

## Improvement of Fisherman House Interior

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### ABSTRACT

Indonesia is the largest archipelago country in the world, with a sea region reaches 2/3 of the count total area. Apart of being a marine / maritime state with huge marine resources, there are still a lot of fishermen who live in inadequate housing. From various studies that have been conducted by the Laboratory for Housing and Human Settlement, Department of Architecture ITS, such as on the innovation patterns of fishermen housing and settlement in tackling the poor condition, it can be concluded that the houses of the fishermen settlement are used as a forum for economic activity, as well as part from as a dwelling. The male adult / children repairing nets and other equipments, while the wives /daughters processing the catch.

During field work conducting for those research, it was commonly found that many un-organized activities are conducted in residential space. Those activities sometimes in many cases lead to the decrease of housing quality in term of health standards and tidiness. Residential arrangement affects many aspects of the inhabitants' daily life i.e. health aspects, the effectiveness of activities. This community service activity is a real application of the previous research, tries to provide direction for the fishermen to organize the interior of their houses that i) in accordance with the requirements of a healthy house, ii) create a division of space both for domestic activities and economic activities of fishermen and iii) in accordance with the needs of residents.

**Keywords :** fishermen house, healthy, interior

### 1. Background

The government of Indonesia has ideals in housing and settlement to promote the establishment of conditions in which every person or family is capable to responsible their needs of adequate housing and affordable in neighbourhoods healthy; safe; harmony; and sustainable. This is support the

realization of society and the environment that have identity; self-reliant and productive. The government opens great opportunity of community participation, equitable development, especially the disadvantaged, including coastal areas fishermen settlement, which is able to improve the productivity and competitiveness of the fishing.

Development of Surabaya as city services grew very rapidly in the last five-years period. However, there are still some fishermen settlement that are still in a state lagging behind compared to other settlement in Surabaya. The study of the fishermen settlement shown that the inhabitants need to be given an information, training and mentoring to participate improving the quality of space in dwelling.

Training and mentoring to improve the quality of dwelling aimed at fishermen wife. The wife will be briefed in order to organize the space in accordance with the requirements of healthy occupancy, as well as the ability to meet the needs of space for domestic and economic activities.

## **2. Policy and Theory of Decent Housing**

The arrangement of rooms in the house adapted with the needs of residents to create a healthier home. According to Local Government Legislation no. 1 of 2011 about housing and residential areas, there is a policy that addresses improving the quality of slums. Where every person has the right to have a healthy environment, safe, harmonious, and orderly. The house should meet the safety requirements of the building and a building area of minimum adequacy, as well as the health of the occupants. Structuring decent housing is also one of the points in the document provision Istanbul Declaration and the Habitat Agenda 21. This means that, low-income economic communities also have the opportunity to have a decent house with a good standard of health.

The house is defined as a process that develops as they relate to social-economic mobility of inhabitants and has dimensions of space and time (Turner, 1972, Rapoport 1977). Home development goes hand in hand with social and economic needs of its inhabitants, which raises the eligibility conditions of the house that also vary. From the results of research conducted by the Laboratory of Housing and Settlements (2014), slum conditions of fishermen settlement is worse than the other settlement. It is a challenge for Indonesia, as a country which include a commitment in the field of settlement, namely reducing slum in 2015 and a target without slums in the world in 2020, and in an attempt to meet the demands of Agenda 21 and the Millennium Development Goals (2005).

To create a healthy space in the house, the fishermen need to avoid conflicts between activities of the inhabitants and the economic activity that occurred in the house. According to Siregar, et al (2012) the housing and the average fishermen settlement already meet the minimum standards required for the activity of 9m<sup>2</sup> / person. But the things that need to be considered is the setting of space in economic activity and daily life in order not to interfere with each other. The responsibility to take care and house keeping many fishermen taken by women. Research by Happy Santosa and Purwanita Setijanti (1999) showed that in the settlement of fishermen, women have a role to repair the house. Because the responsibility is handed over to the fishermen's wife and handyman when

the fishermen spend his time at sea. Therefore, training and mentoring about the house and environment as a form of community participation to tackle slum (Santosa et al, 2014) can be submitted to the wife's of fishermen.

### **3. Criteria for Healthy and Liveable House**

Criteria that used in determining a healthy home refers to the Decree of the Minister of Settlement and Regional Infrastructure No. 403 / KPTS / M / 2002 on Technical Guidelines Development Simple Healthy House, the provision Simple Healthy House. The criteria that must be met are as follows :

#### **3.1 Minimum Period of Needs (appearance) and space (outside and inside)**

The space requirements per person determined by basic daily human activities in the house. The activities include sleeping, eating, sitting, taking shower, using toilet, washing, cooking and other. Based on the results of previous studies, the space requirement per person is 9 m<sup>2</sup> with the calculation of average ceiling height is 2.80 m.

#### **3.2 The need for Health and Comfort**

Health and comfort requirements of residential houses affected by several aspects are as follows:

##### **3.2.1 Lighting**

Harnessing the potential of the sun as natural lighting during the day by using daylight. Where the weather conditions is sunny and not cloudy; the rooms get quite a lot of light; the room gets evenly distributed of light .

Natural lighting conditions can be optimized from 8am-4 pm by creating a window or door openings of 1/10 room floor area. Direct sunlight is also required to enter the house at least one hour each day. If it is not possible to provide openings facing the morning sun then the alternative is to make openings for inserting the daylight sun. The rooms exposed to direct sunlight can reduce the humidity of the room and kill germs.

##### **3.2.2 Ventilation**

The air become the influential element in determining the comfort. The flow or continuous air exchange between the room pass through the hole of partition walls. The freshness of the air in the space will be obtained if cross ventilation applied in rooms arrangement. Cross ventilation can be generated by creating a window or lattice opposite each other and both should be free of the barrier wall. If one of the opposite openings obstructed, the air can not move in. The second way is to create an opening in the roof. The protected opening in the roof can help the exchange of indoor air.

##### **3.2.3 Temperature & Humidity in Room**

The lack of air exchange in the room will cause the room feel stuffy and would lead to high humidity, making the homes unhealthy and uncomfortable. Comfortable only achieved when the humidity of rooms quite similar with the temperature of the human body.

### 3.2.4 Minimum Requirements for Security and Safety

The need for security and safety related to the structure of residential buildings.

## 4. Method

Counselling was conducted in fisherman settlement of East Surabaya. The location is at Jalan Sukolilo Lor RT 1 (Fig. 1).



Fig. 1 Location (Google Maps, 2015)

Process are as follows:

- i. Give training to group of fishermen wife about the importance of healthy and clean house, so the house will not become a slum.
- ii. Survey condition of the room inside the house to get an overview of the initial condition of the house. Four samples were taken, range from the middle to lower standards.
- iii. Make drawings of the house along with photographs of the condition of the room inside the house.
- iv. Suggest for home improvements in drawings with a more appropriate arrangement and 3-dimensional images.

## 5. Results

The condition of the studied house are as follows.

### 5.1 Sample 1

The house on the sample 1 has two floors (Fig. 2). The first floor is a residential area belongs to the parents while the children occupy the 2nd floor. First floor consists of a living room, bedrooms, kitchen and bathroom. To access the second floor, the owners use the stair, which is located in the living room. The second floor consists of two bedrooms and a drying room. Due to limited land-area, the owners use settlement street as service area and include cooking, washing and drying clothes.



Fig. 2 Sample 1

To access the bathroom, the family members have to walk out of the house. The bathroom placed separate from the house. The existence of outdoor bathroom provides benefits to neighbour. The kitchen is also in the alley next to the house. This path is also used by local people as a shared kitchen. The house is not equipped with storage room or warehouse so all the unused goods put on the roof top of front house. The living room is not only used as a place to receive guests but also as a place to put the motorcycle at night. Besides family members put items such as drinking water tank, shoes, dirty laundry and helmet on the floor of the living room and refrigerator. The existing furniture in the room consists of a bedroom wardrobe, desk and wall shelves. There is no massive partition between the bedroom and the living room. Owners use fabric curtain as a barrier.

## 5.2 Sample 2

The house on the sample 2 has one floor (Fig. 3). Besides being used as a dwelling, the house was used for commercial activities. To access the house there are two entrances, from the front and side of the house. Access circulation for buyers is in front of the house while home-owners use the access side of the house which are directly connected to the settlement street. This house partially as residence and commercial activities which have clear boundaries.

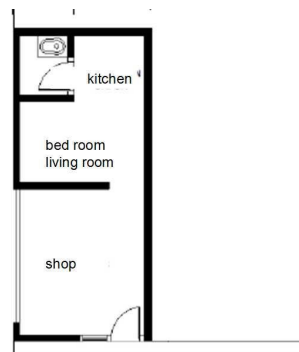


Fig. 3 Sample 2

The bathroom walls of this house is not ended to the ceiling. That makes unpleasant smell from bathroom flows to other rooms. The light entering in the bathroom can pass through the opening in the wall of the other room. Wardrobe serves as a barrier both bathroom and the bedroom. Which bedroom also used as living room. It only has wall shelves and tables television. And to sleep they

use mattress.

Because there is no kitchen inside, the owner cook daily meals in other house. But small alley of kampung also used as a kitchen space for the process of fishing product. There is space next to the outside bathroom to save and put the kitchen appliances and wooden shelves. To sell the fishing product, the owner has a stall in front of their house. It equipped with refrigerator for storing fish and small table.

### 5.3 Sample 3

Sample 3 has one floor. This house consists of a living room, one bedroom, bathroom, kitchen, closet and small space as warehouse (Fig. 4). Public and private areas of the house is not properly enclose-situated. This is shown by separation of living room and bedroom just by the wardrobe.

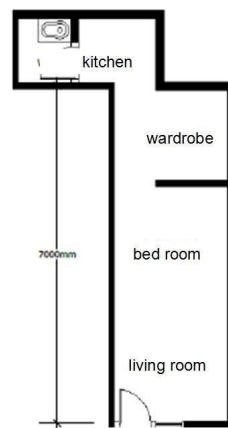


Fig. 4 Samples 3

The bathroom is not fully enclosed to other room. The smell comes from it, flows to entire house. Only small openings direct to the outside. In case the owners use an artificial lighting. The kitchen is located on the back side directly adjacent to the bathroom. It makes the overlapped circulation troubling sometimes, even there are only less furnitures like cooking utensils and stove table. Lower partition of stove make the owner cooks in a sitting position. There is not adequate window opening and this gives threat of gas leak accident and minimum of sunlight penetrate.

The living room also become a storage room. Including to put a refrigerator, a shoes rack, wardrobe and set the cabinets as dividing space. When need to occupy larger area for gathering people, living room and bedroom united by moving cabinets. This living room also used like garage in night to put motorcycle.

### 5.4 Sample 4

The house on sample 4 is a one-story building, with area of 3 m x 9 m (Fig. 5). This house has a grocery shop at the front of the house while on the inside it has a living room, one bedroom, one bathroom, and kitchen. Bedroom, kitchen, and bathroom can be reached through a small alley.

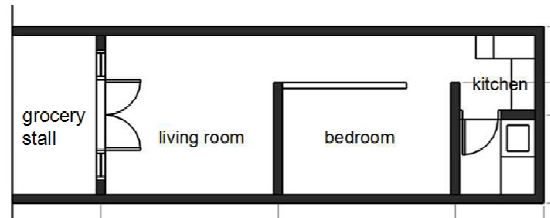


Fig. 5 Sample 4

The bathrooms have good lighting, but ventilation unfavourable, so that humid and unpleasant odours from the bathroom also flows into the bedroom next to it. Household kitchen are in front of the bathroom in this house but cooking rice activities carried out in the living room. Lighting for the kitchen is derived from the skylights and vents equipped with mosquito netting. Lighting through roof is also to handle the lighting in the bathroom.

## 6. Discussion

### Health Needs And Comfort

The space requirement per person is calculated based on basic human activity in the house. In the samples, the house is divided into 2 types according to the amount of building area, namely: (1) small type for total building area under 36m<sup>2</sup> and (2) medium type for total building area over 36 - 60m<sup>2</sup>. The total building area is covered without no green space.

Based on the results of the surveyed, it was concluded that most houses inhabited by 1 households consisting of 2 to 4 people. The small type can be identified in sample 2, sample 3, and 4. And sample 1 is identified as medium type. (Table1).

Table 1. Sample type according to the amount of building area and extensive standards conformance minimum building Simple Healthy House

Samp les	Type	Family group	Person quantity	Building area	Standard Match
1	Medium	3	9	39,5	< standard
2	Small	1	3	21	< standard
3	Small	1	3	22	standard
4	Small	1	2	27	Int. Stand

Two of the four samples that have been studied are not qualified in the range of standard. One house has met the standard, and one house has met international standards.

Studies on samples from house 1 inhabited by three families groups. It is stated that the area is minimal, causing the owners lack of living a healthy and viable in for daily life.

### 6.1.1 Lighting

Based on a survey that has been done, the condition of some homes (samples 1,2,3) lack of sunlight in the spaces located on the back side. While in the house that has an elongated shape (sample 4), has a problem on the space in the middle of the building. This is because the position of the window

just to be on the front of the house, in addition to the placement of the less transparent roof covering designed appropriately. The lack of house area caused some openings in the walls as well blocked by furniture.

Housing conditions were studied with the neighbouring houses huddled together with one another. Thus not allowing the addition window. Solve the problems of lighting, home on samples 4 can be used as a reference for improvement, especially to provide natural lighting in spaces in the middle or back of the house. Although this house does not have enough building area, it is not an obstacle in obtaining sunlight. This house type using asbestos materials and parts of glass fibre as roofing material. Room get sunlight through perforated ceiling. It aims to continue the light that has been incorporated by fibre glass roof into the room.

### **6.12 Ventilation**

Ventilation determines the level of comfort of the residents. Ventilation covers freshness healthy air flow. The air quality in homes that have not been well studied fully. This is because the winds hole indoor not meet the rules of a healthy home. Vent that there is less than 5% of the floor area of the room.

There is some room in the house does not have ventilation holes, less the maximum utilization of the existing ventilation holes, lack of maintenance or ventilation holes. So that the flow of air in the room to be less good. Due to air in the room can not exit. House of studies conducted, the air flow is in the bathroom is still not good. This causes damp and unpleasant odours from the bathroom mixed into the spaces beside it.

Sometimes the ventilation holes are not just relying on a hole or upper window. It often covered with gauze, just collect dust, so the air was difficult to penetrate. Plus the presence of holes upper window that does not meet the rules of cross-flow ventilation vents. Four samples utilizing different roof heights to incorporate natural air into the house. Roof height difference provides the distance between the holes with a roof covering the walls. This hole is related to the openings that exist on the window in the living room and the folding doors stalls, and deliver cross-ventilation.

### **6.3 Air Temperature and Humidity**

In the humid tropical regions such as the city of Surabaya, the level of comfort of air lies in the range of 27°C air temperature and humidity of 70%. The higher the temperature and humidity of the air, there will be more air that is hot, stuffy, and sweat will be hard to dried in the body. In the area of study, the air temperature region is relatively hot, moreover, there is scarcity of greenery in the area of this village. Temperatures contained in most of the samples along the spaces are almost the same, with the exception of a room in a house with walls that are exposed to direct sunlight. At the macro level, the similarity of the air temperature and the humidity level is because the houses are homogeneous, i.e., in the area near the beach.

For the micro humidity, most of the problems of the houses that have been studied was found in the existence of a bathroom that is not supported with good air circulation that causes the room feel stuffy and would lead to high humidity in the room. It can be shown from the damp walls of the house that made the paint peeled. Quite often damp walls can be porous.

Additionally, the bathroom as a source of humidity in the house contributed the moisture in spaces



adjacent or nearby. It becomes even worse when handling the walls and ceiling of the spaces in the adjoining bathroom provides an opportunity for air leaks from the bathroom. As in the sample 4, the bedroom directly adjacent to the bathroom did not have a ceiling meets the wall bordering the bathroom, and also has no ventilation. So the air of the shower will be mixed with air in the bedroom.

#### 6.4 Minimum Requirements of Security and Safety

The foundation used in the examples of houses that have been studied are single footing. This type of foundation can be assumed from the large size of the model house.

The existing condition of the foundation is in good condition, it can be inferred from the absence of cracks wall means. It also means that the carrying capacity of the land given to the building in accordance with the type of foundation used as well as the load of existing homes.

Wall material that is widely used in the construction of the house is red brick and white brick. The use of both types of bricks are mainly found in the outer wall. Some houses still use a plywood board material as a room divider.

Wall frame buildings are widely used in the study area is the installation of a reinforced concrete structure with walls of brick / stone white. While in the installation of material plywood boards will require a wooden frame.

Trusses are widely used in the study area are wood frame truss with asbestos and glass fibre material as the roof covering. From the results of studies that have been conducted, samples of the house has a roof slope of less than 20°. This leads to reduced ventilation in the room. It also resulted in solar heat received by the roof cover quickly channelled into residential buildings, due to a small degree roof slope that led to the volume of roof space too small. This small roof space will make the volume of air that acts as a buffer against the heat gets smaller.

### 7. Spatial Home Planning Improvement Proposal

#### 7.1 Sample 1

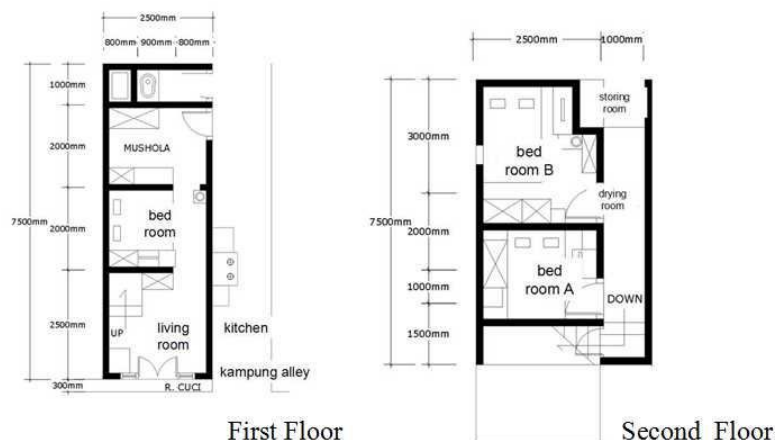


Fig. 6 First Floor Furniture Plan Proposal

Sample 1 required additional special shelves to utilize the space under the stairs to put the goods owner (See Fig. 6). Television in bedroom is placed too high. Therefore, the position of the

television which was originally located at the top of the wardrobe was moved to the small table rack on the side. In addition it is necessary to increase upper window on the side directly adjacent to the kampung street. Location of the closet in the mosque hinders access to go to the outside of the house. Therefore, it needs a change of furniture by sliding to the other side. In addition it is necessary to increase the upper window placed on the side of the side wall near the ceiling; requires only one water reservoir in the bathroom; unused goods placed next to the bedroom B by adding a wall shelf. Additional upper window is needed to replace the presence of a vent in the bedroom. It would also require additional ceiling so that no direct sunlight into the room. Existing roof slope has not reached  $20^\circ$ . Therefore, it needs changes the slope of the roof.

## 7.1 Sample 2

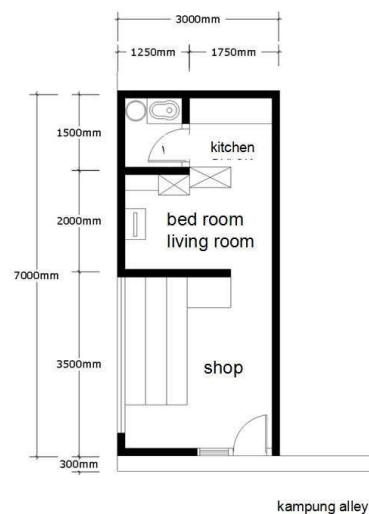


Fig. 7 Furniture Plan Proposal

The furnitures arrangement is good enough (Fig. 7). But the most fundamental problem in this sample is ventilation and humidity. It is caused by a lack of openings in the spaces in the house. Besides the bathroom wall in sample 2 was not closed up to the ceiling. This causes the unpleasant aroma of the bathroom mixed and into the spaces beside it. Therefore, it needs the addition of the bathroom wall to extend into the ceiling. Lack of lighting conditions in the house, because the openings in the wall as the access of light into the room only in one point. It takes the addition of upper window on the side wall of the front approaching the ceiling will make the bedroom to get access of sunlight and good air circulation. In addition, the position of the roof has not shown the degree of slope of  $20^\circ$ , so it takes a change.

### 7.1 Sample 3

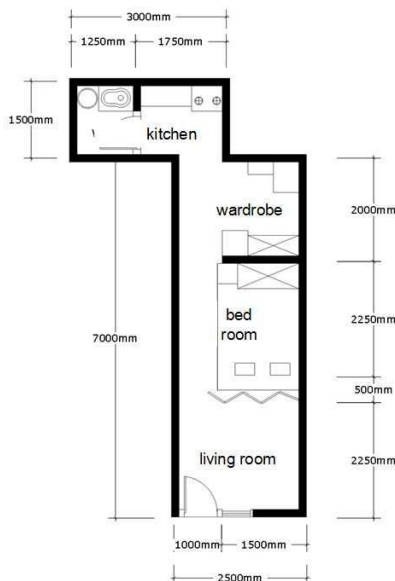


Fig. 8 Furniture Plan Proposal

Privacy between the living room and additional sleeping space was created with a partition that can be moved in the form of a sliding partition (see Fig. 8). Stove table need to be elevated. It would also require additional vent placed on the roof which improve the air flow, and minimize the possibility of fire caused by a gas leak.

The vent placement on the side of the roof is possible because the house is lower than the neighbouring houses on the sample number 3. Bathroom wall at the sample number 3 is not closed up to the ceiling. So that the odour from the bathroom smelled of spaces beside it. Therefore, it needs the addition of the bathroom wall to extend into the ceiling.

### 7.1 Sample 4

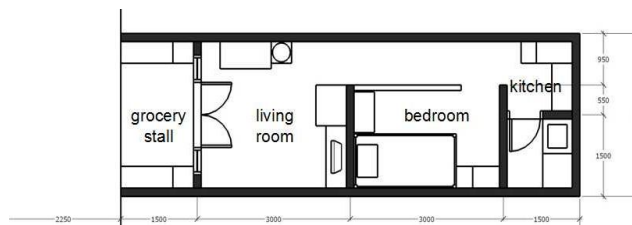


Fig. 9 Furniture Plan Proposal

At grocery stall, a proposal was given to the rearrangement of merchandise by lowering the height of the table on the side table near the window. It is intended that there will be sufficient access to open the shutters and there is quite an area of the field of glass windows for natural light into the house (living room). And given the proposal to shift the wooden cabinet near the window,  $\pm 30$  cm away from the window, so the cupboard is not directly block the entry of light from a window and provide a place on the corner of a closet with a window wall to store rolls of carpet.

The proposal for the bedroom is to close to the ceiling toward the walls around him. In addition the proposal also provided that the issuing of a kitchen utensil in the bedroom that is not too shabby in

the bedroom.

The proposal to the kitchen is the manufacture of a shelf on the wall for stacking, if in the bottom of the kitchen table can no longer accommodate.

### Conclusion

Space order in accordance with the needs of residents becomes an important part in achieving the characteristics of a healthy home as directed by the government in nine goals in the field of governance one settlement. By having a healthy home, residents will have a better quality of life. This can be seen with the complaints of the majority of occupants will be less optimal arrangement of space in their shelter.

Strategy in reaching space in accordance with the needs of the occupants can be achieved by structuring devices and home furnishings, changes in the area of openings in the house, and the replacement of the type of roof covering material. The third strategy was a proposal made in order to improve the existing condition that is not currently meet the criteria for a healthy home.

In principle, public awareness of the importance of having a healthy home with good order already exist, but the limitations social and economics and environmental characteristics make the need for quality housing that is healthy is not carried out to the maximum.

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