

Biophilic Architecture at Workplace

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Article Information

Article history:

Received Jun 10, 2023

Accepted Dec 10, 2023



ABSTRACT

Introduction: Biophilic Architecture provides a strong bond between building's occupants and nature. At workplaces, it enhances creativity and productivity. It also improves one's mental health, keeps calm and relaxed. One can feel more active which reflects in the behavior of the user. Biophilic-designed buildings perform better than conventional buildings. It also provides physical, mental, and intellectual stimulation for Office Buildings users.

Aim: To study and analyze parameters for Biophilic Architecture which gives comfort at Workplaces for Building's users.

Objectives: 1) To study different parameters of Biophilic Architecture at Workplaces which gives comfort at Workplaces for Building's occupants.

2) To study, how to use different parameters of Biophilic Architecture which gives comfort at Workplaces for Buildings occupants.

Methodology: 1) Literature study.

2) Study of different parameters of Biophilic Architecture.

3) Amongst all the parameters of Biophilic Architecture, choose which are appropriate for Workplaces.

4) Study of advantages and challenges of Biophilic Architecture at Workplaces.

5) Book Case Studies where Biophilic Architecture at Workplaces has been used.

6) Analysis of parameters and conclusion for Biophilic Architecture at Workplaces.

KEYWORDS: *Biophilic Architecture, Workplaces, parameters and comfort*

1. INTRODUCTION

Biophilic architecture is an architectural approach which creates a type of built environment which has connection between humans and nature. It is based on the concept of Biophilia. Biophilia is the liking of human being for other forms of life. Human being likes nature, ideas or things those are derived from the nature, natural elements and systems. Biophilic architecture gives a different experience of life which differs from a regular life which cuts people off from nature.

In the context of architecture, Biophilic design principles are employed to integrate natural elements, patterns, and processes into the built environment.

Biophilic architecture recognizes the importance of sustainable design practices and often integrates ecological considerations to minimize the environmental impact of buildings. This can include incorporating features such as abundant natural light, views of nature, indoor plants, water elements, natural materials, and biophilic patterns and textures. It strives to create environments that not only benefit human occupants but also contribute positively to the surrounding ecosystems.

Overall, Biophilic architecture seeks to create harmonious, sustainable, and health-supporting built environments that recognize and harness the profound influence of nature on human well-being and productivity.

Biophilic design has built environment which includes building materials, building form having inspiration from nature, colours and textures. It promotes sustainable involvement of human being with nature and also gives health and rejuvenation to human being.

It also promotes Green Building.

2. PARAMETERS OF BIOPHILIC ARCHITECTURE CHOSEN FOR WORKPLACE

Water

Air

Daylight

Indoor Plants and Garden

Landscape

Natural Materials

Views and Landscape

2.1 WATER: Use of water at workplaces is for good health, reducing stress, lowering heart rate and blood pressure. It provides calm and peaceful state of mind for the employees. It also helps in improving perception, concentration and focus on the work allotted.

2.2 AIR: Temperature and humidity which affects the comfort of employees can be controlled by using Airflow Variability. Fresh air removes air pollutants and foul air by drawing fresh air into usable area And improves air quality.

2.3 DAYLIGHT: Larger openings are advisable for giving sufficient amount of light at workplaces. Also including wall installation or façade skins which creates light and shadow can be interesting and creative elements in design. Properly used daylight along with water and or landscape provides Calming and meditative atmosphere. Unnecessary glare can be controlled by using foliage screen on natural material screens.

2.4 INDOOR PLANTS AND GARDEN: Workers having access to indoor gardens at their offices have personal benefits of wellbeing and also improves in building quality of their working relationships. Plants along with ample amount of light improves creativity.

2.5 LANDSCAPE: A well designed landscape areas enhances the positivity of space so increases the productivity of employees.

2.6 NATURAL MATERIALS: If we use Natural Materials in design of the workplace, it creates strong bond with nature. Natural Materials reflect local identity and connects people with Nature. It acts as another way of indirect simulation of nature in the

workplace. The selection of materials and elements of nature that reflect local ecology or geology i. e. use of stones plays a vital role in design.

It reduces the release of chemicals and toxic emissions that impact air quality.

The selection of color palettes inspired from nature such as earthy shades, blue and green tones play important role while designing spaces in workplace as these are attached with nature.

2.7 VIEWS AND LANDSCAPE: Well-designed landscaping areas should to be a visible part of buildings for user. Maximum number of windows or full height windows should give view to landscape, water and other natural elements.

Green facade brings nature closer to the space, which is important for the interaction between people and nature.

3. There are few advantages and challenges of Biophilic Architecture which are discussed in detail as below,

Advantages and challenges of Biophilic Architecture:

From the study of History also it is observed that the human being is having strong affection with nature. Contact with the natural world is beneficial for our well-being. In Biophilic design, studies have found the following benefits of connection with nature:

The incorporation of these Biophilic elements and concepts brings several benefits to the users:

- Improved well-being and mental health
- Increased creativity and innovation
- Enhanced productivity and job satisfaction
- Reduced stress levels and absenteeism
- Positive effects on physical health, such as improved air quality and access to natural light
- Aesthetic appeal and visual connection with nature
- Opportunities for relaxation, socialization, and outdoor activities
- Greater environmental awareness and sustainability consciousness among employees

By embracing Biophilic design principles, a workplace fosters employee comfort, well-being, and engagement while promoting a sustainable and environmentally conscious culture.

Implementing Biophilic design in offices can present certain challenges. Here are five main challenges that can arise:

- Limited access to natural elements: One of the primary challenges is the limited availability of natural elements in urban office environments. Finding ways to incorporate greenery, natural light, and outdoor views can be challenging, especially in high-rise buildings or spaces with limited access to sunlight or outdoor areas.

- **Cost implications:** Integrating Biophilic design elements, such as living walls, green roofs, or extensive daylighting systems, can come with significant upfront costs. The cost of materials, maintenance, and specialized design expertise may pose challenges for organizations with limited budgets.
- **Space constraints:** Office spaces often have limited square footage, making it challenging to incorporate large-scale Biophilic design elements or dedicated areas for natural elements. Balancing the desire for nature-inspired features with the need for functional workspaces can be a hurdle.
- **Maintenance requirements:** Biophilic elements, such as indoor plants or living walls, require ongoing maintenance, including watering, pruning, and pest control. Ensuring proper care and maintenance of these elements can be time-consuming and may require dedicated resources.
- **Employee preferences and adaptability:** Introducing Biophilic design elements may not always align with individual preferences or cultural norms. Some employees may have allergies or sensitivities to certain plants or may prefer a more minimalist office aesthetic. Additionally, accommodating the diverse needs and preferences of employees can be a challenge when implementing Biophilic design on a large scale.

Overcoming these challenges requires careful planning, collaboration between architects, designers, and facility managers, and a tailored approach that considers the specific constraints and requirements of the office space. By addressing these challenges, organizations can create successful Biophilic design implementations that enhance employee well-being and productivity.

4. Case Studies

4.1: Etsy Headquarters (Brooklyn, USA)

Location: Dumbo – Brooklyn – New York City, New York

Date completed: 2016

Size: 225,000 square feet

Design: Gensler

The Etsy Headquarters showcases Biophilic design principles within its office spaces. The interior features extensive use of natural materials, such as reclaimed wood and stone, and incorporates living green walls, indoor plants, and natural light. The design creates a calming and nature-inspired atmosphere that promotes employee well-being and productivity.

These examples highlight how Biophilic design can be effectively applied within office interiors to create environments that promote employee well-being, connection to nature, and productivity.



Fig. 1) Reception



Fig. 2) Library



Fig. 3) Workspace

CASE STUDY 4.2: THE EDGE (AMSTERDAM, NETHERLANDS):

Architects: PLP Architecture

Area: 40000 m²

Year: 2015

Known as the greenest office building in the world, The Edge incorporates numerous Biophilic design elements to create a healthy and engaging office space. It features a central atrium with a living wall and internal gardens, extensive use of natural materials, such as wood and stone, large windows for natural light and views of the surrounding green landscape.



Fig. 4) Atrium



Fig.5) Public area



Fig.6) Public area with clear line of sight for external View



Fig. 7) Building Elevation



Fig. 8) Atrium

5. FINDINGS FROM RESEARCH ABOUT THE DIFFERENT PARAMETERS OF BIOPHILIC ARCHITECTURE AT WORKPLACES:

Sr. No	Parameter	Used in the form of	Spaces where it can be used	Examples	Health benefits	Maintenance
1	Water	Water fountains, water ponds, water walls, aquariums. If it is not possible to install or in case of unavailability of water in dry regions, images depicting water in nature can also be beneficial.	Entrance areas, Meeting rooms	Ex. Small islands-like meeting rooms sunken in a pool of water	Good for psycho-physiological wellbeing.	Use of clean water. Proper flow of water and periodical Maintenance of appliances.
2	Air	Sun blinds, operable windows or roof terraces used as meeting area, outdoor working areas which provides fresh air. Living walls, controllable façade-glass louvers, use of active air walls.	Meeting spaces, outdoor working areas	Ex. Controllable façade-glass louvers at Hankook Technoplex	Indoor air quality is improved which improves employees' comfort and physical health. Also enhances employees' concentration on focused tasks to achieve their goal.	Airflow sensors are installed to control airflow in workplaces.
3	Daylight	Full height windows, Maximum number of windows, glass walls, atriums, skylights, operable windows	Work areas, Office patios	Ex. Full height windows in Super metrics offices, Finland Ex. Leaf wall installation at Sanofi office, Dubai Ex. Office patio that allows awareness of seasonal changes in nature	To protect from harsh sunlight. To provide sufficient amount of light required to illuminate particular activity more prominently. It creates calming or meditative atmospheres. It promotes environmental awareness and sustainability among employees	Cleaning of glass surfaces and other installations

Sr. No.	Parameter	Used in the form of	Spaces where it can be used	Examples	Health benefits	Maintenance
4	Indoor Plants and Garden	Use of plants in living wall structures increases liveability of normal spaces. Using potted plants indoors.	Waiting areas, working areas, Library	Ex. Indoor plants in Super metrics offices, Finland Ex. Apple HQ in Cupertino.	Personal wellbeing of employees. Increases the quality of their working relationships amongst the employees. Enhances creativity and innovation of the employees. Green wall system removes air pollutants.	Watering, pruning, and pest control to plants as per the requirements
5	Landscap e	well-designed landscape areas. Preserve existing trees. Preserve the natural landscapes during land development and construction.	Waiting areas, working areas, parking areas	Ex. Use of existing trees and natural landscape	Gives soothing effect and increases focus on task. Enhanced productivity and job satisfaction. It develops strong bond between man and nature.	Periodical maintenance.
6	Natural Materials	Use of wood, stone, marble for ceiling, flooring and wall cladding. Selection of colour palettes furnishing which is inspired from nature such as green, blue and yellow	reception and work desks in work places	Ex. Wooden material selection at Hortonworks office Ex. Workplace using colours inspired from nature	It creates a relaxing indoor environment for users. Reduces chemicals and toxic emissions which impact air quality.	Periodical Maintenance
7	Views and Landscap e	Visibility of well-designed landscaping areas such as green walls. Provision of maximum windows, green facade or Living walls.	Office spaces	Ex. Workplaces with clear line of sight	Aesthetic appeal and visual connection with nature.	Cleaning of glass surfaces, Periodical Maintenance

6. Conclusion:

Biophilic architecture at workplace is to enhance the well-being, productivity, and overall experience of building occupants by creating spaces that mimic or recall the qualities of nature. Use of Natural building forms, materials, light, views and landscape contributes a major role in increasing employee's health, comfort, productivity, creativity and innovation at workplace. Designers should use it in their designs to add depth and diversity to spaces in workplaces. It develops and strengthens the bond between employee, space and nature. It also creates working community in workplace. By providing a connection with the nature, Biophilic architecture helps to improve physical health, reduce stress, enhance cognitive function and promote overall employee's psychophysiological well-being at workplace.

References:

- [1] <https://plparchitecture.com/the-edge/>
- [2] <https://www.etsy.com/news/reimagining-our-headquarters>
- [3] <https://www.officelovin.com/2017/02/tour-etsys-super-cool-brooklyn-headquarters/>
- [4] <https://www.archdaily.com/785967/the-edge-plp-architecture> <https://www.newprocontainers.com/blog/8-cool-examples-biophilic-design-workplace/>
- [5] <https://k2space.co.uk/knowledge/biophilic-office-design/>
- [6] <https://officeprinciples.com/insights/role-biophilic-design-office-environment>
- [7] <https://www.cNBC.com/2020/10/17/bringing-the-outside-into-the-office-covid-19-bolsters-green-design.html>
- [8] https://erjsh.journals.ekb.eg/article_235277_519dfa5f7a542d59cf57b1a0d8c7558c
- [9] <https://www.ie-uk.com/blog/biophilic-design-workplace>
- [10] <https://www.researchgate.net/publication/338111192T>