

# Design of House and Architect Office Against Pandemic Covid-19

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## ABSTRACT

Creating a building design customized to survive the Covid-19 pandemic can be useful for an architect working at home. This report will analyze to minimize the influx of viruses from outside the house brought in by the occupants of the house itself, both from clothing, bodies, and goods carried. To increase the house's resilience to the Covid-19 virus and in this study is highly recommended by using a method of maximizing natural lighting, air circulation, and circulation air circulation. Also, still pay attention to the aesthetics of the space, both interior and exterior. It can be concluded that from the three discussions, it is essential to be able to prevent the transmission of the Covid-19 virus either from workers coming from outside the house or dirty air entering the house.

**Keywords:** Architect, air and lighting, COVID-19, home office

## 1. INTRODUCTION

By early 2020 Covid-19 had already spread in Wuhan, causing a stir that spread throughout the world. And from various countries directly implement the Protocol to Minimize the development of Covid-19 following the recommendations of the World Health Organization (WHO), such as washing hands, not gathering, and doing Large-Scale Social Restrictions / PSBB up to lockdown [1]. The problems that occurred during the Covid-19 pandemic in Indonesia significantly affect the physical condition of even many lives that have died. Indonesia is currently contributing to the second-highest death rate in Southeast Asia [2].

The impact of Covid-19 is not only on physical condition but also affects the economy of individuals, households, companies, even significantly affect the economy of a country with a considerable scale graft both nationally and even globally. And in Indonesia, it was announced that the virus was affected by President Joko Widodo on March 2, 2020. The National Disaster Management Agency (BNPB) specifically referred to Covid-19 as a non-natural disaster [3]. With the news announced, many workers enforced Work From Home, including for an architect was also put in place [4]. And here I take research on the design of the architect's house because, in this pandemic condition, an architect must be able to make a house into a healthy office and can apply the regulations against covid-19 following which rules. Because an architect must also have an office to conduct meetings, designs, and others because it is not just coming to the project. And how to minimize the entry of viruses from small things that can have a significant impact.

## 2. MATERIAL AND METHOD

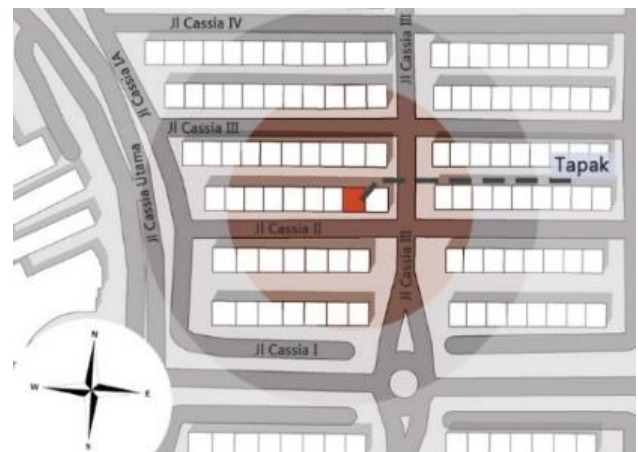


Figure 1 Location, East Jakarta.

Source: cadmapper.com

The location of the site is located on Jl Casia II, Cakung, East Jakarta; here, the face of the building facing southwards will have an impact on the entry of natural lighting rays from the overall face of the building at the rising of the sun from the east. And the house is 15 x 6 m<sup>2</sup> and inhabited by 1 father, 1 mother, 2 children, and 1 housekeeper.

Most architects will spend time in their workspace. However, this activity will create a flow of air that settles in one room. Not only thinking about activities but how to minimize dirty air and viruses that will settle in one room by playing with the circulation of lighting and air in the workspace [5, 6]. And most of the 80-90% of people's daily

life is in a room or building. And therefore, When indoor are mixed with various sources of air pollution and mixed with air pollution from outside the building; therefore, indoor air pollution is more dangerous than outdoor air pollution [7].

**2.1. Healthy Home Criteria**

Home is the center of family life, and a decent home for housing must be health-eligible. A healthy home is a place to shelter and rest to foster a healthy life [8].

The house should be able to provide a sense of security and protect people from natural disturbances, weather, diseases. Therefore the house must have safe and quality building materials and get natural lighting and a good circulation of air in the room [8]. And also must be able to estimate how the circulation flow to create a healthy house, namely to employees and residents of the house that must be very noticed in this new normal condition so as not to the occurrence of circulation colliding, to be able to maximize the protocol of social distancing.

**2.2. Natural Lighting**

Lighting systems should also be provided on a building, including natural lighting and artificial lighting, including emergency lighting. A healthy home is a home that meets the requirements of the delivery system and lighting as well [9]. Because the characteristics of natural lighting are found in the details of openings in the house that can be used to insert natural light, and openings can consist of doors, ventilation, and windows [9, 10].

**2.3. Air Circulation**

Did Sanropie (1989) indoor air quality should not exceed the following conditions:

- Comfortable air temperature ranges from 18° to 30° C.
- Humidity ranges from 40% to 70%.
- The air should not be trapped, so there is no air exchange (Air Change).

From the provisions that can be known that the air is essential to balance humidity and temperature to stay awake and can bring the virus out of the room [11]. In this case, it can be concluded that ventilation is essential for a residential house. Ventilation itself has a function that is like a hole for the entry of clean air that is outside and flowed into and also dirty air from the room flowing out of the building (Cross Ventilation) [12].

In this research method, the authors noticed natural lighting, air circulation, and circulation of movement flows to users and workers to minimize the entry of the covid-19 virus into the house. Therefore, all these methods will be revealed in the final project and also show how an aesthetic is created from this method.

**3. RESULT AND DISCUSSION**

**3.1. Natural Lighting**

From each room, there is an opening to be able to enter the sunlight; also, it can save electricity consumption during the day by maximizing natural lighting (Figure 2).



**Figure 2** Floor plan 1  
Source: documentation author 2020.



**Figure 3** Floor Plan 2 (b)  
Source: documentation author 2020.

### 3.2. Air Circulation

For air circulation is also made the same as natural lighting with the making of each room that has an opening to drain clean and dirty air, and also make use of open space inside the building to get good air circulation (Figure 3)



- Note :
- |                 |                     |
|-----------------|---------------------|
| 1 : Workspace   | 7 : Front porch     |
| 2 : Dining room | 8 : Stair area      |
| 3 : Kitchen     | 9 : Children's Room |
| 4 : ART Room    | 10 : Toilet 2 Floor |
| 5 : Family Room | 11 : Toilet 1 Floor |
| 6 : Main room   | 12 : Rear Terrace   |

**Figure 4** Pieces of air circulation.  
Source: Documentation Author 2020

### 3.3. Movement Flow Circulation

Movement circulation is made into two flows for home users and employees of the office by creating two stairs at the front of the house and at the back of the house to distinguish the flow of activity between home users and office employees so as not to collide with new normal conditions against the covid-19 pandemic.

- **Residents:** the flow of the house occupants can be seen from the yellow line in figures 4a and 4b.

- **Workers:** the flow of workers can be seen from the red line for the architect workers and the purple line for ART in figure 7a.



**Figure 5** Circulation of Floor Plan Movement 1st Floor  
Source: Documentation Author 2020



**Figure 6** Circulation of Floor Plan Movement 2nd Floor  
Source: Documentation Author 2020

**3.4. Final Project Result**

From a method that the author designed for residential buildings and offices by creating a vent to get natural lighting and air circulation, the author also uses it to be an aesthetic in the interior by playing the shadows that are made from the natural lighting (Figure 5).



**Figure 7 (a) Backyard**



**Figure 8 (b) Front stairs**



**Figure 9 (c) Main bedroom**



**Figure 10 (d) Family room**



**Figure 11 (e) Exterior design**

Note :

Figure 5. (a) : In this rear patio area the lighting enters to the maximum because to maximize the natural lighting that will enter the dining room and also the work space, as well as for circulation in the kitchen area.

Figure 5. (b) : In the front porch area there is a vent for air circulation and used for an aesthetic to form a shadow created from incoming light.

Figure 5. (c) : In the main room there are openings to drain air circulation.

Figure 5. (d) : In the living room there is a large opening to give maximum lighting, because this room is used for gathering.

Figure 5 (e) : From a vent made will create an icon on the building because it uses the form follow function method.

**Figure 12 Interior and exterior**  
Source: Documentation Author 2020

**4. CONCLUSION**

To help the problem caused by the Covid-19 virus against an economy from the point of view of a person who works as an architect, one of them is to create a house that is also used as an architect's office, by separating a place to work and a place for a residence.

Of all the discussions the author has made about air circulation, natural lighting, and a flow of movement between workers and the house residents. It can be concluded that from the three discussions, it is essential to be able to prevent the transmission of the Covid-19 virus either from workers coming from outside the house or dirty air entering the house. By maximizing an opening or ventilation of the house, it will be beneficial to remove polluted air to not survive or settle in the room.

As for this design, by using a form follow function method so that the shape of the building must adjust to the current state to create a healthy home. However, anesthetic is still taken into account from a vent that has been made, can be used again to create a shadow game to create aesthetics in the building.

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