

ARCHITECTURAL FLEXIBILITY APPROACH FOR DESIGNING FISHNETS REPAIRING WORKSHOP IN KEJAWANAN FISHERY PORT, CIREBON

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Abstract

The study discusses the change of use of space done by fishermen in Kejawanan Fishery Port, Cirebon. As an archipelago country, fishery becomes the primary livelihood of Indonesian community living in coastal areas. The fishery activities are supported by fishery ports that play a great role in developing economic of the fishery community. One of fishery ports in Indonesia is Kejawanan Fishery Port in Cirebon, West Java Province. The fishery port becomes the center of fisheries sector in Cirebon. At present time the number of fishermen is increasing. This has an impact on the expanding of working area of the fishermen. The problem arises when the fishermen use the dock as a place for making and repairing fishnets. As loading zone, the dock should actually be clear from other activities. Based on the problem, the study purposes to implement an architectural flexibility approach in designing fishnets repairing workshop for the fishermen. Considering the needs of space for relevant activities, the workshop is equipped with some supporting facilities, such as fish market and seminar room. The study implemented a qualitative-descriptive method by collecting primary data from field observations and interviews. The data was analyzed by Envimet software to develop site design alternatives. The analysis was supported by secondary data collected from literature and precedent studies. The result of the study shows that the implementation of architectural flexibility approach in designing workshop for repairing fishnets can be done by three concepts of flexibility, namely (1) expansion, (2) convertibility, and (3) versatility. The three concepts of flexibility enable the design of mixed-use building that can accommodate the fishermen' needs of fishnets repairing workshop and public needs of both economic and tourism facilities.

Keyword: *architectural flexibility, fishnets repairing workshop, Kejawanan Fishery Port, mixed-use facility.*

Introduction

Fishery port is a place to support fisheries activities that can help the economic development of the fishery community and also the other member of community are two archipelago fishing ports located in West Java (Bayyinah, 2016). One of them is Kejawanan Fishery Port in the northern region of West Java. Kejawanan Fishery Port is one of the economic centers based on fisheries sector of Cirebon City. As the economic center of fisheries sector, Kejawanan Fishery Port produces and sells catching fish with different prices every day.

In order to improve the economic condition in fisheries sector, fishermen in Kejawanan Fishery Port are divided into three classifications according to the use of fishing gears. There are fluctuation numbers of fishermen in each classification from 2008 to 2012.

As shown on Table 1, the use of gill nets and *bubu* as fishing tools was decreased from 2008 to 2012. Meanwhile, the use of *bouke ami* was increased significantly.

Table 1. Classification of Fishermen in Kejawen Fishery Port

Year	Classification of Fisherman			Total
	Gill Net	Bouke Ami	Bubu	
2008	230	220	189	639
2009	210	176	147	533
2010	200	308	126	634
2011	180	647	100	630
2012	175	736	85	628

Source: Kejawen Fishery Port, 2013

In line with the increasing number of fishermen in Kejawen Fishery Port, the fishermen need wider space for working, particularly preparing fishing equipments. They use open spaces to do their work, such as the supply and loading zone of the port. Actually, the supply and loading zone must be free from other activities, so that it can be easily accessed by fishermen and services. The supply zone and loading zone are purposely used by fishermen and ship crews to prepare supplies before sailing and unloading catching fish after sailing. The unloading zone is equipped with dock facilities and fish auction facility. The supply zone is equipped with dock facilities. However, the dock in the supply and loading zone is also used by fishermen as working place for repairing or making new fishnets.

The activity of repairing fishnets is done when the fishermen do not go sailing. The activity takes approximately three months. The misused space in the dock area is stimulated by the lack of facilities, particularly for repairing and making fishnets. The misused space in the dock area generates spatial problems, namely disorientation and displacement. Spatial disorientation occurring in the dock area is indicated by the extending function of the dock area, from the movement area as supply and loading zone to be a slow-movement area as a workshop for repairing and making fishnets (Figure 1).

The spatial displacement occurring in the dock area of Kejawen Fishery Port is characterized by the transferring of fishnets repairing and making activities to the dock area. The fishermen can work easily in the larger space, so that they prefer to use the free zone area as their working place.



Figure 1. Activity of repairing fishnets done by the fishermen

Source: Audie, 2018

These spatial problems can be assessed by using the architectural flexibility approach to formulate the design idea. The idea purposes to find out a solution of providing working place for the fishermen through designing fishnets repairing workshop in the proper area. By implementing the architectural flexibility approach, the facility for repairing fishnets can be designed as a multi-use flexible space in one building. Thus, the needs of fishermen can be fulfilled in a building located in the same area.

The planned fishnets repairing workshop will be equipped with commercial facilities in the form of services and goods as provided by the existing workshops and groceries stores. This workshop is needed by the fishermen and ship crews to prepare fishing-ship equipments and necessities. Furthermore, groceries are required to supply the fishing-ships.

Methods

The research applies a qualitative-descriptive method by collecting data from the phenomenon occurring in Kejawanan Fishery Port, Cirebon City. The data was analyzed through architectural flexibility approach that leads to the formulation of concept design. The primary data was collected through interviews with relevant informants and field observations. The field research to gather empirical data was conducted on August 23rd – 25th, 2018. The secondary data was gathered from literature study and relevant precedent study, the regional regulations of Cirebon City (Perda), and the Regional Spatial Planning of Cirebon City (RTRW).

Discussion

The Principle of Architectural Flexibility

According to Beattle (1985), place making is a process that changes space into a place. The space that has no appropriate function and no strong character yet is directed to be a place that has an appropriate function and strong character. The place making concept aims to strengthen the relationship between people as users and the place. The concept also facilitates the arrangement of creative activities related to physical, social and cultural identity. One of the characteristic of place making is flexible.

INTERNATIONAL PROCEEDINGS

LOCAL GENIUSES GENERATE FUTURE DESIGN, 16-17 November 2018

According to Kamus Besar Bahasa Indonesia (2007), flexible means easy and fast to adjust. Meanwhile, flexibility means an easy and fast adjustment. The criteria of flexibility consist of two aspects, namely:

1. Technical Aspects

This criterion takes into account the space requirements that are not many rules and practical, the speed of changes in space, and thinks about the possible risk of minor damage.

2. Economical Aspects

This criterion considers the low-cost of construction and maintenance.

There are three concepts of flexibility in the principles of architectural flexibility, namely:

1. Expansionability

A concept of flexibility that has a wide application for flexible space based on user's requirements.

2. Convertibility

A concept of flexibility that enables space to be rearranged quickly and practically.

3. Versability

A concept of flexibility that enables space to be used by various users/ multi-users.

Applying the architectural flexibility theory, four characters should be considered, namely:

1. Adaptation

This character applies to buildings that can respond to the changes in sustainable manner according to the needs of users both as individual and group of people.

2. Transformation

This character applies to the changes of shapes, volumes associated with closing, opening, expanding and narrowing movements.

3. Movability

This character applies to portable buildings that can move and be dismantled and reassembled.

4. Interaction

This character applies to the actions and reactions among humans as users of a building to regulate the needs of rooms and realize smart buildings.

Precedent Study: Fishnet Repairing Loft at Sibolga National Fishery Port



Figure 2. Sibloga National Fishery Port

Source: <http://pipp.djpt.kkp.go.id>

Sibolga National Fishery Port is the fishing port equipped with some supporting facilities, such as fish auction market, fresh water tanks, generators, workshops, fish processing and drying rooms, and fishnets repairing loft. These facilities are intended to be a place for repairing fishnets when fishermen do not go fishing. The spaces for repairing fishnets are changed to be a fish auction market (TPI) and renovated as the hygienic fish auction market.

Considering the phenomena occurring in Sibolga National Fishery Port, the problems of fishnets repairing place was analyzed with three principles of architectural flexibility theory, namely: expansionability, convertibility, and versability. The analysis shows some results that are:

1. Expansionability

With an area of 800 m² for fishnet repair, the fishermen have the possibility to change the net repair space to be another function, namely TPI. This principle has an architectural impact on the application of wide-span buildings structures that is suitable for multi-functional spaces.

2. Convertibility

The adjustment to the multi- functional spaces is done by cleaning the room and using a forklift aid tool to transport heavy stuffs, so that the room can be used for other activities. This principle has an impact on the construction of wall or barrier between spaces that enables users to change the space function.

3. Versability

Some users are involved in the use of fishnets repairing place, such as employees and fishermen. When the place was converted into TPI, the type of users is also changed. The TPI is used more by fishermen, fish sellers, and fish buyers. This principle has an impact on the application of multifunctional building mass form.

Site Analysis

The data of existing site is used for analyzing the site and formulate the concept of site plan. The site of this study case is located in the area of Kejawan Fishery Port in Lemahwungkuk Sub-district, Cirebon City, West Java Province. VAT Vulnerability of the site is geographically located at 06⁰ – 73,3' – 51,9" LS/108⁰ – 58,5' – 78,8" BT. According to the master plan of Kejawan Fishery Port, the port

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area is divided into four zones, namely the industrial zone, residential zone, administrative zone, and eco-tourism zone.

The selected site is located between two zones, that are administrative zones and eco-tourism zones. As shown in Figure 3, the size of the selected site is approximately 4,736 m² that adjacent to:

- a. North Side: the dock and Pelabuhan Perikanan Street
- b. East Side: green area
- c. West Side: open space
- d. South Side: freshwater pond and settlements

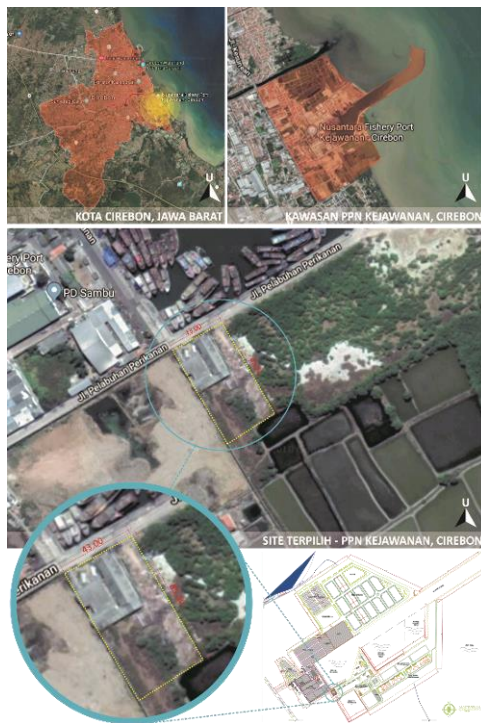


Figure 3. The location of existing fishnets repair place

Source: Audie, 2018

Spatial Programming

The spatial programming of the fishnets repairing workshop identifies the types of users and space requirements. The identification of the type of users can be seen from the activities occurring in Kejawanan Fishery Port. The activities of fishermen and other crew members usually occur at 08.00 am until 05.00 pm (Figure 4). During the working time the fishermen and crews usually repair the ship engine or ship body. Furthermore, they also prepare stuffs and equipments for sailing and repair fishnets.



Figure 4. Activities of fishermen

Source: Audie, 2018

Activities of the management employee in Kejawanan Fishery Port are done during working hours, from 08.00 am to 04.00 pm (Figure 5). Meanwhile, the activity of visitors starts at around 10.00 am and ends at 06.00 pm, especially on weekends (Figure 6).

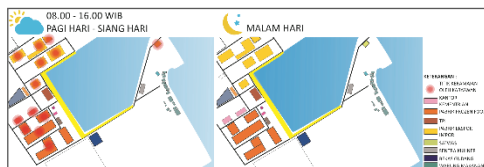


Figure 5. Activities of the employee

Source: Audie, 2018



Figure 6. Activities of visitors

Source: Audie, 2018

The space requirements for the fishnets repairing workshop are divided into three aspects, namely: the primary needs, the secondary needs as a supporting factor, and tertiary needs as an aesthetic factor. The primary needs of spaces for the fishermen are represented by fishnets repairing workshop, the meeting rooms and the fish market. The secondary needs of spaces are indicated by management offices, workshops and shops. These become supporting facilities for the fishermen and the management staffs. The tertiary needs of spaces are applied in parking lots and open spaces that become an aesthetic factor of the area.

By considering the needs of spaces and the types of users, the fishnets repairing workshop is designed by implementing three concepts of architectural flexibility. The first concept is expansion, which the main function is a place for repairing nets. This facility accommodates the spatial needs of fishermen for preparing sailing supplies. This facility can be used for other activities, when the fishermen do not repair nets. This facility can be used also as meeting rooms and fish market.

Design Concept

The fishnets repairing workshop is designed by applying several design concepts, namely: the concept of building mass, building shapes, building structure, utility and sanitation, and vegetation on the site. The concept of building mass describes the layering of building mass consisting of three aspects, namely circulation, zoning, and orientation of the building (Figure 7). The circulation aspect is designed according to the type of users which is divided into three parts, namely the primary circulation for fishermen and crews, the secondary circulation for visitors, sellers, and workshop employees, and the circulation of services for managing employees.

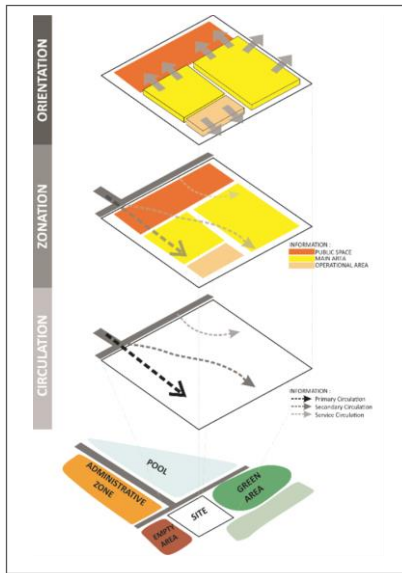


Figure 7. The concept of building mass

Source: Audie, 2018

As shown in Figure 8, the zoning aspect considers the layering of building mass which is divided into three zones: firstly, the open space zone such as parking lots and open parks; secondly, the main function zone consisting of fishnets repairing workshop, the meeting places, the fish market, stores, and offices zone.

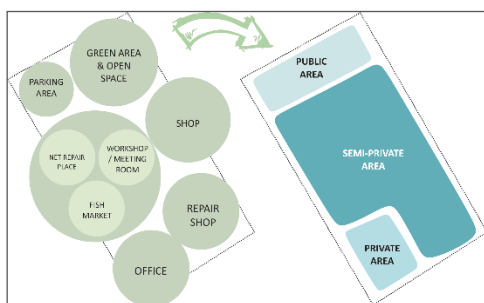


Figure 8. The zoning concept

Source: Audie, 2018

The orientation aspect of the building will be divided into several building masses, so that the mass of the building will be oriented by responding to the typology forms closed to the surrounding environment.

The fishnet repairing workshop needs a wide space for stretching fishnets. Thus, a wide-span with v-shape columns structure is implemented in the building. As shown in Figure 9, the wide-span structure of building enables the fishermen to do their work properly.

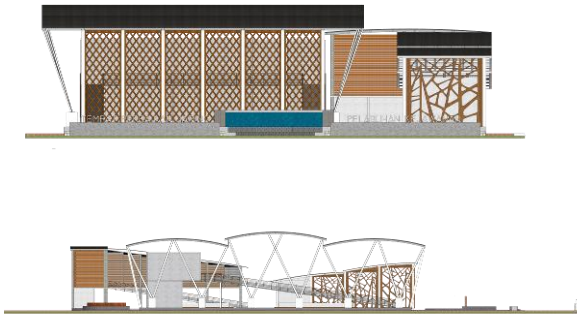


Figure 9. The concept of building shape and wide-span structure for the fishnets repairing workshop

Source: Audie, 2018

Conclusion

The results of the design concept of the net repair site in Kejawan National Fishery Port that implements theory of architectural flexibility approach can be summarized as the following ideas:

Firstly, by applying the principle of architectural flexibility to the design of fishnets repairing workshop, the design will be more functional and can be used by various activities. The activities can be done in one building with the main function as workshop for repairing fishnets. The flexibility theory applied in the design consists of three concepts that are expansion, convertibility and versatility.

Secondly, the design of working space for repairing nets implements the concept of architectural flexibility based on building mass, building forms, building structure, utility and sanitation, and vegetation on the site. The spatial flexibility can be achieved through implementing the wide-span structure for the building of fishnets repairing workshop.

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INTERNATIONAL PROCEEDINGS

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