

# Resilient design in the conservation of Johar market heritage building

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**Abstract.** Johar Market building based on Law of Republic of Indonesia No.11 of 2010 is a heritage building. It was built in 1936 located near traditional square of Pasebaan and Aloon-Aloon was built by Dutch merchants union in 1678. Semarang based on decentralized policy by the Dutch Government in 1906 became a trading city. Rapid development of trading activities has caused the city planning policy by Semarang Government since 1970 made Aloon-Aloon become market buildings. Johar Market and market buildings in surrounding were on fire in 2015. Basing on Law No.11 of 2010 Semarang Government plans to conserve Johar Market heritage building and reconstruct Aloon-Aloon based on proposal of Roesmanto in 2016. The architect bureau assigned by the Semarang Government designed a new building in the middle of South-Johar Market to accommodate Johar merchants. This study aims to evaluate the design of new building by the architect bureau considering that since 2012 the city of Semarang including earthquake prone areas. The revitalization of Johar Market should use resilient design in order to prevent future damages to heritage buildings located nearby and new building must be spaced sufficiently against surrounding heritage buildings. This research uses descriptive qualitative method base on the field data after Johar Market burned and design planned bureau architect. The results of this study found that the distance between new building and heritage building is less wide.

**Keywords:** resilient design, heritage building, conservation, Johar Market, Semarang

## 1. Introduction

Based of ancient map of Paan van het Fort in omliggende Cuiatie van Samarangh [1] can be seen that in Samarang or Semarang in the 17th century there are places called Pasebaan, Dalem, Javaan te tempel, Negery and Fort. Based on another an ancient map of Plan Platte Grond van Samarang met dies Environs op een Afstand in [1] can be known that Vereenigde Oost-indische Compagnie or V.O.C. as the union of Dutch merchants who had been given authority by the Mataram kingdom to reign in Semarang since 1678 built a De Vijfhoek or Fort of Vijfhoek and then a new square called Aloon-Aloon. Aloon-Aloon was located near the traditional square of Pasebaan and to the north of the Dalem as the residence of Semarang Regent. Semarang Regency was a part of Mataram Kingdom situated in the Pesisir Wetan or Eastern Coastal area. Aloon-Aloon and Pasebaan were located on the west side of the Semarang River and between them was the Masigit Semarang or Semarang Mosque. The Semarang Mosque was located in the northeast part of traditional square of Pasebaan [1], but then the mosque burned during the Geger Pacina or Chinese War in 1740-1743. Until the mid 18th The V.O.C. had reigned in the area along the North Coast of Java [2], hence the displacement of the Semarang Mosque from its original presence in the south-eastern part to the south-western part of



Aloon-Aloon was intended to distance it from the Semarang River as the centre of major trade and transportation activities. Local architects designed New Semarang Mosque or Masjid Besar Kauman with the Nusantara-Java Architecture based on Demak Mosque architecture model, which might be taught by Sunan Kalijaga [3]. The New Semarang Mosque used wood construction, its size was enlarged and its location was adjusted to the size and location of Demak Mosque, but the roof of the mosque was struck by lightning in 1885. Renovations were made by Gambier on the orders of Nicolaas Hartingh who served as the director of the V.O.C. on the East Coast or Eastern Java while still utilizing wooden pillars in the south gallery and north gallery that were still intact.

After the Chinese War is over Chinese community and merchants were moved by the V.O.C. to the east of the Semarang River. The building of the salt storage shed after the Chinese War was moved closer to the Fort of Vijfhoek in order to make trading activities easily controlled by the V.O.C. for its commercial interests. Trading activities along the Semarang River grew rapidly, and on the west side appeared Pasar Sebandaran or Sebandaran Market, Pasar Pedamaran Lor or North Pedamaran Market and Pasar Pedamaran Kidul or South Pedamaran Market. Fort of Vijfhoek was extended eastward become the Little Netherland or Semarang Oud as an embryo of Semarang City, and now called the Kota Lama. In 1799 the V.O.C. collapsed, the wall of Little Netherland fortress was dismantled. The main road in Little Netherland was connected to Daendels Street limited the northern part of Aloon-Aloon.

During the brief reign of Thomas Raffles little change occurred in Semarang city. Significant developments affecting Semarang city occurred in the late quarters of the 19th century when the first railway line in the government of Hindia Belanda or Dutch East Indies Government was built. The construction of the railway was intended to facilitate the transportation of crops from the Vorstenlanden region where the crops were used as export commodities to Europe for the Dutch East Indies through the port of Tanjung Mas. Prison buildings were built in some areas of the Pasebaan and Aloon-Aloon became the Main Square in Semarang city.

Since 1906 Dutch Government implemented decentralization policy. As a result, Semarang city was developed into a trading city. At that time in Semarang there were three railway companies namely N.I.S., S.J.S. and S.C.S. The Semarang Express train line of S.J.S. crossed Aloon-Aloon. In 1914 the largest international exhibition of Koloniale Tentoonstelling was held, its impact was the construction of Nieuw Tjandi in 1916 as an expansion of Semarang city based on the design of Thomas Karsten. In 1930 the northern prison building was changed into traditional market of Johar. In 1933 until 1936, Dutch Government built Central Market of Johar with design of Thomas Karsten to united Sebandaran Market, Pedamaran Market and the traditional market of Johar. In 1957 Central Market of Johar expanded to the south by the addition of the South Johar Market built on Pasebaan. Central Market of Johar became the largest modern market in Southeast Asia in the mid of 20th century. In 1970 the Semarang City Government built Pasar Yaik Baru or New Yaik Market in the southern of Aloon-Aloon to accommodate the growing number of merchants, also built hotel, bank and mall in the northern of Aloon-Aloon, and the area of Semarang Regent also changed into parking building and Pasar Kanjengan. Aloon-Aloon as Semarang Square became lost. Central Market of Johar then known as Johar Market.

On 9 May 2015 the Johar Market and surrounding markets were on fire. Johar Market only leaves the building elements made of concrete, but New Yaik Market burned down. According to Law of Republic of Indonesia No.11 of 2010 Johar Market is classified as an important heritage building in Semarang because it is more than 50 years olds and has special meaning for the history of Semarang city development. Johar Market is a masterpiece and first central market in Indonesia and applies tropical architecture in accordance with Indonesian geographical conditions. Johar Market is a building that implements modern architecture, and has the best mushroom construction in Indonesia.

Semarang City Government plans to preserve the building of Johar Market. The Architect Bureau assigned by Semarang City Government plans the Conservation of Johar Area with a parking lot by demolishing the South Johar Market. Totok Roesmanto on Focus Group Discussion-1 to Conservation of Johar Area in early 2017 proposed reconstruction of Aloon-Aloon and on Focus Group Discussion-2 proposed conservation of the heritage building of Johar Market including South Johar Market. The Architect Bureau assigned by Semarang City Government cancelled the plan to demolish

the South Johar Market Heritage Building, and planned to conduct a revitalization by adding a new building in the middle for a trading place for merchants.

Based on Standar Nasional Indonesia/SNI or National Standard of Indonesia 1726-2012 about Earthquake Resistant Planning Procedures city of Semarang including earthquake prone areas since 2012, the revitalization of heritage building of South Johar Market should use resilient design.

This study aims to evaluate plans made by architect consultant who will revitalize Johar area by adding new building in the middle of the heritage building of South Johar Market whether it has considered the use of resilient design. There has been no previous research on the need resilient design in the revitalization program for heritage building conservation. This study is based on Law No. 11 of 2010 that regulates the conservation of heritage buildings. Employing descriptive method, data were collected on the damage of Johar Market Heritage Building after burning on 9 May 2015. The results of this study will be useful for the Semarang City Government which will rehabilitate and conserve the heritage building of Johar Market and revitalize the surrounding in 2018. This study is based on Law No. 11 of 2010 which regulates the conservation of heritage buildings and considers the rule of SNI 1726-2012 for new building not to fall on heritage building during an earthquake.

The research method used is descriptive qualitative by doing observation object in South Johar Market, analyzing plan made by architect bureau based on Law No.11 2010, SNI 1726-2012, and basic principle of conservation and revitalization.

## **2. Methods**

The method used in this research is descriptive qualitative, which is done with observations in the field and other sources, especially the new building design proposed by the architect bureau. The observation to Johar Market especially South Johar Market is intended to find the existing data about the building after a fire on 9 May 2015. The architect's bureau plans to add new building in the middle of the South Johar Market should be known. The design proposal for a new building made by architect bureau is based on the needs of the floor area that will be used as a place to accommodate Johar Market merchants especially those who originally trade in South Johar Market. By combining existing data from South Johar Market and the plan of new building designed by architect bureau it will be able to analyze the distance between the two buildings.

Based on Law No.11 of 2010 can be analyzed whether the building of South Johar Market including heritage building should be conserved or an additional building on the Johar Market that can be demolished. Based on SNI 1726-2012 Semarang including earthquake prone areas, since 2012 all buildings both heritage buildings and new buildings will be affected.

Resilient design is a design that has the ability to make buildings have resilience. Johar Market is a heritage building, because it has been burned and the elements of the building made of concrete material is still intact it must be conserved. Consider that Johar Market including South Johar Market can not function as a place of trade the building must be revitalized.

## **3. Discussion**

### *3.1. Conservation of the heritage building of Johar Market*

The Based on Law No.11 of 2010 Article 5 the building can be proposed as heritage building if it has criteria : 1.aged 50 years or older; 2.represents a period of style at least 50 years; 3.has special meaning for history, science, education, religion, or culture; 4.has a cultural value for strengthening the nation's personality [4].

Johar Market was originally called Centrale Pasar [5] is merger of Sebandaran Market, North Pedamaran Market, Central Pedamaran Market, South Pedamaran Market, Jurnatan Market, Beteng Market and Johar Traditional Market conducted Gemeente Semarang or Semarang Government in 1936. Baldinger argues that the merger of several markets has been done to add to the beauty of Semarang city and improving hygiene in the marketplace [6]. Semarang Government then makes a requirement for modern market based on Johar Market design ie.1.the room inside the market must be sufficiently light and air; 2.all floors and walls should be easy to clean; 3.all buyers and sellers must be protected from direct sunlight; 4.the aisles for circulation of buyers should be wide enough; 5.the distribution of the sale plots should be transparent and clearly visible [6].

Johar Market is the most important modern architectural building in Semarang. It was designed by Thomas Karsten who is famous architect and planner as the pioneer of the urban renewal and urban planning design in Indonesia. Johar Market is designed by applying tropical architecture in accordance with its existence in tropical climate, air circulation and natural lighting into the building very well. The building equipped with an elevated floors for bargaining activities while sitting between buyers and merchants. The bargaining activity between buyers and merchants is a typical culture in traditional markets in Indonesia. Because of the potential of Johar Market, the building is a very important heritage building in Semarang and must be conserved.

According to Orbasli [7] conservation is the process of understanding, protecting, when necessary, maintaining, repairing, restoring and adapting historic buildings to preserve the cultural value. According to Law No. 11 of 2010 Johar Market Building is a heritage building, hence after the fire damage on May 2015 the conservation of the building is necessary based on Article 58 of Law No. 11 of 2010. Based on Article 53.3 of Law No. 11 of 2010, the building should be returned to the original condition.

### *3.2. Reconstruction of Semarang Square*

Law North Johar Market and Central Johar Market are built on Aloon-Aloon, and South Johar Market is built on Pasebaan. Previously at Aloon-Aloon there are also some office buildings and bus terminal. The remaining field is called Aloon-Aloon Semarang or Semarang Square. Since 1971 South Semarang Square was changed to market buildings for the sale fruits and clothes, and North Semarang Square for local transport terminal. Then the local transport terminal replaced the building for the bank in 1977 and the hotel of Metro in 1981. At the Semarang Regent area built Kanjengan Market and parking building. Since 1981 Aloon-Aloon and Pasebaan have been lost.

At the time of Johar Market on fire 9 May 2015 also burned the building market around it. The number of merchants who lost their trading places was approximately 4000 people. They have been relocated and will be partially returned to Johar Market later on. The bureau architect assigned by Semarang Government plans to revitalize Johar area covering Johar Market, South Semarang Square and Semarang Regent area.

Roesmanto submitted a proposal to reconstruct North Semarang Square as a part of Aloon-Aloon at the Focus Group Discussion-1 held in October 2016 [8]. In Focus Group Discussion-1 architect explained his proposal for revitalization of Johar Area. The architect planned New Semarang Square as a substitute South Semarang Square based on the reconstruction proposal by Roesmanto. New Semarang Square will be reconstructed in 2018, and some merchants will return to the South Johar Market Heritage Building. New Semarang Square has a semi-basement that will be used for parking area. The semi-basement of New Semarang Square will facilitate merchants and buyers in Johar Market go to pray to the Semarang Mosque comfortably. In the southern part of the New Square of Semarang several units of three-stories buildings will be built to accommodate merchants.

### *3.3. Revitalization of South Johar Market*

South Johar Market was built in 1957 using a mushroom construction as designed by Thomas Karsten. The building plan of South Johar Market is different from North Johar Market and Central Johar Market. The heritage building of North Johar Market and Central Johar Market are two-stories building and shaded by concrete roof from mushroom construction. South Johar Market Heritage Building that is also a two-stories building has an O Trapezium-Shaped plan. The South Johar Market was built on Pasebaan. Based on Law No.11 of 2010 South Johar Market over the age more than 50 years and has relationship with North Johar Market and Central Johar Market is a heritage building.

On Focus Group Discussion-2 in December 2016 architect planned to demolish the South Johar Market Heritage Building to be replaced by a multi-stories building for vehicle parking. Based on Law No.11 of 2010 Article 51 because South Johar Market Heritage Building is not destroyed and does not change shape and style then the building can't be demolished.

Roesmanto opposed the destruction of South Johar Market Heritage Building and proposed to revitalize it. Because South Johar Market Heritage Building is a two-stories building has a O Trapezium-Shaped plan, so that in the void a new building can be built to accommodate merchants.

Other than that the architect bureau must plan a parking building in the former Semarang Regent area [8]. According to Murtagh historic buildings should not be demolished and changed [9].

### *3.4. Semarang prone to earthquakes*

Based on SNI 1726-2012 since 2012 Semarang has been added to the list of areas prone to earthquakes. The decision is based on the results of the evaluation of many natural disasters that occurred in Indonesia before 2012. The Johar Market consists of the North Johar Market and Central Johar Market that were built in 1936, and South Johar Market that was built in 1957. Johar Market Building is a concrete constructed building using mushroom konstruktie or mushroom construction, that has been proven to be sturdy and not collapse until now. The construction strength of the Johar Market Building after the fire damage can certainly decrease. Considering that since 2012 Semarang city has been included in the list of earthquake prone areas, the reconstruction, rehabilitation and revitalization of Johar Market Heritage Building must be planned with resilient design.

South Johar Market Heritage Building is two-stories building with mushroom construction. South Johar Market Heritage Building is known by its popular nickname Pasar Maling [Thief Market], because traded goods are sold at very cheap prices. The height of the building on the second floor that is the distance between the floor surfaces to the concrete roof surface is 2.80 m. The height of the first floor building that is the distance between the first floor surfaces to the second floor surface is 1.90 m. The condition of the first floor surface is in the form of not only a pile of cumulative burning remains, but also stockpile of new materials. Merchants collected the stockpiling for an adjustment to changes in the types of traded goods. According to the rules of the Law No. 11 of 2010, the first floor needs to be returned to its original shape. All materials that have been stockpiled on the surface of the first floor should be discarded. The Johar Market Heritage Building will return to its original form like when it was built in 1957.

### *3.5. Re-placement of old merchants*

Before Johar Market was burned on May 9, 2015 there was a crowded and large number of merchants. Alleys between the circulation ways designed by Karsten were quite spacious and fine. However, about half width of the alleys was used as new trading places or old merchants expanded the area towards the front.

According to Law No. 11 of 2010 and Karsten's design the alley section must be returned as a circulation path for buyers. Considering that after the burning the strength of concrete construction of Johar Market Heritage Building also decreased, re-functionalization needs to be carried out to transform the market into exhibition and souvenir center with a selective and limited number of merchants. Likewise, the number of merchants resettled in South Johar Market Heritage Building should be limited. Due to the limited Johar area owned by Semarang Government, the architect bureau proposes the addition of a new building in the middle of the void in South Johar Market Heritage Building.

The architect bureau designed a new building in the middle of the void of the South Johar Market Heritage Building. Architect plan the distance between the new building in the middle of the void and the surrounding heritage building is only 4 meters so that the capacity to accommodate old merchants can be maximized. Based on measurement data in South Johar Market Heritage Building on void can only be made new building of size [30-4-4] meters x [30-4-4] meters or 22 meters x 22 meters. That number of merchants to be accommodated should be based on the height of new building that can be built.

### *3.6. Resilient design for heritage building*

Resilience is the ability to adapt and remain able to firm in difficult situations. In the opinion of Eskew-Dumez-Ripple in built environment is concerned communities and not about building. Eskew-Dumez-Ripple define resilience is the preservation of communities through ongoing planning for the capacity to learn, adapt, and change in the face of present-day and future, both predictable and unknown [10].

The area of plot for Johar merchant communities replaced to the South Johar Market Heritage Building and the new building in the middle of the void must be in accordance with the Karsten



design of 1936. Johar merchants who are not accommodated in South Johar Market Heritage Building and the new building should be placed in new building in the former Semarang Regent area.

American Institute of Architects define resilient design is the design that can adapt to changing conditions to rediscover its function and vitality to deal with impending troubles. According to the Rockefeller Foundation resilient design relates flexibility to the ability change, adapt to alternative strategies for facing disasters, accept new solutions, and also the ability to re-establish and re-organize function [10]. The upcoming problem that must be faced by all buildings including heritage building is earthquake.

Even though the Johar Market Heritage Building has survived until now, has been burned in 2015, since 2012 until now has experienced several earthquakes, but in the future the building structure and construction will be reduced and vulnerable to the earthquakes. Merchants who are planned to be replaced to new building in the middle of South Johar Market Heritage Building will adapt to their new place.

The height of South Johar Market Heritage Building after the reconstruction of its first floor to the original condition is  $2 \times 2.80$  meters = 5.60 meters. The South Johar Market Heritage Building was built in 1957 before Semarang City was considered as an area prone to earthquakes. The new upcoming building on the void of the South Johar Market Heritage Building is planned based on SNI 1726- 2012. From the difference in the construction strength of the building, in case of major earthquake buildings form South Johar Market will be more affected first than the new upcoming building in the void.

With a height of 5.60 meters, if the South Johar Market Heritage Building collapses due to the earthquake, the debris of the ruins will be slammed down and sideways as far as 5.60 meters. If the ruins of the South Johar Market Heritage Building are reflected again irregularly to the side about 1 meter, then the open space area that should be provided between South Johar Market Heritage Building and the new building is 5.60 meters + 1 meter = 6.60 meters. This means that new buildings that can be built in the void part of the South Johar Market Heritage Building are sized  $[30-6.60-6.60]$  meters  $\times$   $[30-6.60-6.60]$  meters or 7.30 meters  $\times$  7.30 meters. Building with the measurement of 7.30 meters  $\times$  7.30 meters cannot accommodate many merchants.

The resilient design of South Johar Market Heritage Building in the conservation will be restored to its original form in 1957. The void of South Johar Market Heritage Building in 1957 was functioned as a place for fruit and vegetable stalls attaching shaded umbrellas that could be closed and opened. The quality of the stalls on the void was then improved with the construction of wooded roof with tajug [a pyramid-shaped roof]. The shape of the building imitated Karsten's work in Pasar Gede Hardjonagoro or Gede Market Heritage Building in Surakarta it was built in 1930. From these considerations, the void of the South Johar Market Heritage Building will become a new building that is not storied and is constructed from wood with a tajug shaped roof. In order to prevent future earthquake damages in the new building in the void of South Johar Market Heritage Building, the position of the first floor surface should be raised.

The higher of the first floor surface position of the new building, the less affected it will be by the ruins of the debris of the South Johar Market Heritage Building. The maximum position of the first floor surface of the new building is equal to the half of the height of the first floor surface position of South Johar Market Heritage Building  $(2:8:2) = 1.4$  meters. The distance between the open space between South Johar Market Heritage Building and the new building in its void part is  $[5.60 - 1.40]$  meters = 4.20 meters.

#### 4. Conclusion and Recommendation

Based on the results of the analysis of the revitalization plan conducted by the architect bureau, the resilient design should be used in order to prevent future impacts of natural disasters. The results are as follows:

- a. The distance between the South Johar Market Heritage Building and the new building in its void should be widened, it is at least 4.50 meters and should be an open space; with the following requirement the position of the first floor surface of the new building should be 1.40 meters higher than the surrounding surface;

- b. The new building in the middle of the void of South Johar Market Heritage Building must be designed with structure and construction based on SNI 1726 of 2012;
- c. The reconstruction of the New Semarang Square is necessary and it must remain a green open space; in case of an earthquake buyers and Johar merchants can save themselves to the New Semarang Square;
- d. The conservation of Johar Market Heritage Building should be carried out by increasing of the strength of the mushroom pillar construction; the mushroom pillar should be reinforced to last longer;
- e. The height of the new building in the middle of the void of South Johar Market should not interfere with the view to the South Johar Market Heritage Building, maximum 3-stories building.

### 5. Acknowledgments

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