

Trends in Human-Centric Office Design

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ABSTRACT

Recently, many companies have dramatically changed workstyle and workplace of their office workers. Specially for achieving high productivity, providing high value, and employing talented people. Hot keywords are Human-Centric, ABW (Activity Based Working), wellness of employees and biophilia. Takenaka Corporation introduce the latest office trends through own experience.

1 INTRODUCTION

The origin of the office is said to be the office desk placed in the corner of the factory. Modern offices, created in the early 20 s, were based on the same concept as F. W. Taylor's 'scientific management' in which work was broken down into pieces that were then allocated to each employee for management and efficiency. This style continued until the 1990s, during which time the office was considered a cost, and efficiency and functionality were pursued.

In the late 1990s, due to globalization and advances in IT, office workers were no longer confined to hotels, airports, cafes and other offices. This type of work, called mobile work, is now available in the office. However, office space was still often seen as a cost. Since then, new offices have undergone remarkable changes in recent years in order to acquire and retain excellent human resources, demonstrate higher performance, and realize innovation in order to enhance competitiveness. Office is now considered an investment.

Activity Based Working has begun to evolve from a traditional office with little change and a uniform layout, in which employees work in a variety of areas and choose where to work according to the type of work they do at the time. At the same time, the focus is on the health of employees in order to avoid losses due to poor health and to improve performance through physical and mental health promotion. For example, the Well Building Standard certification system has started. When it comes to office design, the idea of a more natural biophilic design has been adopted.

Here, we describe some of the keywords that have attracted attention in recent office designs and installation in real offices, which we sensed through our experience as a workplace consultant. Takenaka Corporation's own efforts are also introduced.

2 MAJOR KEYWORDS IN OFFICE DESIGN

In recent years, office space has been seen as an

investment and has undergone a dramatic shift from its traditional lack of uniformity.

Major keywords include ABW (Activity Based Working / Workplace), Wellness/Mindfulness, and Biophilia/Biophilic design. Through these synergies, it is possible to acquire and retain excellent human resources, to generate focused thinking and more creative thinking, and to realize higher performance and innovation by enabling employees to be physically and mentally healthy, thereby improving corporate competitiveness.

2.1 Activity Based Working / Workplace

Activity Based Working/Workplace is a way of working and a workplace for that purpose that started in the Netherlands at the end of the 20 century. In a conventional office, there are only one's own seat, a few meeting tables, and a few conference rooms, and the employees do all the work except the meeting in their own seat where the work tools are arranged intensively at the fixed time.

Activity Based Working, on the other hand, is a mechanism to promote more creative results by working freely in a place and time, not only in the office. For this reason, the Activity Based Workplace provides various areas as shown in Fig. 1, and provides an environment in which employees can flexibly choose the location according to the activities required for their work. [1]

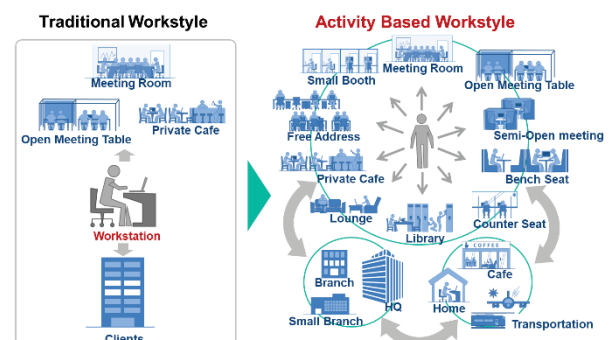


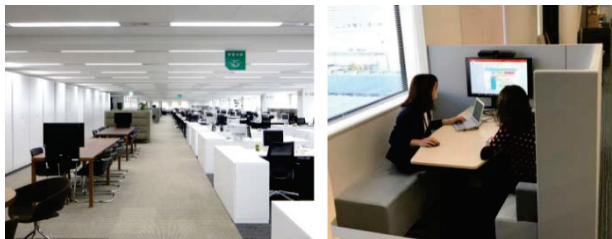
Fig. 1 Activity Based Working

Workers can select the place to work based on activity from various area.

In traditional offices, for example, meetings for communication and collaboration to generate new value by sharing various ideas were held in a single private meeting room. In the ABW style office, there are several types of private rooms and areas to use depending on

the content of the meeting or collaboration.

Even an open meeting table without reservation, there are variations such as a completely open meeting table provided near the office desk for a quick meeting in a short time, and a semi-open meeting table surrounded by a short partition suitable for meetings about personnel matters to pay attention to the surroundings or for a video conference using PC.



(a) Full-Open Style

(b) Semi-Open Style

Fig. 2 Variations of Open Meeting Area

Workers can choose a full-open style for a quick & short meeting and semi-open style for teleconference. Semi-open style is also suitable for a short meeting with sensitive topics.

As for the area for solo work, there are various variations because each person can concentrate in different environments. People who can concentrate more while drinking coffee in a little buzz will prefer a lounge where they can do solo work, while a booth will be set up for those who want to completely block out the surrounding sounds.

2.2 Well/Mindfulness

In the past, it was common for companies to provide systems and services to employees' health, and even in the office, the minimum quality was legally ensured. However, it was rare to actively promote the health of employees in office design.

In recent years, among various efforts aimed at improving intellectual productivity, attention has been focused not only on absenteeism due to health problems but also on the decline in work performance due to health problems. In its "Health Management Office Report" published in 2015, Japan's Ministry of Economy, Trade and Industry said that improvements in performance resulting from the elimination of presentism and absenteeism were due to the health maintenance and promotion effects of changes in work styles. The seven actions to maintain and improve health are "heightening health consciousness", "feeling comfort", "communicating", "taking a break and refreshing", "cleaning", "taking proper eating behavior", and "moving the body", and the importance of improving the office environment to enable these actions is emphasized. [2]

When it comes to office design, the health of employees is attracting more attention around the world than in Japan. In U.S.A., the certification system by Well Building

Standard has been started since 2014. The evaluation is based on 7 concepts (105 assessment items) in the current V1, and 10 concepts (Total of 117 evaluation items) in V2 which is expected to be officially launched in 2020. [3] The conventional building evaluation system has evaluated the environmental performance of buildings such as LEED and CASBEE. Well certification also focuses on living in buildings and the health and comfort of residents. In particular, it is said that evaluation points related to the physical condition of residents are examined not only from the viewpoint of environmental engineering but also from the viewpoint of medicine.



Fig. 3 Well Building Standard

Well Building Standard has been registered in 3506 cases (54 countries) and has already been certified in 195 cases (22 countries)

The common idea is that not only efficiency but also light, sound, wind, water, scenery, and other factors that affect emotional aspects should be considered, and that a healthier and more comfortable living space is expected to improve the performance of employees working there.

2.3 Biophilia/Biophilic Design

As described in the previous section, "nature" such as light, wind, and green are emphasized in office design in health management and the Well Building Standard. There are studies on the need for and effectiveness of incorporating such "elements of nature" into the office. [4]

According to a questionnaire survey of 7,600 people from 16 countries around the world conducted by The Human Spaces Co., the top 5 reasons why office workers want to be in their offices are I) Natural light (44%), II) Indoor plants (20%), III) Quiet working space (19%), IV) View of the sea (17%), V) Bright colors (15%).



Fig. 4 Lounge Office with Nature Designed according to the concept of green visibility

The study also found that workers working in offices with such "elements of nature" had improved mental and physical health, as well as increased productivity and creativity.

In response to Biophilia's need for "nature" in these offices, Biophylic Design has begun to be incorporated into office designs. Biophylic Design can be said to be "Design that makes you feel nature" and there are various methods and variations. Some are inorganic but have a shape that makes them feel natural or living, while others bring plants or water directly into the office.

As for the rate of green vision required by the Well Building Standard, according to a survey result [5], the highest productivity is obtained when the rate of green vision is around 15%, and there are some companies that design their offices based on the rate of green vision. The Well Building Standard evaluates the quantity and quality of the view outside the window as well as the rate of green vision. The question is how many seats you can get out of the window, the volume of the view, and the quality of the view (Even if you can see the outside of the window, it is not enough to see the wall of the next building that is not 5 meters away.).

However, some offices, such as the basement office, have no view of the outside of the window. As a solution for such situation, Professor Miki of Doshisha University proposed "virtual window" [6]. A large display is embedded in the wall, and the bezel is covered with a member imitating the window frame to make it look as if the window is there.

3 CHALLENGES IN TAKENAKA CORPORATION

This chapter mainly introduces the efforts of the Osaka Head Office and the Tokyo Head Office of our company. They were renovated to incorporate ABW in 2017 and 2018 respectively.

3.1 BIM Studio: Example of Collaboration Room

Both offices have a collaboration room called BIM Studio, which projects images from multiple projectors across the wall for a variety of discussions. BIM stands for



Fig. 5 Virtual Window in a Room with No Windows
Two large displays embedded on the wall with window frame and a blind

building information modeling. It is a building database that adds attribute data such as material names, costs, and management information to 3D drawings of buildings.

In BIM Studio, you can visually check various simulation results such as design examination using BIM model, natural lighting and natural ventilation.

In addition, by using HMD for VR and by projecting the image onto the wall, the architect can confirm the design details at actual size.



(a) with Large Screens



(b) with VR

Fig. 6 Design Confirmation in BIM Studio

3.2 Trail of casual remote communication

"Ensuring a sense of unity among business sites" has long been a problem for companies with multiple business establishments. This is especially true when the same business unit is divided into multiple locations.



Fig. 7 Real size images and a 24-hour video conferencing system are used to improve the sense of unity between remote sites.

As a result of this renewal, the Tokyo and Osaka head offices are equipped with an always-connected videoconferencing environment that can display full-size images. Watching each other on a regular basis increases the sense of closeness and helps reduce the number of business trips and increase communication.

3.3 Experiential verification of brightness design using VR

According to various laws and guidelines, office lighting in Japan was higher than in Europe and the United States in ceiling lighting alone. However, according to the Lighting Environment Standards issued by the Architectural Institute of Japan in 2016, task ambient lighting is recommended, and evaluations based on ambient lighting and brightness are required.

Regarding the relationship between ambient lighting and brightness, it is known that people feel bright when the brightness of the walls and ceiling is high, even when the floor illumination is low.

Until now, the luminance has been displayed only as shown in FIG. 8 (a), but it is difficult for an ordinary person to image a sense of brightness from this graph. In collaboration with Tokyo Institute of Technology, our company has developed a visual environment design support tool that allows users to experience brightness through VR. It is expected to be used not only for the

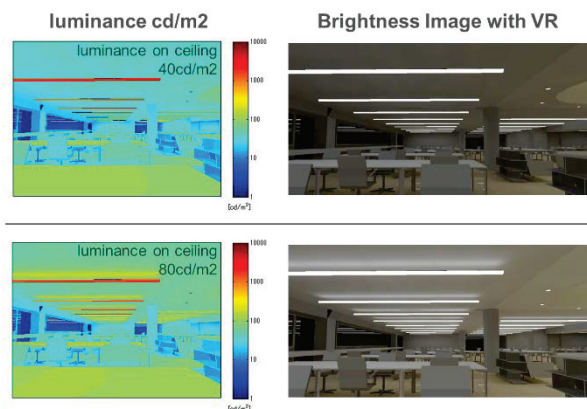


Fig. 8 Lighting Design with Brightness

Bigger ceiling luminance can let human feel brighter with similar illuminance on the floor.

designer's own confirmation but also for consensus building with the building owner.

3.4 ta-tta-tta: Trail for promoting employee health

Takenaka Corporation now calls itself "Healthy Community Development" and aims to create a place where everyone can live healthy and full of spirit, transcending the traditional framework of space and community development.

As part of these activities, we are developing a system called "ta-tta-tta" that supports the exercise habits of office

workers by utilizing IoT.

Specifically, let employees have IoT tags and smartphones. When employees try to climb stairs, a sensor in the stairwell detects them and a cloud service identifies them. It aims to encourage active use of stairs by projecting different images at different heights.

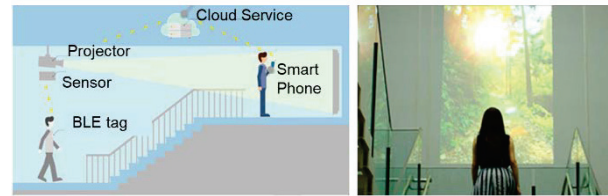


Fig. 9 System Image of ta-tta-tta

Identify employees and project images of the landscape based on how high they've climbed

4 CONCLUSIONS

Many of the experiences presented in this paper can be gained through information displays. Regardless of location, individuals can experience the same experience, connect people with groups, and collaborate in real time. An effective way to deploy the use of Display for such experiences could play a significant role as an effective tool for both organizations and the growing number of freelancers.

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