

Simulation at House Type 45 Viewed From Natural Light

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ABSTRACT

Residential houses resemble the basic shape, building area, materials, and facades. The similarity makes the house is now grouped based on the area of the building, one of which is a residential type 45. 45 type houses are now often met is a house lined and the place house in the middle of the lot by leaving open space on the front and rear. in development type 45 houses, some of the things that mattered were lost because of nothing a better solution. Preparation of its spaces without considering the sunlight into the building optimally or not enter at all. Natural illumination is visually attempted to lower the negative impact on less sunlight-induced spaces. This research starts from analyzing the contents of 45 type house, simulated by using software to know the ideal light suitable for the 45 type house. In this case, the simulation is going to find out whether the lighting has fulfilled the standard of light need.

Keywords: House Type 45, Natural Light, Simulation

1. INTRODUCTION

Starting from a simple house in an area, to a house that group in one area and managed by a property company known as housing. Residential houses resemble the basic shape, building area, material to the façade of the building. The similarities make the house is now grouped into a type based on the area of the building, one of which is a residence type 45.

Bumi Parahyangan housing is find in *Tasikmalaya* City precisely on *Jalan Letjen H. Mashudi, Sukanagara* Sub-District *Purbaratu City Tasikmalaya*, West Java 46196. Established at the end of 2012 by *PT. Gema Citra Parahyangan* with the full responsible director is mr. *Dindin Saripudin*. The site of this housing is close to *Wiradinata* Air Force Base which is also the site of *Tasikmalaya* City Airport development plan. The place is in the military area and the area belonging *Pertamina Tasikmalaya* City is at a special point that serve as the starting point of development the second class area of *Tasikmalaya* City as well as a point of housing that can use as a reference development in *Tasikmalaya* City in *Purbaratu* region in the end point of the new road construction that connects between the *Cibeureum* region to the *Kawalu* area in the South *Tasikmalaya* City.

Type of building in area *Bumi Parahyangan* Housing include type 45, type 60, type 129 office and there are several buildings that have a large area of land in the corner of the land. With the unit being marketed is a price range of *Idr* 315.000.000,-. The materials used are quite diverse, namely home frame made of teak finishing *melamik*, American standard sitting closets, hollow framework, lightweight steel roof truss, flat concrete roof tile, granite floor 60 cm x 60 cm, gypsum ceiling. The site is quite strategic because it is on the edge of the provincial road.

Residential Type 45/90 owned by *Bumi Parahyangan* is a residential area of 45 m² which build on a land area of 90 m². The small residential type owned by *Bumi Parahyangan* Housing consists of living room which is combine with dining room and sitting room, kitchen, 2 bedrooms, 2 bathrooms with 90 m² of land used as garden, clothesline and car port.

2. METHODOLOGY

The research method used in the form of quantitative is by analyzing the study object simulated using computer program with the result in the form of numbers. The results compared and adapted to theories that refer to standard lighting in Indonesia.

The simulation used for the natural lighting of a building using a computer program that is *ecotect*. *Autodesk Ecotect* is simulation software to know the design of buildings that we make to produce sustainable buildings and pay attention to energy use. This analysis tool allows the designer to simulate building performance from

the early stages of conceptual design. So that the simulation results serve as a measuring value approaching towards environmentally friendly concept.

How *ecotect* work associated with other work media is as follows:

1. Create 3 dimensional shapes in the required workbench (such as *Archicad*). After the 3-dimensional shape is complete, save the storage format in *3DS*.
2. Open the *ecotect* software and open the data with the *3DS* format it into *ecotect*.
3. Determine the coordinates of the site and date required in the simulation.
4. Set the height of the work table and prepare the data analysis as needed, and enter the weather in the size of 10,000 (refer to 10,000 lux).
5. Wait while the simulation is running until finished.
6. When finished, can see in various options, choose in the form of daylight levels (strong lighting).
7. The result of *ecotect* simulation value in lux form can see and can use as reference of simulation.

Observation of illumination at home type 45 in all room include family room, kitchen, bathroom, front bedroom and back bedroom.

In the family room not only has a light opening on the bottom only, on the top of the living room façade there is also a light glass openings consisting of glass ice with wooden frame is finishing *duco* white. This opening call the clerestory window. Clerestory window is a vertical aperture on the façade of the building with a put away from the work plan above the window, which is functional to help the light gain in the room.

3. RESULT

Aperture in the kitchen consists of two glass windows open in a frame made of wood finishing paint of brown with the same size that is 120 cm x 50 cm. The place window is found in the middle of the massive wall.

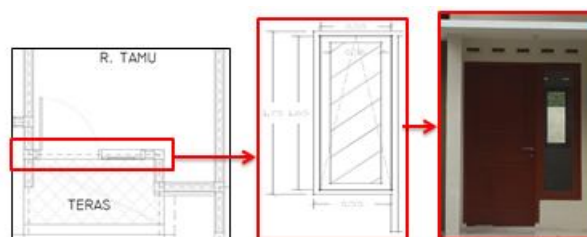


Figure 1 opening in living room



Figure 2 opening at the top of the family room a clerestory window

Aperture in the kitchen consists of two glass windows open in a frame made of wood finishing paint of brown with the same size that is 120 cm x 50 cm. The place window found in the middle of the massive wall.

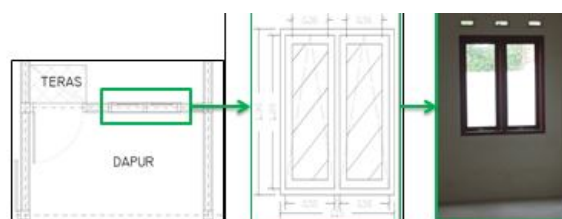


Figure 3 opening in kitchen

Aperture in the front bedroom is the same as the openings in the kitchen is a pair of open glass windows in a brown wooden finishing framework and with the same size of 120 cm x 50 cm. The place of window is in the right area of the bedroom massif field.

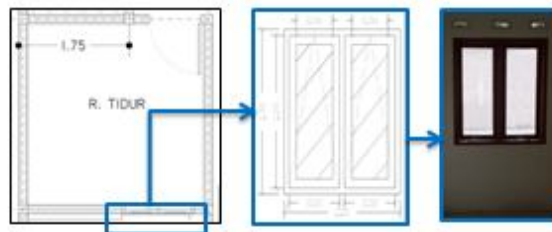


Figure 4 opening in front bedroom

Aperture in the back bedroom was the same as the front bedroom, which is an opening consisting of a pair of glass windows open in a wooden frame finishing brown color with the size of 120 cm x 50 cm. the place of the window is right in the middle of the massive field of the bedroom.

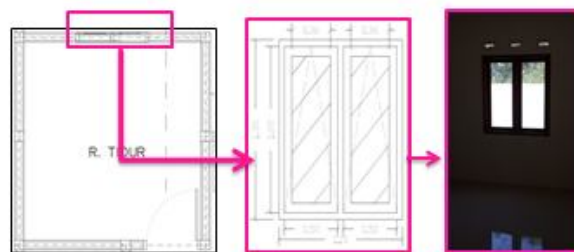


Figure 5 opening in rear bedroom

In the bathroom, there are no openings either window open windows or dead windows. So the openings in the bathroom only use the bathroom door only so that light into the bathroom is very less. This means that sunlight entering only when the bathroom door is open, the rest when the bathroom door is close will be dark and use artificial light (lamp) as a tool of lighting in the bathroom.



Figure 6 bathroom door in house type 45

The first powerful illumination simulation is doing in the living room. Including the area of exposed openings and determining the coordinates of the site and orientation of the opening. In the living room, strong lighting is calculate from the two opening positions. Namely openings and openings up. the two lux results are sum and got 230.72 lux. So the results of the new family room simulation, entered in the standard strong lighting.

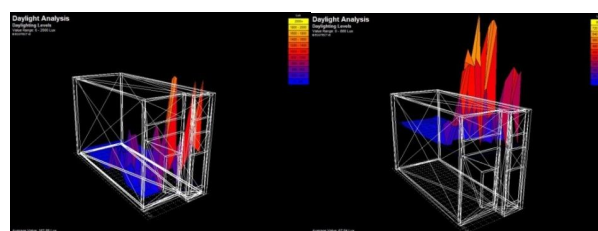


Figure 7 ecotect test results in living room

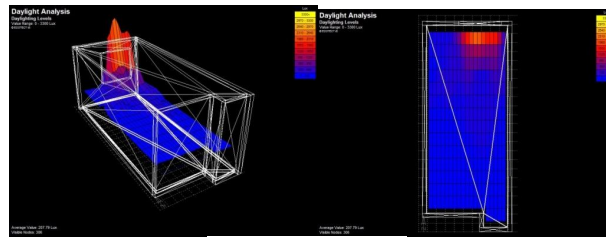


Figure 8 *ecotect* test results in kitchen

Other rooms include kitchen, front bedroom, back bedroom, and bathroom was simulate according to the extent and orientation of the opening. Lux results obtained from the kitchen that has orientation to the north is 207.79 lux. For the front bedroom with openings directed to the southeast get a lux of 226.57 lux. In the rear bedroom, openings make on two sides of the adjacent building that is to approach the northeast. The strong light obtained from the rear bedroom is 344.40 lux. In the bathroom, with orientation of openings above the building gets a powerful illumination of 183.63 lux.

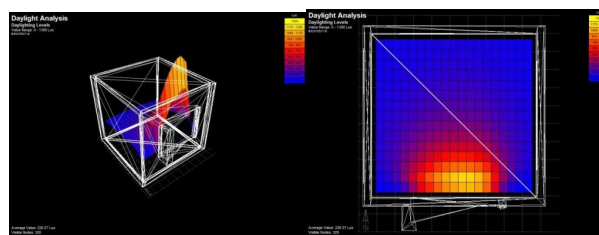


Figure 9 *ecotect* test results in front bedroom

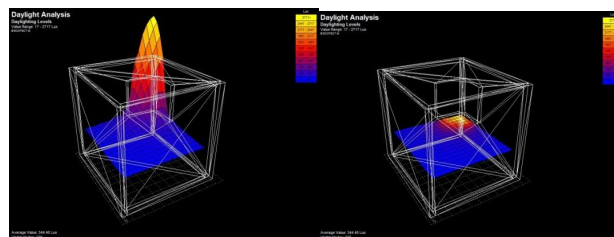


Figure 10 *ecotect* test results in rear bedroom

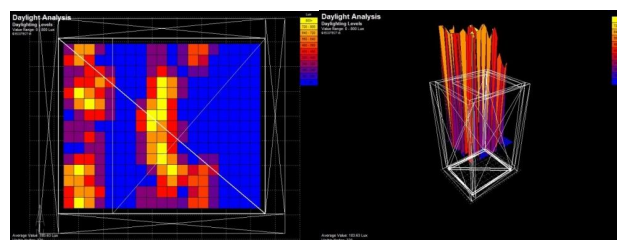


Figure 11 *ecotect* test results in bathroom

4. CONCLUSION

Type 45 homes analyzed based on current conditions tailored to the standard on ideal opening orientation as one of the alternative forms in the visual comfort of the building have mixed results. It expected that the new design is use as a form of visual comfort that has adjusted to the site conditions and environment, so it will feel more useful for the user and cut the use of excess energy.

By considering the existing standards, consider in advance in terms of building orientation and then toward orientation of the openings and extent of the openings that exist. Orientation of openings should follow good exposure limits. There should also avoid direct openings that lead to East or West. If the orientation and the width of the openings are right, try in the form of a simulation because it possibility of the strong illumination that is not ideal also occur. By doing some of these things, standard design intend for strong lighting into the building to ideal and make the building there is no dark room during the day, especially by only utilizing the side of a very limited openings due to adjacent buildings.

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