characteristics (Grant, Alderson, 2008, P: 21).

Vynil floor with more friction
Source: Floor, Grant, Alison, 2008



Sandblasted glass supplies enough friction for flooring.
Source: ibid

- The most contrast should locate in hirizontal and vertical juncture. In this case the most exact visual sign will be utilized in the room (ibid, P: 34).

The black margin can be used to identify the juncture between the floor and the wall.
Source: ibid

- Floorings should be tough and dense to separate water, soil and wastes and keep them, be washed easily and be consistent.
- Soft floorings and cocunut fibers are not recommended, because they are directional and pushable and moving on them is difficult for many people. These floorings are danderous for those who use walking sticks.

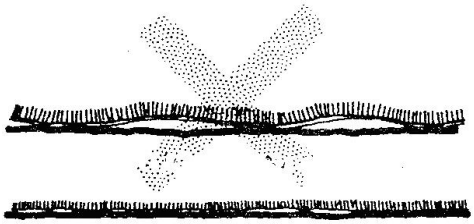
Source: Architecture for the disabled, James Sorensen, 1991

	Moving disabled	Weelchaired disabled	Blinds	Old people
Rugs with high piles	-	*	*	-
Rugs with short piles	0	-	-	0
Spring floorings	0	0	0	-
Tough floorings	-	0	0	-
Smooth (non-slippery) floorings	*	-	-	*
Slippery floorings	*	*	*	*

*Unacceptable - Acceptable 0 Good

- In areas with a lot of traffic, we shouldn't use rugs or use rugs with short and compressed piles.
- Layers which are seemingly slippery should not be used. These surfaces cause worry and stress in moving disableds and old people.
- Flooring directly stuck to the floor is better.
- Carpets with short and compressed piles are more suitable.
- Surplus slope or rump to flooring edge should be in a maximum hieght of 1.25 cm. and maximum rump slope of 1:12.
- If the noise is heard on surfaces which we step are very suitable for the blinds.
- Almost coarse and non-slippery surfaces are suitable.

Do not use smooth and glossy surfaces.
Source: ibid



Do not use floorings which are not stuck on the ground or are not connected sequentially.
The flooring which is directly stuck to the floor is better.
A rug with short and compressed piles is more suitable.
Do not use continuous floorings from the inside part of the building to the outer parts of the building, especially those types which have compact (slippery) piles.
Source: ibid

Do not use floorings with thick, very long or loose piles

Do not use deep or soft layers under the flooring.
Source: ibid

Surplus slope or the rump to the flooring's edge should be: maximum of height, 1.25 cm. and maximum rump slope 1:12
Source: ibid

6.Samples:

6.1. Introducing a flooring system for the blinds:

Source: www.tilesandmosaics.co.uk.

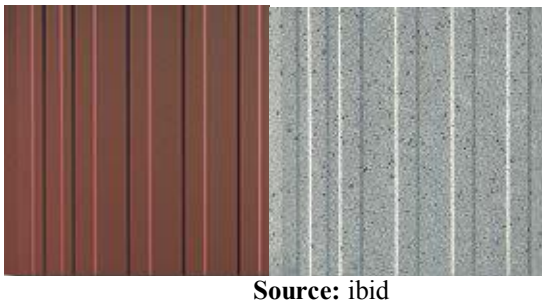
This system is a special flooring design. The arrangement amount of these tiles can be useful for the blinds and it can help the security of their movements.

These special tiles for the blinds can be used in designing internal and external spaces of the constructions, traffic jams and locations such as stations, airports, sales centers, supermarkets or money payment centers. Also the manufacturer of this flooring can produce wall as well as floor tiles and this helps the blinds to move around more safely.

Source: ibid

This system has route direction and alarming systems with the four following methods:

1- Sense the tissue texture of the tile through walking
2- These tiles are touched by the hands when we stick them to the hands.
3- Through auditory organs
4- Creating dark and light conditions through the colors for those whose eyesight is damaged



Source: ibid

6.2.Ross Macdonald's School of blinds

This school was designed by Bruce Stratton, an architecture from Torrento. He believed that sometimes the thing that an observer percieves is not the thing which really exists.

A School

In designing this school, he intrestingly emphasized on creating directive spaces to force his young and blind users to use their touch and hearing senses. The walls of this school were equipped with touch symbolizing systems of plastic and flooring materials which are known messages for the feet of the students. Also, materials which reflected sound with differentiable spaces wer used in this school.


School entrance flooring


Flooring done in the halls

In the external view, Ross Mandonald school conveys an inviting sense, by using a glass covering in a symbolic way to mix metal, cement and brick.

School's pool surrounding flooring


School's athletics saloon flooring

The creation of these kinds of spaces which have special and unique characteristics has always challenged special architectural thoughts.

6.3. Using grooved stones in London subway

The London underground rail, as a governmental transportation system, is responsible to render services which are accessible for all the people. Most parts in this grid have been designed in 1863, when the concise designing was not obligatory. One of the common factors in all subway stations is the fact that users should confront the least alarms in the stairs. So people should be informed that in the route they should go up or down the stairs and potentially there is the danger probability.

In most stations, these stairways are internal. In the primary interpretation of ADM guidelines, it was supposed that touch alarms should not locate in the internal steps. This is dangerous for people with eyesight problems because they are not aware of the steps' existence and the danger of falling or losing the balance. However, ADM states that the obligation to locate the danger alarms on top of

internal steps is not logical, because there is not any specific alarm surface which can guarantee to avoid the falling danger when using surfaces with different friction characteristics.

Here frictional resistance is an important factor. It seems that the friction quality of cobblestone, stones or concrete for stairs' construction are the same with touching cobblestone and thus it is suggested to be used as a danger alarm (Grant, Alderson, 2008, P:75).

Using grooved touching surfaces on top and down the internal stairs
Source: flooring, Grant, Alison, 2008

In London subway, the goal is to study friction quality of floor surfaces used in underground systems. For each material used, some obligations should be taken into consideration such as friction, resistance against fire and consistency. Also the characteristics of materials used for grooved touching alarms should adjust with these standards and the similar floor friction quality. Thus, using danger alarms on internal stairs is appropriate. By doing this, the subway can create a safer and more accessible environment for people suffering from eyesight problems without causing dangers for the others.

Notes:

1- Cited in www.majlis.ir (Parliament research center report about the blinds)
2- "LOGES" system
3- W. Ross Macdonald
4- Bruce Stratton

1/5/2012

Construction regulations in England and Wales: accessibility and use of buildings, 2004 edition, and issues related to conditions in internal floors of entrance saloons and reception desk, halls and moving routes, lobbies, stairs and ramps and health care devices.

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