The Rejuvenation of the Settlement at Kapuk West Jakarta

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Abstract. Increasing the population results in a higher capacity of limited available land. The need for houses for low-income population groups is hard to fulfill. This causes many slums that require redevelopment to provide comfort for the people who live in the settlement. It also occurs in citizens association No. 12 Kapuk, West Jakarta. There are 11 standards of the Central Bureau of Statistics in conducting an assessment of the slums, one of them is ventilations. Rejuvenation by the design of ventilation through the shape of grammar can improve the quality of the housing specifically in every house.

Keywords: Setlement, slums,

1. Introduction
The Jakarta Housing Department has programmed the development of the buildings into the scale of the development priorities. One of the main programs is the rejuvenation of the settlement of residents that belong to heavy slums throughout the city in DKI Jakarta. Based on the exposure of the Directorate General of Works or Ditjen Cipta Karya (2014) [1], the most slum pillars are in the West Jakarta area. There are 67 slum citizen associations in West Jakarta, namely citizen association No. 12 Kapuk with the severe category. Then, another 66 citizen association is a mild slum. Based on the evaluation of the citizen association of DKI Jakarta in 2013, severe slums were programmed to have a priority to be rejuvenated. This rejuvenation activity aims to improve the quality of life, health, and welfare of the people, especially low-income groups, to obtain decent housing in the environment of a healthy and orderly settlement.

Table 1. Heavy slums in DKI Jakarta

| Kabupaten/Kota   | Kecamatan | Keberahan | No R/W | Klasifikasi | Jumlah RT | Jumlah RT Rumah | Nomor RT Rumah |
|------------------|-----------|-----------|--------|-------------|-----------|----------------|---------------|
| Jakarta Timur    | Jatinegara| Kampung Raya | 2      | Berat       | 17        | 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 |
|                  |           |           | 3      | Berat       | 16        | 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 |
| Jakarta Barat    | Cempagen  | Kapuk     | 12     | Berat       | 22        | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 |
| Jakarta Utara    | Pengampan | Pengampan | 17     | Berat       | 22        | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21 |
| Cilegon          | Kali Baru |           | 12     | Berat       | 14        | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 |

Source: Jakarta.bps.go.id, accessed 24 August 2016 [2]
It can be seen from Table 1 that the people of citizen association No. 12 Kapuk is classified as a severe region with the number of the most slum as many as 22 citizen associations. Therefore, the Kapuk area was chosen as a research material because of the chronic condition in which it occurred in 22 citizen associations.

![Figure 1. The condition of Kapuk settlement in West Jakarta](image)

It can be seen from figure 1 that the condition of the settlement is unfit for habitation because the construction of buildings is not feasible and does not have a line of river flow or the building demarcation line on the house. Besides, the houses do not have building borders and road widths do not even reach 3 meters. The development of cities that are not well managed tends to cause a decrease in the quality of the environment for the people who live in the area.

Based on the evaluation of the of slum citizen associations of DKI Jakarta in 2013, the central Statistic agency has 11 variables in determining the score to classify the slums in Jakarta which later will be categorized based on the citizen association that is not grungy, mild slum, moderate slum, heavy slum and so on. One of the variables of the 11 variables specified by the Central Statistics Agency is the magnitude of the openings that must meet the requirements of at least 8.86 percent of the home surface field.

Data taken from 30 selected houses in the citizen association No. 12 in West Jakarta is made a sample and it is obtained that the smallest openings that are owned from the sample are 0%, the largest aperture is 7.71%, and the average aperture of the entire sample is 2.30%. If compared with the existing standard then of course there is a big inequality because the average of existing openings is only 2.30% that is far below the standard which is at least above 8.86 percent. So this area needs to be rejuvenated with attention to openings in the area of Kapuk, West Jakarta.

2. Research methods

Data Collection Method, which is collecting data that is binding on the site such as function, density, environmental data, literature review, and photographs of the residential settlement.

Analyzing the percentage of openings is: analysis percentage of existing openings on 30 house samples, Analysis of the percentage of openings that are still to be pursued

Opening design with attention to several things, namely: Rules used in shaping the application of the result of derivation shape Grammar to the opening of the building display

Analyze density and layout issues: Building density Analysis, building density Analysis

Analyzing the facilities and infrastructure in citizen association 12 Kapuk West Jakarta: road drainage analysis, analysis of waste management.

3. Results and Discussion

Percentage analysis of openings, the standard used in determining the number of openings needed in this research is the standard used by the Central Bureau of Statistics in evaluating and assessing the slum citizen association s of DKI Jakarta namely the minimum openings that exist on the facade surface of 8.86 percent. In this research there will be 30 samples of houses that are divided into several types namely skewers type, stall type, two-story type, hook type, and one-story type which will be discussed one by one.
The first house that has skewer position (as shown in the picture above) has an opening that is 20x75 cm where the area is 1.39% from the extent of the overall visible field. Therefore, it still takes an additional 7.47% aperture, to meet the standard of opening BPS (2013) which is the minimum aperture of 8.86 percent.

There are three constraints taken in the designing process done at the settlement of residents of citizen association No. 12 Kapuk West Jakarta, namely:

1. The openings use simple crafting. Where it is intended to be easily realized by citizens independently and does not take a long time in its execution.
2. Material (local). Local material usage is also intended as a form of energy efficiency and how to utilize the resources that are indeed in the settlement of citizen association 12 Kapuk West Jakarta.

There is a rule in using shape grammar:

1. Addition

   ![Figure 3. Rule 1 Addition](image)

   This occurs from a field of squares into the addition of another square on the top right.

2. Addition with lines

   ![Figure 4. Rule 2 addition with lines](image)

   This occurs from a field of squares into the addition of squares in the initial field box.
3. Addition on the top right side

![Figure 5](image5.png)

**Figure 5.** Rule 2 addition on top right side

This occurs from a field of squares into the addition of boxes outside the initial fields.

4. Rotation and addition

![Figure 6](image6.png)

**Figure 6.** Rule 4 Rotation and addition

This occurs from a box field into the addition of squares and other lines in the starting field.

5. Addition of 2 grid fields

![Figure 7](image7.png)

**Figure 7.** Rule 5 Addition of 2 grid fields

This happened with the addition of 2 field squares on the two sides of the initial box field.

6. #1 Buildup

![Figure 8](image8.png)

**Figure 8.** Rule 6 Buildup #1

This happens with the buildup of the starting box field with the same large box field.
7. Intersection

![Figure 9](image_url)  
**Figure 9. Rule 7 Intersection**

This happens with the intersection between the starting field and the new field with the same magnitude as the initial field and forming as shown below.

8. #2 Buildup

![Figure 10](image_url)  
**Figure 10. Rule 8 Buildup #2**

The buildup that happens is the same as that happening at number 6 but what distinguishes is while number 6 is done in a vertical buildup, this stacking is done horizontally. The use of the rules is done through design intuition that will produce a diversity of new opening design forms on each sample that will be tested so that it will produce a diversity of the facial settlements in citizen association 12 Kapuk West Jakarta. Of course, the diversity gives a new atmosphere for people of citizen association 12 itself and visitors of the settlement.

Aperture design using Shape Grammar

Skewer Type 1

![Figure 11](image_url)  
**Figure 11. First home sample becomes Standard compliant**

This first one-story house (as shown in the picture above) was added 90x90 cm opening in order to meet the standard opening BPS (2013) which minimum aperture of 8.86 percent. Then it is also observed in the formation of the openings so that there is always an inlet and outlet that have
different magnitudes on the same surface so that there is a pressure difference that will encourage the occurrence of good air openings and circulation (Lippsmeier, 1997) [3].

![Figure 12. First home opening derivation](image)

Shape Grammar can continuously develop the design until it achieves a design that is in accordance with the specified boundaries. The formation of this opening (as in the picture above) has three constraints that must be fulfilled. The first one is the form that occurs is a simple form in the sense that there is no form of dull or pointed corners that are difficult in the construction. The second is the shape of the glass is easy to be cut so that the shape of the glass that appears is a square or rectangular shape that is indeed easy to cut and install, the last is the area that occurs is the optimal area for both the dead and the living. The problem of the amount of openings can be resolved through this design so that the standard of BPS (2013) is met and the quality of the air exchange that occurs within the home increases.

![Figure 13. First home-looking design](image)

4. Conclusion and suggestion

4.1. Conclusion

The largest effort that is mostly carried out is toward several houses in the settlement of citizen association No. 12 Kapuk West Jakarta, which from the beginning had no openings at all that amounted to 0 percent. This led to the effort to reach the standard of 8.86% very far and requires energy and an overhaul that is quite significant. Unlike a home sample that has a percentage of openings approaching a standard like a twenty-sixth home sample with a percentage of initial openings already having 7.71% so the effort to achieve standard is very minimal.

- **Openings.** Of the 30 samples of houses taken and researched, the houses that had no openings at all (0%) until the houses that already has an aperture of 7.71% are capable of being finished through the design of the plan so that it can reach the standard and can be out of the Slum evaluation category.

- **Density and layout.** Problems arising from density and layout can be at least minimized by the creation of new open spaces in various areas of citizen association 12 Kapuk West Jakarta which
can stimulate the absorption of rainwater to increase the quality of settlements in the citizen association 12 Kapuk West Jakarta area.

- **Facilities and infrastructure.** The process of rejuvenation by improving the quality of the settlement can be done also through the improvement of existing facilities and infrastructure with the participation of the community because it is a simple process that does not take time and the costs are not expensive so it can be done in the form of social gathering or cooperative. As discussed in the journal made by Nur'a'ini, Triharti, and Rahman (2015) [4], where they discussed the study of architectural revitalization at the river banks of Code Yogyakarta conducted by Romo Mangunwijaya.

### 4.2. Suggestions

Of the 11 variables which are the basis of the assessment by the Central Bureau of Statistics to the slum area, this study has discussed and provided solutions to 2 variables directly related to the field of research in terms of architecture where both variables are about construction and openings.

- **Openings.** The planning process can be further developed so as to provide a variety of alternatives that can be chosen by the residents so that residents have a part in the design process to the specific needs of the residents themselves.
- **Density and layout.** The designers not only stop at the design but also get to technical issues and also help to provide design solutions to problems that occur in the field.
- **Facilities and infrastructure.** The community and the government can collaborate to be able to make a rejuvenation activity as discussed, which can be called the Village Improvement Program. Where this activity improves the condition of facilities and infrastructure in mutual cooperation by the community and is supported directly by the government.

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