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TECHNOLOGY**  
**EFFECTIVENESS OF BALCONY OF RUSUNAWASURABAYA IN ANTICIPATING  
ADAPTATION**

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**ABSTRACT**

Daily activities of human are centralized at domestic spaces of dwelling/home (Monteiro, 1997). This means that most activities of low income households will occur at their low cost apartment unit. Rusunawa in Indonesia is the low cost apartment that provides dwelling for the poor families by renting instead of purchasing. Rusunawa units usually consist of four different spaces, three of which: kitchen, bathroom / toilet and balcony are considered as service area; and only one space namely the multi-functional space which can be considered as the living area.

This multi-functional space inevitably has to accommodate all the household activities. At least private and semi-private activities have to be carried-out in this space, while the public activities for residents of rusunawa are commonly tolerable to be conducted in the corridor although this space is actually a communal public space, through which each resident of the floor can reach their unit from the stair hall. Therefore the multi-functional space will sooner or later be overwhelmed to accommodate the increasing activities both in terms of either the number of activities or the amount of space area.

The multi-functional space must be able to adjust the needs with the existing space through adaptation. Buildings need to adapt. A building that is more adaptable will be utilized more efficiently and stay in service longer (Moffat and Russel, 2001). In the case of adaptation, rusunawa units can only expect the reliability of the balcony. Indeed residents of Rusunawa can still hope to adapt their space through the installation of mezzanine within the multi-functional space, however this requires funds, and not all dimensions of rusunawa units will allow construction of this mezzanine. Adaptation through occupying the corridor is either illegal. Therefore in rusunawa units, the existence of balcony is crucial. However, not all balconies can be effective in solving the problem of space shortage.

By investigating balcony types that exist in 14 rusunawa locations which are spread-out all over the city of Surabaya, this paper intends to describe the rusunawa balconies in Surabaya to classify the possible benefits, and to analyze how the effectiveness of the balcony, especially in the problem solving of the occupants in overcoming the lack of space.

**KEYWORDS:** balcony dimension, space adaptation, effectiveness, rusunawa Surabaya

**I. INTRODUCTION**

**Background**

Apartments are an alternative choice of housing in the city caused by limited land and the price of land that is getting more expensive. Thus, the approach undertaken in development is to meet the aspects that become the basis of society's choice. In Indonesia, Rusunawa allows the middle to lower income society to have decent dwelling with a guaranteed environment.

Rusunawa is an abbreviation of Rumah Susun Sederhana Sewa, meaning a simple rental apartment. It is a multi-storey building that is built by the (local/provincial) government in a residential neighborhood, using funds from the Central Government or Regional Budget. Usually local governments work together with the Ministry of Public Housing. The development of Rusunawa aims to provide a decent home for all Indonesian families, especially the Low Income Society who has not yet had the capability to meet their home needs through ownership, therefore it is rented to poor families by monthly payment. Rusunawa are residential units that are

used separately, with lease tenancy status. The main function is as a dwelling, and the minimum requirement of space for simple healthy house according to decision of Indonesian Housing Ministry (kepmen 2002) is nine square meters per person.

Until 2015 there were 14 locations of rusunawa in Surabaya that were managed by the city of Surabaya and the province of East Java government. These 14 locations include: Sombo, Simolawang, Dupak, Penjaringansari 1, Penjaringansari 2, Wonorejo, Randu, Gunungsari, Waru-Gunung, UripSumoharjo, Tanah-Merah, Penjaringansari 3, ITS, and UNESA. The mass pattern of each location is different, 3 of which are single loaded where one corridor serves only one row of units of rusunawa. The mass of the other 3 are twin blocks that are twin masses consisting of 2 single loaded facing each other. The remaining 8 are of double-loaded masses in which one corridor serves two rows of units on both sides. In this later mass pattern, double loaded, the presence of balconies on the back side of the unit is more necessarily required because the corridor that located at the front side of the units is an inner space. This is clearly different from the other two mass patterns, single loaded and twin blocks, where the corridor in front of each unit is a space that has a direct connection to the outside air. Therefore, the presence of balconies on masses with double-loaded patterns is more needed than that of the other two mass patterns, as the balconies here are the only connectors with the freshness of the outer space.

All rusunawa in Surabaya have or equipped with balconies, however some of them are actually outdoor balconies as they are supported by cantilever structures, while some others are indoor balconies because they have the same function as balconies but their positions are as inner spaces which are bounded by walls and glass. To be converted into an indoor space, the indoor balcony is easier and can be directly utilized as an inner space, while the outdoor balcony still requires the closure of the boundary area so that the balcony space that is changed into an inner space can no longer be seen from the outside in order to ensure privacy.

## II. LITERATURE STUDIES

Residential units should be designed in such a way so that the space can grow in accordance with the needs of the household which also constantly develop. This development includes not only the increasing number of household members, but also the development of socio-economic of the family. Therefore a building or the housing unit must be able to adapt to the family's need for space (Geraedts, 2001). Adaptability as suggested by (West and Emmit, 2004) is the affordance of dwelling space to fit the changing requirements placed upon it at different time and stages of development family.

All mentioned above also happens to Rusunawa, a simple rental apartment that is addressed for poor families in Surabaya Indonesia. Generally it is designed in open plan with one multi-functional space and equipped with kitchenette, toilet or bathroom & WC, and balcony. All household activities inevitably have to be adequately carried-out in the multi-functional space which is the only living space.

At the time when the needs for space of the family increase, then the families often adapt the space through ways, among others: 1). By occupying some corridor space which is actually unauthorized, or illegal because this corridor is a public horizontal circulation path of residents from the stairwell hall to each residential unit on each floor. 2). By building or constructing a loft or mezzanine in the multi-functional space. Although this is the only legal action in doing adaptation, but it requires fund, correct planning, and sufficient unit height, so that the mezzanine can be utilized appropriately. 3). By turning or changing the balcony function into an indoor space for living or for doing activities. This third action is not too legal, but this is the easiest way to be executed by the occupants. This action is more legal than occupying the corridor, moreover, it can be said that no significant cost is required.

The existence of the balcony is quite important, because in addition to a place to enjoy the outside scenery (Pile, 1988) this semi outdoor space can provide fresh air flow from outside into the inside space therefore reducing the use of energy for cooling (Givoni, 1998). Most importantly this balcony has the opportunity to be transformed into an inner living space when the residents need to adapt their needs for space to the existing space. However, to be able to accommodate the activity due to spatial adaptation demands, the dimensions of the balcony space should be sufficient at least for performing household activities. Based on what has been discussed above, this study aims to classify the effectiveness of rusunawa balcony in Surabaya in order to meet the needs for space adaptation, according to each dimension.

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**III. BALCONIES OF RUSUNAWA IN SURABAYA**

The following paragraph is a review of rusunawa balconies in 14 locations in Surabaya. Each review will be followed by a drawing of the plan, dimensions, and the picture of each balcony.

**SOMBO**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space Balcony</p>		Continuous, shared and spacious outdoor balcony $(3 \times 1.5) = 4.5$ square meters

**SIMOLAWANG**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space Balcony</p>		Continuous, shared and spacious outdoor balcony $(3 \times 1.5) = 4.5$ square meters

**DUPAK**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space Balcony</p>		Continuous, shared and spacious outdoor balcony $(3 \times 1.5) = 4.5$ square meters

**PENJARINGANSARI 1**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space Balcony</p>		Continuous, shared and spacious outdoor balcony $(3 \times 1.5) = 4.5$ square meters

**PENJARINGANSARI 2**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space</p> <p>Balcony</p>		<p>Private, semi outdoor and medium balcony (1.6x2) = 3.2 square meters</p>

**WONOREJO**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space</p> <p>Balcony</p>		<p>Private, outdoor and medium balcony (1.6x2) = 3.2 square meters</p>

**RANDU**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space</p> <p>Balcony</p>		<p>Private, outdoor and medium balcony (1.5x1.2) = 1.8 square meters</p>

**GUNUNGSARI**

Plan	Picture	Dimension (m <sup>2</sup> )
 <p>Multi-functional space</p> <p>Balcony</p>		<p>Private, indoor and medium balcony (1.4x2) = 2.8 square meters</p>

**WARU GUNUNG**

Plan	Picture	Dimension (m <sup>2</sup> )
		Private, indoor and medium balcony $(2 \times 1.5) = 3$ square meters

**URIP SUMOHARJO**

Plan	Picture	Dimension (m <sup>2</sup> )
		Private, outdoor and spacious balcony $(2 \times 2) = 4$ square meters

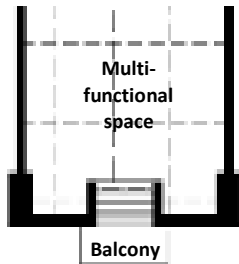

**TANAH MERAH**

Plan	Picture	Dimension (m <sup>2</sup> )
		Private, indoor and medium balcony $(1.5 \times 1.5) = 2.25$ square meters

**PENJARINGANSARI 3**

Plan	Picture	Dimension (m <sup>2</sup> )
		Private, outdoor and medium balcony $(1.8 \times 1.5) = 2.7$ square meters

ITS

Plan	Picture	Dimension (m <sup>2</sup> )
		Private, outdoor and small balcony $(1.2 \times 0.5) = 0.6$ square meters

UNESA

Plan	Picture	Dimension (m <sup>2</sup> )
		Private, outdoor and small balcony $(1.2 \times 0.6) = 0.72$ square meters

**IV. EFFECTIVENESS OF BALCONIES IN ANTICIPATING ADAPTATION**

According to its privacy, private balconies are more legal for space expansion in order to adapt to the space needs, as residents do not need to ask for permission from neighbors to insulate their balconies that they will be used as an inner space. A continuous balcony is a shared balcony that should be an alternative access through the back passage. Therefore residents of units whose balconies are continuous, should not close or block the shared balcony which is actually a common path, although this is in order to meet their needs for space adaptation.

Judging from indoor or outdoor positions, indoor balconies have the advantage of being able to directly utilize its indoor balcony as an inner space without having to cover with some material or some field barrier. While by having balconies with outdoor positions, the inhabitants still need to protect and cover them, if they want their balcony to be converted into an interior space, so as not to be easily visible from outside in order to maintain resident's privacy.

Considering from its dimensions, balconies of larger area size with proportional dimensions are certainly more advantageous than those of the small ones, especially when their dimensions are not proportional. For example, although it is of large area, but when the proportion of its dimension is long and narrow, it becomes ineffective in anticipating for space adaptation. Talking about the effective dimensions of space, we have to start from the size of human in the floor plan according to the standard that so far has been valid for this, that is  $(0.60 \times 0.60) = 0.36$  centimeters square. So to be effectively used to perform an activity, the dimension of space should not be smaller than 0.60 meters. But this dimension only applies to activities that do not require facilities or furniture, such as activities for viewing the atmosphere outside, or just breathe the outside fresh air. When the space is

used to perform activities that require means or furniture, then the dimensions of space will be determined by the dimensions of furniture and the space of motion.

For rusunawa, the most crucial inner space which is needed by the occupants is the bedroom. This bedroom is also the most in need of privacy, whereas rusunawa unit has only one living space that is multi-functional space, in which either private or public activities must be carried-out in the same space here. According to (Kisnarini, 2015) the main drivers of the importance for adaptation in rusunawa was privacy, which was followed by changes in activity, changes in family structure, and the presence of income generation. Therefore, even before their family structure and their amount of activities were changed, inhabitants already needed a more private dwelling space. This may be because the multi-functional space is considered less private, if the residents meet their guests (interact with outsiders) also in this multi-functional space. But when the interaction with outsiders takes place in the corridor, then the multi-functional space can be considered more private.

So, based on the reasons that were described above, the assessment regarding the effectiveness of balconies in terms of space adaptation should be based on whether the space dimension is sufficient to be used as a sleeping space. This means that the furniture which is used as a benchmark is a bed. But it is not infrequently that residents of rusunawa sleep not on the bed, but on the mattress only, or even on just a mat. The size of their beds is not as wide as standardized in general. Their bed length is often not up to 2.00 meters, only 1.90 meters or even 1.80 meters. The width of the bed for two persons often not up to 1.20 meters, approximately only 1.00 meters, whereas by standard, the width of the bed for one person must be at least 0.90 meters, or minimally 0.80 meters. Plus space for motion from one side only (0.60 meters), then a space with dimension is considered effective for anticipating space adaptation in rusunawa is minimally (1.50x1.80) square meters.

## V. CLASSIFICATION OF BALCONY EFFECTIVENESS

RUSUNAWA		DIMENSION (m <sup>2</sup> )	EFFECTIVENESS	POSITION	EXPLANATION
1	Sombo	(3.00x1.50) = 4.5	More effective	Outdoor	The balcony width is right enough for bed width 0.90 plus motion 0.60, then more rest of space can be used after taken by bed length
2	Simo	(3.00x1.50) = 4.5	More effective	Outdoor	
3	Dupak	(3.00x1.50) = 4.5	More effective	Outdoor	
4	Penjaringan-1	(3.00x1.50) = 4.5	More effective	Outdoor	
10	Urip-Sumoharjo	(2.00x2.00) = 4.0	More effective	Outdoor	
5	Penjaringan-2	(1.60x2.00) = 3.2	effective	Outdoor	Both bed width and bed length can be sufficed by the balcony dimension
6	Wonorejo	(1.60x2.00) = 3.2	effective	Outdoor	
9	WaruGunung	(2.00x1.50) = 3.0	effective	Indoor	
12	Penjaringan-3	(1.80x1.50) = 2.7	effective	Outdoor	One or both bed dimension cannot be sufficed by the balcony width or length
8	Gunungsari	(1.40x2.00) = 2.8	Less effective	Indoor	
7	Randu	(1.50x1.20) = 1.8	Less-effective	Outdoor	
11	Tanah Merah	(1.50x1.50) = 2.3	Less-effective	Indoor	Both balcony width / length are insufficient at all for bed
13	ITS	(1.20x0.50) = 0.6	In-effective	Outdoor	
14	UNESA	(1.20x0.60) = 0.7	In-effective	Outdoor	

## VI. CONCLUSION

From the above classification, it can be seen that based on the dimensions, the more effective Rusunawa balconies in Surabaya are owned by Sombo, Simo, Dupak, Penjaringan-1 and Urip Sumoharjo. The effectiveness of these balconies is more because after being cut by the space for bedroom, there is still some space that can be used for others. Unfortunately the positions of these balconies are outdoors, so to change the balcony into an inner space household still needs some cost or effort.

Balconies with enough effectiveness are balconies of Penjaringan-2, Wonorejo, WaruGunung and Penjaringan-3. Utilization of balcony space is only fit for this bedroom alone, because there is no significant space left. Among this class, the most favorable balcony is that of WaruGunung because its position is indoor, so that the space can be directly utilized without significant effort.

Balconies of rusunawa Gunungsari, Randu and Tanah Merah are included as a balcony that is less effective because it cannot be used as a sleeping space due to its dimensions that are not able to load the needs for the bed

and its space motion. The Balcony of Tanah Merah although its position is indoor but it may only be able to load a recliner seat or bench to rest.

While balconies of ITS and UNESA seem only intended for enjoying the freshness of the outside air, or to provide shade for openings or windows only. So it does not be surprised if these two balconies are classified as ineffective balconies (especially for use as a bedroom).

## VII. ACKNOWLEDGMENT

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