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# Application of Mycelium Technology Panel in Depression Healing Space

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**Abstract.** The use of natural materials plays a role as a form of biophilic design for depression recovery buildings. This research aims to provide adequate healing facilities for depressed patients in Jakarta with Mycotech as the primary building material that can play a good role in the recovery process of depressed patients. The methods used to support this project are; 1) Symbiosis; 2) Biophilic design; and 3) Healing architecture. This research explains the application and the effect of using environmentally friendly Mycotech materials to heal depression patients. This research makes a new health facility with a series of therapeutic programs highlighting Mycotech, thus creating an unprecedented novelty. This research creates a platform (buildings and environment) that can help depression recovery by utilizing new technologies and not harming nature.

**Keywords:** Mycotech, Depression, Healing Space, Mental Health, Architecture Building

## INTRODUCTION

From early 2020, Indonesia has been fighting the pandemic. The impact can be felt in an increasingly damaged environment, the economy is in disarray, the death rate continues to increase, and mental health is getting worse [1]. The pandemic causes depression that leads to trauma, loneliness, and loss of life hope. Efforts to maintain mental health are even more difficult during the Covid-19 pandemic [2].

Then, the more damaged the environment increases the awareness of the building to be more ecologically and environmentally friendly. Along with the development of the era, more and more innovations in building materials that are environmentally friendly. In the form of panels called Mycotech, one of the building materials can absorb twice as much carbon as conventional materials [3].

The purpose of this study is to provide adequate healing facilities for depressed patients in Jakarta, with Mycotech as the primary building material that can play a good role in the recovery process of depressed patients. Many studies discuss biophilic design but do not yet specifically examine the role of natural materials in healing depressed patients. More details can be seen in Table 1.

**TABLE 1.** Prior studies on Biophilic Design

| Title | Summary |
|---|---|
| Application of Biophilic Design to Improve Mental Health of City Populations [4] | By optimizing the biophilic design aspect would benefit the user in the long term |
| Application of the Concept of Healing Architecture in Type D Hospital in Kendal District [5] | Healing Architecture at the Hospital helps the healing process |
| Design of Mental Rehabilitation Facilities for Patients Depression [6] | A good environment for the rehabilitation process for people with depression is an environment that is far from pressure |
| Effects of the biophilic indoor environment on stress and anxiety recovery: A between-subjects experiment in virtual reality [7] | Biophilic design may be a way to bring nature and its therapeutic benefits to a patient |
| A Mental Hospital With The Concept Of A Healing Environment In Semarang City [8] | The application of a healing environment can support the healing process of people with a mental health condition |
| Rehabilitation Facilities for Sufferers | Nature sound therapy in buildings can be a healing therapy for |



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| Title | Summary |
|---|---|
| Sound Therapy-Based Depression in Surabaya [9] | depressed patients |

## THEORETICAL APPROACH

To maximize the proper use of Mycotech so that the purpose of the building is achieved, it is necessary to understand it first; 1) Symbiosis Method; 2) Biophilic design; 3) Healing architecture.

1. Symbiosis Method
   Symbiosis comes from the Greek '*sumbiōsis*' meaning 'a living together' or 'live together' with the basic word '*sumbios*', which in English is 'companion' [10]. In Kurokawa's concept (1994), he tries to combine this symbiotic relationship in humans and open space activities to provide added value for the environment [11]. One of the six principles of symbiosis, according to Kisho Kurokawa, used in this building project is the sixth principle, namely Symbiosis of Man and Nature [12]. The purpose of using the symbiotic method is to demonstrate the need to design following nature and to analyze the relationship between the artificial and natural environment [10]. Symbiosis is not a theory of dominance, where the strongest leads the weak [13]. So, doing symbiosis does not mean uniting differences but producing new things by merging.

   Application of this symbiosis method can be created by the interaction between nature and human in this building. Some theories have been proven to support this method. Hon Yuen, director of research in the department of occupational therapy at the University of Alabama at Birmingham, states, "Some people may go to the park to enjoy nature, not to exercise. However, it would relax and reduce stress, and feel happier". Then in the International Journal of Environmental Health Research, it is said that spending 20 minutes in the yard or the park without exercising and simply enjoying the scenery can increase well-being and feelings of calm. Finally, a study of 123 students conducted by Katherine D. Arbuthnott, Campion College, stated that participants who sat in a green open space for just 5 minutes showed a significant increase in positive emotions compared to participants who sat in a windowless laboratory room. However, if you want to improve your mood, at least spend 15 minutes in a green open space like your home page. It increases the positive effect on the body [14].

2. Biophilic Design
   Biophilic design is the development of a green design that pays attention to ecology with natural life, not only creating environmentally friendly and energy-efficient buildings and creating buildings that can be beneficial to health [15]. Biophilic is an approach to creating designs that can produce interactions between humans and nature in buildings and modern landscapes [16]. Fourteen patterns are owned by Biophilic Design [17] (See Table 2).

**TABLE 2.** Fourteen biophilic design patterns

| Context | Fourteen Patterns of Biophilic |
|---|---|
| Nature in the space | Visual Connection with nature |
| | Non-Visual Connection with nature |
| | Non-Rhythmic Sensory Stimuli |
| | Presence of water |
| | Dynamic and Diffuse light |
| | Connection with natural systems |
| Natural Analogues | Biomorphic forms and patterns |
| | Material connection with nature |
| | Complexity and order |
| Nature of the space | Prospect |
| | Refuge |
| | Mystery |
| | Risk/Peril |

Source: Journal Article Putting Theory and Patterns into Built Environment Practice, 2017



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One of the points is material connection with nature. This building's materials is dominated by Mycotech. Mycotech is a new technology in composite materials and environmentally friendly leather made by recycling from agricultural waste containing sawdust, empty fruit bunches, palm oil, sugarcane fibre bagasse, and natural adhesives obtained from mushrooms mycelium. Mycotech was founded by Adi Reza Nugroho CS (Hana), with a sustainable mission of renewable resources at affordable prices. Mycotech has two types of products. Biobo is a decorative panel for interior wall elements, and Mylea is a leather material used for shoes, wallets, bags, watches, and other fashionable products.

3. Healing Architecture
The function of this building is to heal depression patients. Depression is a period in which human functioning is disrupted related to feelings of sadness and accompanying symptoms, including changes in sleep patterns and appetite, psychomotor, concentration, anhedonia, fatigue, feelings of hopelessness, 2helplessness and suicide [1]. The depression recovery facilities provided consist of consultation and counseling services, inpatient care, therapeutic activities such as craft workshops from Mycotech (Mylea) and building materials dominated by Mycotech (*Biobo*) to accelerate the patient's recovery process. Use simple decorations, built-in-furniture inpatient rooms, safe building floor and ceiling heights to anticipate patient behavior out of bounds, and secure building material textures with psychologically calming colors.

Based on the approach of behavioral architecture to be able to create ideal conditions for the needs of sufferers, then there are three aspects described by Gifford, which can be used as guidelines in designing [18]: 1) Privacy, arrangement of mass, space, and circulation would affect patient privacy. Privacy provides a feeling of security and comfort [19]. Privacy is divided based on the patient's interaction needs. People with severe mental disorders need high privacy, while privacy is not too high to interact with other people. 2) Comfort supports healing, including ventilation, lighting, aroma and noise, and spatial arrangement, according to Chrysikou [20]. 3) Security, safe design is obtained from the use of interiors, materials, shapes, and textures that do not harm the patient in the building or the surrounding environment [21].

## METHODOLOGY

To be able to realize how to applicate Mycotech into a design, the following analysis is used; 1) Symbiosis; 2) Biophilic design; 3) Healing architecture.

## RESULT AND DISCUSSION

To find out the use of Mycotech in buildings, it is necessary first to understand the concept of the symbiosis method used in this study as the primary method in building design.

### 1. Symbiosis

Under the principle of Symbiosis of Man and Nature, from Kisho Kurokawa, the design of the building maximizes the relationship between fungi and the healing of human depression. In this project, the focus is more on the interactions that result from the Mycotech *Biobo* used as an interior building panel (See Figure 1) psychologically from theory; the influence of natural elements would give a good effect. Workshop activities from Mycotech Mylea as a therapeutic program are in this building, and besides that, there is also the consumption of oyster mushrooms. For the fungi itself, human cultivate and take care mycelium fungi in the room (See Figure 1).

**FIGURE 1.** Mycelium Cultivation Room and Mycotech Material applied on interior wall, *Biobo*
Source: Media startup.id, 2021, Accessed: August 21, 2021



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After understanding the symbiotic method, in completing the detailed design stages, a biophilic design guide is used in buildings.

## 2. Biophilic Design

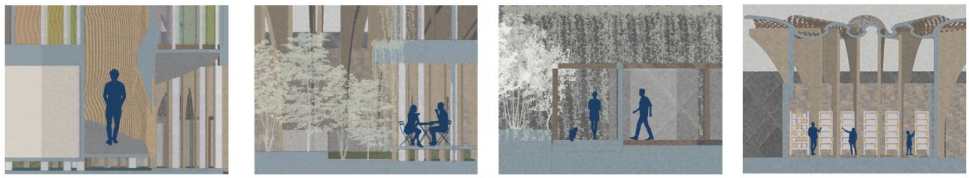
It can apply Four of the ten biophilic aspects of Mycotech (See Figure 2):

a) Biomorphic forms and patterns;
Mycotech's role lies in flexible panels that are applied to various patterns such as biomorphic shapes. Biomorphic shapes can affect emtions from fear to happy [22]. Biomorphic shapes on buildings are applied to ramp hallways to stimulates visitors there (See Figure 2a).

b) Visual connection with nature;
The use of Mycotech with its earth-tone colors provides a visual connection with nature. The application in the building is the cafeteria room that is designed with the outside view, influences on reducing stress [23], improved mental attentiveness [24], and brings happiness [25] (See Figure 2b).

c) Non-rhythmic sensory stimuli;
The Mycotech texture offers a stimulus to the patient when touched. Visitors are allowed to make the connection with material by touch the Mycotech panel in building. This action impacted heart rate positively, stabilize blood pressure and activate sympathetic nervous system [26] (See Figure 2c).

d) Material connection with nature.
The use of Mycotech as the main material in buildings minimizes processed materials and reflects the ecology and creates a different sense of space. This kind of design has been proven can improve creativity that help patients to recover [27] (See Figure 2d).



(a) (b) (c) (d)

**FIGURE 2.** Diagram of Application of Biophilic Design in Building
Source: Author, 2021

## 3. Healing Architecture

The Healing Architecture design uses mushroom panels with natural colors that tend to be neutral (beige) provides a good stimulus for depressed patients. In addition, the soft panel material is also safe for depressed patients. Natural materials can heal patients by its presents and the impact is can lower blood pressure and provide comfort [28] (See Figure 3).

**FIGURE 3.** Living area wall material made of Mycotech *Biobo*
Source: Author, 2021

In addition to using Mycotech as a building material (See Figure 4a), Mycotech is also used in handicrafts where the workshop activities are related to depression recovery activities (See Figure 4b). Mycotech Mylea can be used as; watches, shoes, bags, wallets, and various other items (See Figure 5).



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(a) (b)

**FIGURE 4.** Workshop room design and handicrafts from Mycotech, Mylea
Source: Author, 2021

**FIGURE 5.** Hand-crafted watch products from Mycotech, Mylea
Source: designboom., 2021, Accessed: August 21, 2021

## CONCLUSION

The existence of mental health issues, namely depression and environmental damage, is the background of this research. This study describes the role of Mycotech as a natural material in building a depression recovery, not to completely cure the patient but rather to speed up recovery. The research was conducted with three methods: 1) Mushroom is a symbiosis between humans and natural materials. Natural materials, namely Mycotech, dominate the building. It is filled with a therapeutic activity room program that highlights mushrooms as the main object in the building, which is expected to speed up the recovery process for patients; 2) A biophilic design describes how a depression recovery building can positively stimulate depressed patients and maximize the use of Mycotech materials in buildings to accelerate the recovery process more optimally. The biophilic designs applied are biomorphic patterns and shapes, natural visuals, non-rhythmic sensory stimuli, and natural materials; 3) Healing architecture can restore depression because it maximizes the relationship of the building's atmosphere with nature. The finding of this study is that we can find out a new material technology from nature, namely Mycotech, which also plays a role in depression recovery.

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