

## VISUAL AESTHETIC STUDY BASED ON BUILDING FORM AND MASSING ORGANIZATION CRITERIA ALONG SURAMADU BRIDGE CORRIDOR, SURABAYA

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### ABSTRACT

*The existence of Suramadu bridge accelerates transition of building functions, into the function which is economically more valuable. Buildings along this corridor are experiencing visual disharmony order. Therefore, street picture along the corridor should be reorganized to provide visual aesthetic. The purpose of the study is to identify the criteria of building form and massing organization along the corridor in question to achieve better visual aesthetic. This study uses descriptive qualitative method, through exploration of existing data, literatures, stakeholders and users interview, questionnaires, and photographic records. Purposive sampling method is also used to collect samples of stakeholders opinion through interview and questionnaires. As supporting data, samples of users questionnaires are obtained using quota sampling method. After being gathered, the data are systematically analyzed using Delphi analysis techniques. Through these methods, comprehensive criteria required in organizing building form and massing could be established. The results will hopefully be able to accommodate visual aesthetic experience for observers and users at the study area.*

**Keywords:** *building form and massing, streetscape, Suramadu corridor access, visual aesthetic*

### ABSTRAK

*Keberadaan Jembatan Suramadu mempercepat transisi fungsi bangunan menjadi lebih berharga secara ekonomis. Akibatnya bangunan-bangunan di sekitar koridor mengalami penataan yang tidak harmonis secara visual. Oleh karena itu, wajah jalan di sepanjang koridor seharusnya diorganisasi ulang untuk menghasilkan estetika visual. Tujuan dari penelitian ini adalah untuk mengidentifikasi kriteria bentuk bangunan dan organisasi massa bangunan di sepanjang koridor untuk mencapai estetika visual yang lebih baik. Penelitian ini menggunakan metode deskriptif kualitatif melalui eksplorasi data eksisting, literatur, pihak-pihak yang berkepentingan, interview pengguna, kuesioner dan rekaman fotografi. Metode*

*pemilihan sampel secara purposive juga digunakan untuk mengumpulkan sampel opini pihak terkait melalui interview dan kuesioner. Sebagai data pendukung, sampel dari kuesioner pengguna diperoleh menggunakan metode kuota sampel. Setelah terkumpul, data tersebut secara sistematis dianalisis menggunakan analisis Delphi. Melalui metode-metode ini, kriteria komprehensif yang dibutuhkan dalam organisasi bentuk dan massa bangunan dapat dilakukan. Hasilnya dapat mengkomodasi pengalaman estetika visual untuk pengamat dan pengguna di tempat studi.*

**Kata kunci:** *bentuk dan massa bangunan, furniture jalan, akses koridor suramadu, estetika visual*

## INTRODUCTION

Urban design involves the design of building configuration, spatial, and relationship between buildings & formed spaces. Urban design, in general, pays more attention to physical form of the cities which creates built environment providing image and good visual quality for users (Zahnd, 2006). A good visual quality experience for users is implemented by combining design elements and building layout, building form and massing that will provide impacts on visual, psychological, aesthetic, and building intensity (Widyawati, 2003). The appearance of the physical environment is not simply an abstract of aesthetic phenomenon, it does matter and the perceived quality depends on the evaluations of those who regularly experience it (Sanoff, 1991 in Gjerde, 2010).

### Background

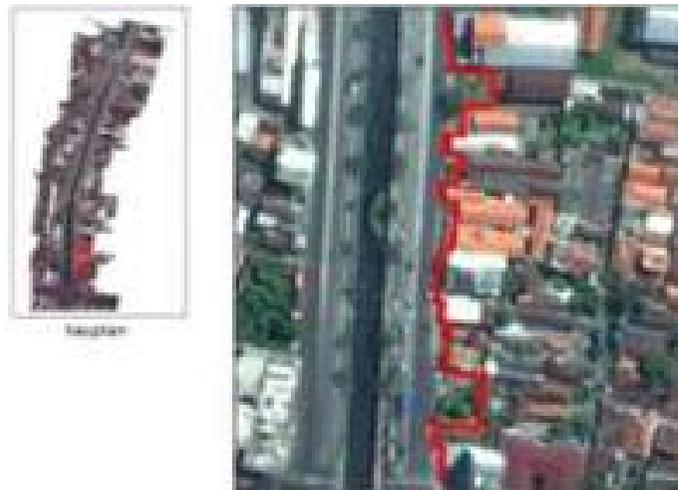
The existence of Suramadu bridge accelerates transformation of building function along Kedung Cowek corridor into the function which is economically more valuable. In fact, buildings along the corridor are experiencing visual disharmony. As the entrance to the city, the existing spaces should be designed to engage urban visual elements by enhancing aesthetic quality of the city, establishing it as the city point of view, and providing societies awareness and prestige (Bararatin, 2010). However, the current condition is just the opposite.

Lack of attention in visual quality along the entrance corridor leads to visual disharmony and ruining scenes of the corridor mentioned. On the other hand, Kedung Cowek street is the path towards a prestigious area to be built in Madura. It is necessary that the corridor is prepared to support the plan. Therefore, the street picture along the corridor should be reorganized to provide visual aesthetic in sequential way, especially for moving observers (from car driver perspective).



**Figure 1.** Sample of Existing Visual Disharmony Street Picture at the Study Area

From figure above, it can be seen that buildings along the corridor have different building height and proportion. Generally, the buildings have 1-3 floors. On the other hand, building proportion may be observed by its height and its position from frontage road.



**Figure 2.** Sample of Variation of Building Setback at the Study Area

At the study area, goods and services (commercial) buildings have various building setback from frontage road, as well as housings and warehouses. Commercial buildings and housings located 0-3 meters from frontage road. Meanwhile, warehouses situated approximately 10 meters from it, to accommodate vehicles circulation inside the building site.

Building function along the corridor is also changing very quickly, especially at the entry point of Kedung Cowek street. Example of the transformation mentioned above is located at the east corridor entrance. A plot of vacant land and a plot of 1 floor-height housing are changed into 3-floor-height commercial building. The alteration can be seen on the following figure.



**Figure 3.** Example of Building Function Transformation at the Study Area

Alteration based on the example occurs within approximately one year. The change is one the effect of Suramadu Bridge establishment. However, the change does not supported by the availability of parking lots and pedestrian ways misuse. The pedestrian paths are used as parking area and informal commercial space. In addition, there is lack of space for shade vegetation as well as decorative plants at the pedestrian ways. So, the amount of plants is insignificant both quality and variety. Based on the explanation, the corridor needs to be controlled, so the visual quality still could be managed and maintained.



**Figure 4.** Example of Building with and without Parking Lot



**Figure 5.** Mis-use of Pedestrian Path and Lack of Vegetation

## Research Variables

Variables are needed to control the research process include the following:

**Table 1.** Research Variables

No.	Variables (1)	Operational Definition (2)
1.	Aesthetics: Unity, Rhyme, Scale and Proportion, Point of Interest, Sequence	Unity of facade elements among buildings along the corridor. Rhyme: Elements variation of facade composition with different dimensions, placement, and distance. Scale & Proportion: Ratio of building width and height among buildings, observed by moving observers with given distance and speed.
2.	Complementary	A common application of buildings height and size, also their elements, so the buildings along the corridor have complementary unity to each other.
3.	Definition	Ratio of the road width is 2-3 times the building height to creates impression of spatial.
4.	Facade: Wall Colors and Material	Facade treatment among buildings along the corridor.

## Sampling Methods

To carry out appropriate criteria of building form and massing organization along the corridor, data collection needs to be conducted at the first place. Phases in data collection in the study are divided into several stages, include the following:

### 1. Observation/Primary Data Collection

Researcher intensively visits the research site. The researcher executes recording of various specific elements and existing linkages among them. Site visit can be categorized into two types of activities. Firstly, walking down through the site, making observations, and noting various elements found in the network or some of roads fabric that makes up specific configuration. Secondly, systematic identification. (Loeckx, 1988 in Darjosanjoto, 2006)

### 2. Secondary Data Collection/Literatures

Techniques of data collection are collected through literatures and theories. Some documents which can support the study as following:

- a. Literatures including urban design theory, associated with the image/identity of the area, its supporting elements, corridor, aesthetic theory, and theory of building elements.

- b. Literatures about Suramadu Foot Bridge Area in Surabaya to apprehend the description of area at issue (data from Suramadu Area Development Agency).
- c. Literatures which contain either Local Government Regulation as well as other urban regulations.

### 3. Interview

- a. Stakeholders interview: Direct interview with sources who are the experts in the field of architecture, especially urban design; community leaders; and government officials (e.g. Surabaya Planning and Development Agency, Suramadu Area Development Agency, Department of Public Works & Spatial Planning, and so on). The selected respondents are examined to indicate the character of population, so that it is necessary to do stakeholders mapping. It is useful for determining the priority of competent stakeholders involved in the study. The interview using purposive sampling method, which is a method of a direct determination of respondents, who are considered experts or stakeholders in accordance to the discussion of the study.
- b. Structured and proportionate interview with the users/observers, as well as local people. They will be asked about their perception/impression and intention to the environment.

### 4. Questionnaires

Questionnaires are numbers of written questions to accumulate information from respondents in terms of personal statements, or things they know (Arikunto, 2006). This study uses closed questions questionnaires (structured and proportioned) to constrict the data results, so they will be easily sorted. The questionnaires use Guttman scale which gives a firm response on two alternative questions, such as agree-disagree, good-bad, and so on. There are questions about the close response of both answers that have been prepared on pre-determined variables. Then, the questionnaires are distributed to stakeholders and users.

- a. Questionnaires for stakeholders use purposive sampling method that has been explained before.
- b. Questionnaires for users/local residents use quota sampling method, which is a technique to determine a sample of population that has certain characteristics to desired number (quota). In the study, the data validity is fruited from 5% of the adult population in Kedung Cowek district. According to the Community Empowerment National Program 2010 year 4, the number of adult residents in the area is 3240 people. Therefore, the required quota is 162 people of total respondents. The users questionnaires results are needed as the stakeholders questionnaires results supporting data. Subsequently, they are compared to the results of the interview.

### 5. Photographic Records

Documentation is data collection through photos of existing study object and aerial views, to acquire real condition of the site. Documentation is illustration of the study object.

**Table 2.** Delphi Analysis Respondents

No.	Stakeholders (1)	Position (2)
1.	Surabaya Planning and Development Agency	Head of Sub-Division of Environment and Spatial Planning
2.	Surabaya Planning and Development Agency	Staff of Surabaya Planning and Development Agency
3.	Suramadu Area Development Agency	Head of Sub-Division of Building Technical Planning
4.	Academics	Academic in field of urban design
5.	Department of Public Works & Spatial Planning	Technique Staff of East Java Department of Public Works & Spatial Planning
6.	Community Leaders	Local Headman

### Analysis Method/Technique

The study uses delphi technique which is efficient in terms of time, money, and result possibility. It is because the stakeholders participate in exploring and exploiting their views on the topic. The implementation of the method contains principles, include:

1. Anonymity  
The stakeholders give their respond separately.
2. Iteration  
Assessment of each stakeholder will be collected and shared back to all participated experts in two rounds of comments. Later, the results of the separated responses are presented to each other to get feedback.
3. Controlled Feedback  
The assessment is communicated by making answer summary of the questions list. Any feedback and response from each respondent are noted systematically.
4. Expert Consensus  
Stakeholders feedback and response formed the basis of the criteria.

## RESULTS AND DISCUSSION

Data exploration 1 is conducted to collect respondents information/opinions by questionnaires. In the study, presumption of building form and massing criteria i.e., aesthetics, complementary, definition, and facade.

1. Aesthetics  
Based on data collection through interview and questionnaires, all of stakeholders consider that aesthetic variable is one of the criteria. One of stakeholder stated that before determining building aesthetic, its function needs to be classified due to the fact that each building function has its own aesthetic value. As supporting data, 83,95% of the users agree that building scale & proportion

is the criteria, followed by point of interest with 79,62%, rhyme with 79,01%, unity 77,78%, and sequence with 67,28% votes.

2. Complementary

Based on data collection through interview and questionnaires, all of stakeholders agree that complementary variable is one of the criteria. Distinction of building elements application among the buildings are caused by ownership factor. Each building owner has different preference in accordance with their capability and desire. As supporting data, there are 63,58% of the users vote that it is one of the criteria.

3. Definition

Based on data collection through interview and questionnaires, all of stakeholders agree that variable of definition is one of the criteria. The variable could be the basis of building form and massing organization due to integrate road width and building proportion. One of stakeholder said that building function should be taken into consideration, because each building has different proportion and spatial requirements. As supporting data, there are 89,50% of the users concede that the variable is one of the criteria.

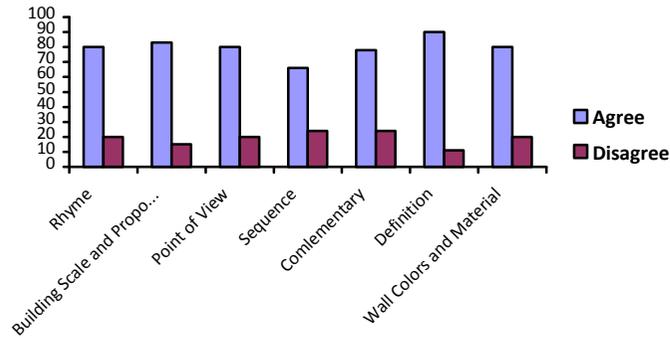
4. Facade

Based on data collection through interview and questionnaires, all of stakeholders agree that variable of facade is one of the criteria. Harmony of wall colors and material could be the standard to achieve organized building form and massing along the corridor. As supporting data, there are 79,62% of the users agree that it is one of the criteria.

**Table 3.** Results of Stakeholders' Interview and Questionnaires Related to Criteria of Building Form and Massing Organization

No	Variable (1)	Sub Variable (2)	Respondents/Names/Agencies/Job Position (3)												
			1		2		3		4		5		6		
			A	NA	A	NA	A	NA	A	NA	A	NA	A	NA	
1.	Aesthetics	Unity	√		√		√		√		√		√		
		Rhyme	√		√		√		√		√		√		
		Building Scale & Proportion	√		√		√		√		√		√		
		Point of Interest	√		√		√		√		√		√		
		Sequence	√		√		√		√		√		√		
		2.	Complementary	-		√		√		√		√		√	
		3.	Definition	-		√		√		√		√		√	
4.	Facade	Wall Colors and Material	√		√		√		√		√		√		

Annotation: A = Agree  
 NA = Not Agree



**Figure 6.** Users' Questionnaires Bar Chart Related to Criteria of Building Form and Massing Organization

After getting information from the respondents, researcher makes summary which contains variables of building form and massing organization criteria. Despite the fact that all of stakeholders agreement, it is not necessary to conduct exploration 2.

**Table 4.** Results of Iteration I

No.	Respondents (1)	Factors (2)				
		1	2	3	4	5
1.	Surabaya Planning and Development Agency	A	A	A	A	A
2.	Surabaya Planning and Development Agency	A	A	A	A	A
3.	Suramadu Area Development Agency	A	A	A	A	A
4.	Academics	A	A	A	A	A
5.	Department of Public Works & Spatial Planning	A	A	A	A	A
6.	Community Leaders	A	A	A	A	A

Annotation: A = Agree  
 NA = Not Agree

## CONCLUSIONS

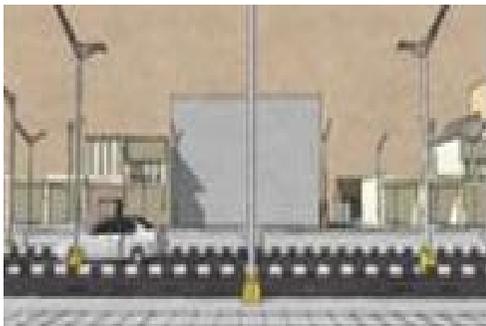
Criteria of building form and massing organization appointed to achieve better visual aesthetic along the corridor Suramadu bridge entrance in Surabaya, consists of the following features and elements:

1. Definition
2. Building Scale & Proportion
3. Point of Interest
4. Wall Colors and Material
5. Rhyme
6. Unity
7. Complementary

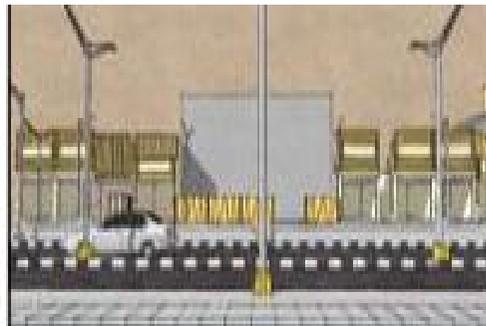
The criteria can be applied for infill building or new buildings only. Because, it is not easy to apply the criteria mentioned above at the existing building due to each building owner authority. Therefore, owners of existing buildings could assign one of the criterias to their building lot.

Another way to make all of buildings along the corridor seems related to each other is by arrangement of street furniture based on the criteria. For example: pedestrian paths, vegetation, potteries, and street lamps, may be designed with the same color, pattern, size, and so on.

Here is a sample of the street picture design based on criteria mentioned above:



**Figure 7.** Current Street Picture Condition Model



**Figure 8.** Street Picture Criteria Implementation Model



**Figure 9.** Existing Sequential Condition Model



**Figure 10.** Sequential Criteria Implementation Model

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