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Effects of Earthshelter's on Urban Space in Context of Biophilic Design; A case of Meydan İstanbul Mall, Turkey

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Abstract

The aim of the research is evaluating earthshelters in biophilic context and to examine their effects on urban spaces in detail. The scope of the research consists of the example of Meydan İstanbul Mall located in Ümraniye district of Istanbul, which is an example of an earthsheltered partially underground construction. The basic material of the research consists of the findings that depend on the case study. In this context, the architectural projects, aerial photos, maps, and visuals of the building are among the other materials. The method of the research bases on the evaluation of Meydan İstanbul Mall in the context of biophilic design principles (developed according to literature research data) by comparing it contemporary conventional buildings. In this context, urban biophilic design criterias are developed primarily. In the second stage of the research method, Meydan İstanbul mall in the context of urban biophilic indicators are evaluated elaborately. The findings obtained from the research show that earthshelters increase the biophilic value by interacting the city and contribute to integration of ecologic urban space.

Keywords: Earthshelters; Biophilic Design; Architectural Design; Ecology; Urban Space.

1. Introduction

Since the earliest period of cave use (prehistoric times), human beings have been developed earthshelter use and underground spaces in many ways. Accordingly, today there are many terms that represent various earthshelter and underground construction types. However, in general referring, it is possible to define earthshelters as all structures with soil on and around it, according to the ground level and topographic locating related to underground. (İncesakal, 2011). Earthshelters are classified into 4 groups according to their section and their relations with earth surface. (Sterling, Aiken, & Carmody, 1980). These are earth covered walls only, above and below grade space combines, earth covered walls and roof partially recessed and earth covered walls and roof fully recessed. Earth covered, earthshelters and mountain shelters (slope) are in general integrated with topography and natural landscape harmoniously. Because of this reason it is possible to see in literature defining the term earthshelter as "earth-integrated building". (Racusin & McArleton, 2012; Warshaw & Parisel, 1982; Boyer & Grondzik, 1987; Givoni, 1994)

DESIGN	TRUE UNDERGROUND	ATRIUM	ELEVATIONAL	PENETRATIONAL	COMBINATION
BERMED					
SLOPE					
ENVELOPE					

Figure 1. Types of Earthshelter Designs (Secull, 2001)

Today's contemporary earthshelter architecture concept has begun to develop by the mid-20th century. Especially, after the energy crises of 1970's, the earth-sheltered architecture concept entered the trend of housing architecture and is evolving ever since. In the realm of Earth-Sheltered architecture the factor of energy saving has the priority. Regarding (Givoni, 1994) the earth-sheltered architecture the non-residential structures were built underground for reasons other than energy saving and this by no means is an indication that saving energy in this manner cannot be applied in non-residential structure (Went, 1982). Indeed, earthshelters are widely preferred in terms of ecological life model today. As

it is known, the changing family-society structure and growing modernist architecture and urban structure after industrialization have severely mistreated human-nature relationship. Therefore, the desire to reconstruct human interaction with nature emerges as reasons related a longing for nature and an essential requirement. The reflection of this situation in urbanism and architecture represents itself with a biophilic design approach.

Biophilia as a term was first used by Erich Fromm in 1964 for emphasising humans “love of life” and living organisms, a affiliation that humans seek. (Fromm, 1964, 41) The idea then put forward by Wilson as “Biophilia Hypothesis” as biologically based, innate desire for connecting to nature, affiliation to life and lifelike processes and “innate tendency to focus on life”. (Kellert & Wilson, 1993; Wilson, 1984, 1) It’s a term in environmental psychology defining affiliation to nature.

2. Biophilic Design

Biophilic design is a design philosophy that encourages the use of natural systems and processes in the design of the built environment. Biophilic design is based on the Biophilia hypothesis, which proposes that humans have an innate connection with the natural world and that exposure to the natural world is therefore important for human wellbeing. (Kellert, 2008; Wilson, 1984). Biophilic design can reduce stress, improve cognitive function and creativity, improve our well-being and expedite healing. As the world population continues to urbanize these qualities are ever more important (Browning,, Ryan, & Clancy, 2014). In this context, Biophilia as the evolution of biophilic design in architecture and planning and presents a framework for relating the human biological science and nature.

Material and Method

In the studies of Judith Heerwagen and Gordon Orians a list were presented in which the properties related to physical elements and spatial patterns were specified in preferred natural environments. (Heerwagen ve Orians, 1993, 138-172). Ryan (2014) developed and classified these biophilic qualities in their study “14 patterns of Biophilic Design” The method of the research bases on the evaluation of Meydan İstanbul Mall in the context of biophilic design principles by comparing it contemporary conventional buildings. In this context, urban biophilic design criterias are developed primarily. In the second stage of the research method, Meydan İstanbul mall in the context of urban biophilic indicators are evaluated elaborately. The findings obtained from the research show that earthshelters increase the biophilic value by interacting the city and contribute to integration of ecologic urban space. In Meydan İstanbul Mall is evaluated according to Ryan’s 14 pattern of Biophilic design related to the interconnection with urban space and effects on it.

Table 1. 14 Patterns of Biophilic Design (Browning, Ryan, Clancy, Terrapin,2014)

CONTEXT	PATTERNS
Nature in Space	1. Visual Connection with Nature 2. Non-Visual Connection with Nature 3. Non-Rhythmic Sensory Stimuli 4. Thermal and Airflow Variability 5. Presence of Water 6. Dynaic and Diffuse Light
Natural Analogues	7. Connection with Diffuse Light 8. Biomorphic Forms and Patterns 9. Material Connection with Nature 10. Coplexity and Order
Nature of The Space	11. Prospect 12. Refuge 13. Mystery 14. Risk/Peril

Table 2. 14 Patterns of Biophilic Design (Browning, Ryan, Clancy, Terrapin,2014).

Nature In The Space	Naturel Analogues	Nature Of The Space
1.Visual Connection with Nature A view to elements of nature, living systems and natural processes.	8.Biomorphic Forms & Patterns Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature.	11.Prospect An unimpeded view over a distance for surveillance and planning.
2.NonVisual Connection with Nature Auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems or natural processes.	9.Material Connection with Nature Material and elements from nature that, through minimal processing, reflect the local ecology or geology to create a distinct sense of place.	12.Refuge A place for withdrawal, from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead.
3.Non-Rhythmic Sensory Stimuli Stochastic and ephemeral connections with nature that may be analyzed statistically but may not be predicted precisely.	10.Complexity & Order Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature.	13.Mystery The promise of more information achieved through partially obscured views or other sensory devices that entice the individual to travel

		deeper into the environment.
4.Thermal & Airflow Variability Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments.		14.Risk/Peril An identifiable threat coupled with a reliable safeguard.
5.Presence of Water A condition that enhances the experience of a place through the seeing, hearing or touching of water.		
6.Dynamic & Diffuse Light Leveraging varying intensities of light and shadow that change over time to create conditions that occur in nature.		
7.Connection with Natural Systems Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.		

This research aims to raise awareness about the effects of earthshelter spaces on urban space by drawing attention to their biophilic qualities. The research is based on the hypothesis that underground structures, when supported with appropriate biophilic qualities, increase the use of the ground with squares, parks and open-green areas, generating more livable urban spaces. The scope of the research consists of the example of Meydan İstanbul Mall located in Ümraniye district of İstanbul, which is an example of an earth sheltered partially underground construction. The basic material of the reseach consists of the findings that depend on the case study. In this context, the architectural projects, aerial photos, maps, and visuals of the building are among the other materials.

3. Evaluating Meydan İstanbul Mall in context of Biophilic Design Pattern

General Properties of Meydan İstanbul Mall, Turkey

Located in Umraniye, İstanbul, **Meydan İstanbul** is a multiplex commercial area as an urban center in one of the fastest growing zones of İstanbul as near future’s a dense fabric built. With capacity of 50.000 m² retail arena, 30.000 m² green roof area, 1.500 kWh geothermal system and 3.000 car capacity of project, Meydan İstanbul has gained LEED certificate.



Figure 2 and 3. Aerial View and Google-Earth map of Meydan İstanbul Mall



Figure 4 and 5. Site Plan of Meydan İstanbul Mall in differing scales (macro-micro site connections)

With Restaurants, cafes, stores and having a capacity of (2500 seat) cinemas Meydan İstanbul (Meydan - Umraniye Retail Complex & Multiplex) is an urban arena integrated with topography presenting a central square for site. (Site area 128.000 m², construction area 80.000 m²) Opposite of many shopping malls design approach, it's serving as an ecologic arena with green roof for urban space. It's designed by FOA Foreign Office Architects in 2007 with an ecologic design approach serving earthshelters for urban space. The provision of underground car parking is an essential part of this design strategy, presenting significant amount of ground use area serving as landscaped areas and an alluring urban square in the center of the plan typology.

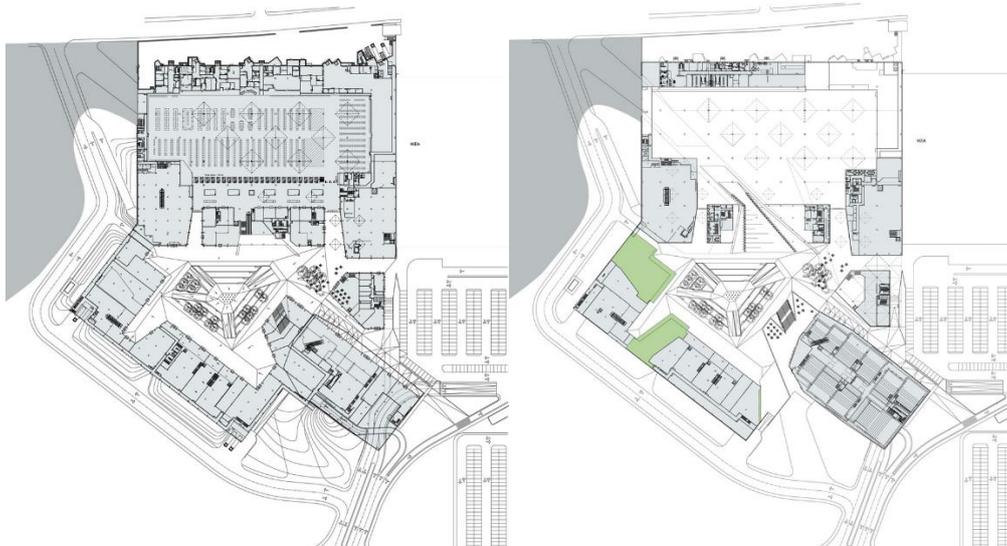


Figure 6 and 7. Plans of Meydan İstanbul Mall.

3.1 Effects of Earthshelter's on Urban Space in Context of Biophilic Design "Nature in the Space" Dimension

Visual connection with nature

It includes the experience of natural qualities such as natural light, water, soil, air flow in macro and micro scales of space. These are similar to Feng Shui five elements and "*western natural elements; water, wood, fire, earth, and metal*" (Sarvimäki, 2002) in Chinese Cosmology, Eastern philosophy. Natural qualities that can be supported with topography such as planting, soil, water and biodiversity also increase the interaction with nature. Clouse (2016) stated that the prospect, sound, and even the smell of water has positive psychological effects. As Chalfont (2008, 116) stated, being in the garden motivates people to do things. Chalfont highlighted that is a result of enticement of nature.

In Meydan İstanbul mall design approach green roofs, water elements in square are in this context. After planting on the sloping roof of Meydan İstanbul mall, blooming has been observed over time. This shows that the urban space created by the shopping mall's green roof has also been a biophilic attraction for all living things serving as an urban refuge.



Figure 8 and 9. Blooming green roof of Meydan Istanbul Mall, aerial view

Non-Visual Connection with Nature

“Auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems or natural processes.” (Browning, Ryan, Clancy, 2014). Earthshelters are urban structures supporting urban-space interaction that can be articulated with public spaces and foster the tranquility of the urban space. It is designed as introverted spaces with entertainment or shopping facilities in urban. When this kind of crowded assembly areas is taken underground, they provide a silent experience to the urban space due to the sound insulation feature of the soil. Urban space turns into a biophilic space where birds, water sounds and children's voices are heard thanks to this concept with the green landscape and squares. With this context Meydan İstanbul mall serves a rich experience for city dwellers with its landscape design.

Non-Rhythmic Sensory Stimuli

“Non-Visual Connection with Nature in that it is inclusive of all sensory systems and is most commonly experienced at a subconscious level through momentary exposure that is not typically sought out or anticipated; whereas Non-Visual Connection may be deliberate, planned, and over longer, more predictable durations of time.” (Browning, Ryan, Clancy, 2014). Interconnection arena (courtyard and green roof) of Meydan İstanbul Mall, is serving as biophilic zone in urban for human and other livings (bees, birds etc.) This approach indicates that a complex integrate with zone as an ecologic habitat not with vernacular architecture only.

Thermal & Airflow Variability

“Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments.” (Browning, Ryan, Clancy, 2014). In the recent projects, it is observed that the interaction with the natural environment is strengthened by designing the public buildings as earthshelters. This situation positively affects biophilia and vitality in urban space in case design is supported by criterias such as continuity of green areas, perpetuity of wind flow, incessant human circulation and accessibility. In addition, the fact that their ability to attach with topography, enabling green areas, preserves ecological diversity in urban space. Meydan İstanbul represents a substantial model with it’s aerodynamic green roof supporting airflow in urban space. Perforated façade design of Meydan İstanbul enhances airflow biophilic and bioclimatic comfort of urban space by meeting winds of courtyard.



Figure 10 and 11. Aerodynamic green roof of Meydan İstanbul Mall and perforated façade design.

Presence of Water

“A condition that enhances the experience of a place through the seeing, hearing or touching of water.” (Browning, Ryan, Clancy, 2014) Since water has cooling effect, it is used as a bioclimatic element in architectural design. However, when designed with proper interaction with space users, it can also serve as a biophilic factor. Since earthshelter interiors are cool in summer and warm in winter, there is no need for microclimatic pool in the place. It will attract other living things (insects etc) to the space as it will increase the humidity in interiors and will transform the situation that looks like a biophilic effect into a biophobia for the user. In these cases, reflective materials can be used as biophilic elements, as they mimic the properties of water (reflection, transparency, etc.) with metaphors in the space.

Water walls, water banks and fountains in Meydan İstanbul Mall sustain bio-climate in urban space. It generates an alluring recreation area for urban serving as a cooling biophilic effect arena. It is a reflection of the holistic design approach that urban space transformed into a living recreation zone contributing to the water-cycle by strengthening human-nature-climate interaction in a biophilic context. The design had water cycle systems which hasn't been constructed yet.



Figure 12 and 13. Water walls, water banks and fountains in Meydan İstanbul Mall

Dynamic & Diffuse Light

“Leveraging varying intensities of light and shadow that change over time to create conditions that occur in nature.” (Browning, Ryan, Clancy, 2014) In today's modern vertical architecture built on the ground level with conventional methods, the buildings adversely affect each other's sunbathing levels and insolation durations in urban space. Urban spaces should be designed taking into account the sun factor as bioclimatic and biophilic element. Earthshelters and underground buildings are designed in atrium style or courtyard section type, since massive structures such as malls. While the courtyard planning creates interaction with natural environment in a controlled way, it enables the creating of bioclimatic and biophilic spaces. Although both types are common in urban space, it is seen that the underground space and earthshelters with a courtyard is more biophilic than atrium type. Since the underground spaces with courtyards do not cast shadow on the surrounding buildings, they also increase the sunbathing quality and biophilic value of the urban space. The sun indirectly contributes the biodiversity of the habitat in the urban space, as it enhances to green areas plantation and the circulation of bees in urban space. The sun is significant not only for the human biophilia, but also for the biophilic tendencies of all living things. In the past, while people feel fatigue and headache in artificially illuminated (LED also) mall corridors, today's earthsheltered shopping mall samples (Meydan İstanbul Mall) serve as a biophilic courtyard like a sunbathing place gaining an arena to urban space. In addition, it's dormer windows located on the green roof, serves a biophilic experience indoors with daylight.



Figure 14 and 15. Meydan İstanbul Mall –courtyard.

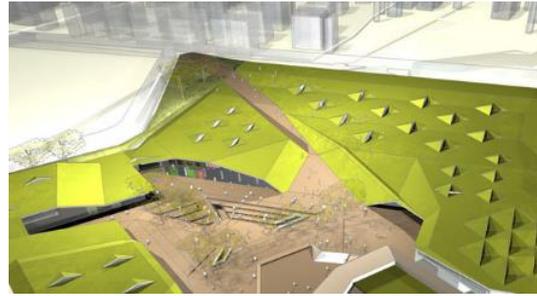


Figure 16. Meydan İstanbul Mall- Aerial view- Natural lighting, dormer windows.

Connection with Natural Systems

“Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.” (Ryan, Browning, Clandy 2014). All living things are biophilically camouflaged by instinctively and performs adaptation. Canan (2019) stated that those who survive in nature are not the strongest, but those who have the best harmony with their environment. (“Herbest Spencer states survival of the fittest is essential.” (Canan,2019) es) With this context buildings should be designed with harmony of environment. Perceiving time, seasonal changes, space-time rhythms of space by the way light, shadow, plants and materials changing according to time is essential. In Meydan İstanbul Mall city dwellers perceive time with courtyard concept, grass and plants. Also water elements of it (waterbanks) can change according to season while freezing. It can serve as a motion element according to seasonal winds. Meydan mall enhances the time-space perceptual behaviors as well related to biophilia effect.

3.2 Effects of Earthshelter’s on Urban Space in Context of Biophilic Design “Natural Analogues” Dimension

Biomorphic Forms & Patterns

“Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature.” (Ryan,2014) As Browning (2014) stated, biomorphic and zoomorphic analogies, patterns and materials evoking nature stimuli, artworks related to nature (Artnouveau designs), organic forms, golden mean, Fibonacci numbers, design and construction elements mimicking nature (furniture, spatial elements, urban equipment) are parts of this patterns.



Figure 17. Artworks and natural patterns as cladding in interiors

Meydan İstanbul mall has artworks on entrance transparent facades and in cafes reminding nature. Also a biomimetic, biomorphologic structural design reminding trees. Moreover, it’s an effective structural design supporting extensive eaves serving as a bioclimatic urban experience for city dwellers. A dynamic symbol for urban space reminding belonging to nature as an ecologic and biomimetic way.



Figure 18, 19. Information of Richness, Arts And Biomorphologic Structural Design Of Meydan İstanbul Mall

Material Connection with Nature

“Material and elements from nature that, through minimal processing, reflect the local ecology or geology to create a distinct sense of place.” (Browning, Ryan, Clandy, 2014)

Natural materials, natural colour patterns (colours evoking nature) of zone are the patterns of this section. Meydan İstanbul mall represents a natural habitat with colours and materials reminding nature for city dwellers.

As an ecologic concept, in Meydan İstanbul Mall design not all the surfaces of the project are planted with greenery, essentially both elevations, facades and floor finishings, are clad or paved with the same material: earth-coloured ceramic tiles that include miscellaneous degrees of perforation related to functions and uses behind.



Figure 20,21. Earth colored façade and floor materials and green roof.

Complexity & Order

Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature. (Browning, Ryan, Clancy, 2014) Fractal patterns on façade, furniture design, floor tiling and arrangements on finishings, patterns of claddings are in parts of this section. Meydan İstanbul mall design, landscape silhouette perceived as fractals with hierarchic levelled ramps (pedestrian ways) and daylighting on eaves reminding fractals are in this category. Natural patterns are used in interiors as well. (Honeycomb patterns etc.) As fractals are significant for human visual perception and mentality development these designs effect city dwellers effectiveness positively leading to urban space's intellectual interaction.



Figure 22,23,24. Fractals in ceiling cladding and hierarchy of fractals in courtyard, honeycombs patterns in interiors .

3.4. Effects of Earthshelter's on Urban Space in Context of Biophilic Design "Nature of the Space" Dimension Prospect

Prospect is defined as *“An unimpeded view over a distance, for surveillance and planning”* (Browning, 2014) in Terrepin report 14 patterns of Biophilic design. *Humans evolved in adaptive response to the complementary benefits of prospect and refuge. Prospect refers to long views of surrounding settings that allow people to perceive both opportunities and dangers, while refuge provides sites of safety and security.* (Kellert, Calabrese, 2015). Earthshelters as massive mass public buildings preclude affecting the city silhouette in urban space. In this context, it also increases the landscape quality of the city and urban biophilic value.

Interaction with the urban space in earthshelters manifests itself as infinity, immensity in the borders of the earthshelter. The aim here is not only interconnection with the landscape. The limitlessness of the space aims to serve the city dweller a feeling like a Flaneur who travels in modern time passages. Although this vitality, mobility and dynamism seem only as the face of modernism; it is also a biophilic experience. No organism in nature is stable, there is continuous interaction. Spinoza stated that the interaction of modus is inevitable in Ethika.



Figure 25,26. Limitlessness of space with broad transparent for more interaction in malls.

Refuge and opportunity

One of the naturalistic dimension of biophilic design in direct experience category feeling of security. The first spaces proposed in exceptional circumstances such as earthquakes, natural disasters and war are earthshelters and underground. Many protective qualities of the soil, such as radiation protection, sound and noise protection, and earthquake safety, make the earthshelters and underground spaces advantageous. When evaluated in the urban context, these qualities are imperative beyond being a perceptual and biophilic requirement. Considering that the first primitive tendency of human is shelter in caves, it is understood that underground spaces are one of the important dynamics of urban in biophilic context.

At the same time, thanks to the heat absorption quality of the soil, earthshelters prevent both urban temperature differences and thermal corridors in urban space. Urban spaces created thanks to the underground spaces generates microclimatic areas which is vitally considerable for biodiversity. In terms of environmental psychology, the increasing variety of living organisms in urban space supports the feeling of safety of living things in a biophilic context. In urban space, opportunities can turn into opportunities within the scope of accessibility of the earthshelter space, movement, being open to pedestrian circulation, meeting the square by pedestrian paths or creating a square in urban like Meydan İstanbul mall. It should be ensured that a structure or a space is strengthened by pedestrian circulation to feed the city and support flow like a heart. This should not only sustain the functionality of urban space but also include strategies to encourage people to motion. With this strategy, ramps have been used in the landscape design of Meydan İstanbul Mall which also enhances the accessibility.



Figure 27,28. Landscape design with ramps, Meydan İstanbul Mall and Eaves as refuges

Ensuring accessibility in urban space equally and clearly (for humans and living things) is important in order to share opportunities. Any transportation grid should be designed taking into account the biophilic tendencies of another living creature in the city (migration routes, breeding times, etc.). In the distribution of opportunities (for example, as bees provide pollination and are the key element of nature), planting choices that support bee circulation are an ecological approach that considers the sustainability of all living things.

Mystery

“The promise of more information achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment.” (Browning, Ryan, Clancy, 2014)

Meydan İstanbul mall, in square design light-shadow elements evokes feeling of mystery and refuge. Reflections of floor material on reflective eaves enhances perceiving mystery by defining an axis through the transparent façade. Reflection of façade and water elements (water banks) generate mystery for square increasing activity and dynamism of urban arena. Arts on the entrance façade and in the café interiors enhance mystery as well. Scent as a biophilic mystery element, it's green roofs with blossoms allures many living things as human effecting urban space attractively.



Figure 29, 30, 31. Mystery effects of Meydan Mall.

Activity and movement generates an experience of mystery as well. (Ryan, 2014) As being transparent and translucent space, urban corridors of Meydan İstanbul mall and activation arena serves as mystery arena for the urban space. Everything in nature is in flow, loop, motion. However, in this flow and loop, the modus does not turn out of details. Even a snowflake falls on earth with its fractal details and original geometry. However, the movement in modern cities causes buildings to be perceived without details. This situation deprives our sense of place attachment and the feeling of place in urban space. According to Anderson (1981, 76), similarly to this situation, passing through the urban space rapidly makes it impossible for us to notice the details of the buildings. This undetailing hinders our sense of belonging and ownership of urban space. However, in the biophilic context, every living creature embraces its living space (habitat), leaving its smell or feathers or pile. As *Celebrese and Kellert stated, (2015)* positive contact with animals can be performed by creating a habitat for them.

Risk / Peril

“An identifiable threat coupled with a reliable safeguard.” (Browning, Ryan, Clancy, 2014)

As Ryan, Browning and Clancy mentioned infinity edges, double sized atriums, objects or elements perceived to defy gravity, being improper for human scale, bees, spiders, snakes etc. causing biophobia in urban space or interiors are the part of risk and peril pattern. In the context of urban space, vertical construction exceeding the human scale affects people biophobically. (Buildings that exceed the height of the trees, buildings defying gravity) Mahaffy and Salingaros (2015) stated that the iconic structures designed by architects today for sculptural imagery consume natural resources and lead to insanitary cities. Earthshelters are biophilic spaces that meet the need for perceptual security as they do not exceed the human scale and do not underestimate the nature around the building. (Historical environments etc.) Meydan İstanbul Mall serves biophobic night lighting especially for activation arena. Broad eaves of Meydan Mall (as it hasn't columns supporting) evokes biophobia as well. Water banks as they're located dispersed lead to risk / peril for urban space. For city dwellers walking on water on courtyard is a risk in urban space related to accidents. Infinity (as it mentioned in section 3.4-11) can cause both mystery and risk for city dwellers related to perceptual security requirement. In context of interiors of Meydan İstanbul Mall green elements (pot plants) in the gallery defying gravity triggers biophobic effects of space users. Walking along the façade under the reflective ceiling evokes a stimuli as if walking under water can cause biophobia effect as a peril.



Figure 32,33 Night Lighting of Meydan İstanbul Mall .



Figure 34 and 35. Meydan Istanbul, Broad Eaves and Pot plants in Fast food-restaurant causing Biophobia defy gravity.

3.5. Effects of Earthshelter’s on Urban Space in Context of Biophilic Design “Vernacular/ placed based” Dimension

Salingaros (2015,17) stated that remarkable success of many 20th and 21st Century buildings with organic forms has arisen almost entirely from biophilic design. Parametric architecture, amorphous forms, biomimetics and biomorphology have been widespread all around the world. Reflecting modernism, as basic forms doesn’t tone with vernacular architecture, our place based biophilic tendencies were negatively effected as human don’t feel place attachment and sense of ownership. Behrens (1914) stated that simple forms consisting of non-detailed planes define the age of rapid movement (Colomna, B. 2017,61). It has seemed as it enhanced biophilic effect related to humans affiliation for movement in urban.

4. Discussion

Table Biophilic pattern images evaluating Meydan mall as an urban arena

Nature In The Space	Naturel Analogues	Nature Of The Space
		

Table Evaluating Meydan İstanbul Mall according to 14 patterns of Biophilic Design

Nature In The Space	Naturel Analogues	Nature Of The Space
1.Visual Connection with Nature Green Roof ✓✓✓✓	8.Biomorphic Forms & Patterns Arts on façade and interiors, biomorphologic and biomimetic structural design, tree colomns, biomorphic patterns in interiors ✓✓✓✓✓	11.Prospect Preserving urban silhouette by earthshelter, generating an courtyard for urban, serving as ecologic habitat prospect for city dwellers ✓✓✓✓
2.NonVisual Connection with Nature	9.Material Connection with Nature	12.Refuge

Birds pipe, discant of courtyard children, flower fragrance on roofs, odour of grass, clapping water elements ✓✓✓✓✓	Green roof, Earthcoloured ceramic tiles, steel coloums, wood cladding in interiors ✓✓✓✓	Feeling the earthshelters refuge, Experiencing refuge under eaves, Feeling of safety and silence in interiors ✓✓✓✓
3.Non-Rhythmic Sensory Stimuli Green roofs generating ecologic habitat for urban space ✓✓✓✓✓	10.Complexity & Order Fractals in ceiling cladding and hierarchy of fractals in courtyard ,honeycombs patterns in interiors ✓✓✓✓	13.Mystery Reflective transparent facades, reflective waterbanks, feeling motion in urban corridor, mystery of arts on entrance façade and interiors ✓✓✓✓
4.Thermal & Airflow Variability Aerodynamic forms of mall, eaves and roofs, urban corridors supporting airflow, Perforated Façade design ✓✓✓✓✓		14.Risk/Peril Night lighting, broad eaves defying gravity, pot plants in restaurant, reflective ceilings under eaves, walking on water on courtyard ✓✓✓✓
5.Presence of Water Water walls, water banks and fountains ✓✓✓		
6.Dynamic & Diffuse Light Courtyard as Sunbathing arena, dormer windows on green roof, broad eaves for shadow dynamism ✓✓✓✓✓		
7.Connection with Natural Systems Perceiving Seasonal changes, time ✓✓		

Although design strategies have been followed in order not to make you perceive time in shopping malls in the past, it is seen that shopping malls are mostly designed as wellness center as life-focused today. This strategy increases the biophilic quality of the shopping malls today. Nowadays, introvert shopping malls with atriums have turned into places where we can feel the sun, the wind, the nature with courtyards, squares, urban arenas like Meydan İstanbul Mall.

5. Conclusions

Completely underground forms with massive masses such as Malls enriches the urban space experience. Urban space exposed above the ground turns into squares and activity areas, and this strategy serves as dynamic urban spaces by increasing friskiness. Considering that biophilia is not only affiliation of nature, but also fondness for life, it is noticed that the solutions that sustain vitality in urban space are biophilic solutions. In Shopping Malls, architectural solutions can be put forward to increase the vitality and interaction by increasing transparent showcase of the store. (as Meydan İstanbul mall) In this way, earthshelters are more livable, attractive since its interaction with the urban space is more intensive. The findings obtained from the research show that earthshelters increase the biophilic value by interacting the city and contribute to integration of ecologic urban space.

*Plants and nature that feel good in some periods can cause different effects in different processes of human life.

*All living things have biophilia and it should be taken into consideration that when biophilic spaces are created in urban space, urban space can attract other creatures as well.

*Considering that the ecological chain is a whole, it is significant to use urban design strategies to keep all living species alive.

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