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Potential of processed timber for preserving the Chinese traditional buildings

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Abstract. As one of the ethnic groups that enrich the diversity of customs and culture in Indonesia, the Chinese people have a cultural characteristic that their ancestors brought more than 400 years ago to Indonesia. This certainly gives a great influence on various aspects, one of which is the building architecture. This study aims to examine the architecture of traditional Chinese buildings in the China Benteng area, Tangerang. This research aims to examine the architecture of traditional Chinese buildings in the China Benteng area, Tangerang. The research method used is a qualitative rationalistic approach with qualitative data analysis. In the Chinese tradition, a procedure for building houses cannot be separated from *Fengshui*, as in the temple building in the China Benteng area. *Fengshui* is very important in determining the building direction that is profitable so that it will get blessings and avoid disaster. Meanwhile, wood materials usage in traditional Chinese buildings such as the Boen Tek Bio temple is solid wood. If a renovation or replacement of wood material is needed, of course now it is difficult to find solid wood of good quality, such as when building the Boen Tek Bio temple. For building preservation needs, processed wood or engineering wood is commonly used as one of the building materials and can be considered if needed to replace damaged wood material in traditional Chinese buildings.

Keywords: Building architecture, Chinese traditional buildings, *Fengshui*, Preserving, Processed wood

1. Introduction

The Chinese-Indonesian are one of the ethnic groups in Indonesia whose ancestral origins come from China (China). These Chinese migrants usually call themselves Tenglang (Hokkian), Tengahan (Tiochiu), or Thongnyin (Hakka). In Mandarin, they are called Huaren (Traditional Hanzhi: 華人). Chinese people in Indonesia generally come from the southeastern part of China (now the provinces of Fujian, Guangdong, Hainan, and surrounding areas). Chinese-Indonesian ancestors migrated in waves thousands of years ago through commercial activities [1]. Their role appeared several times in Indonesian history, even before the Republic of Indonesia was declared and formed. Records from China state that ancient kingdoms in the archipelago were closely related to the ruling dynasties in China. These factors then fertilize trade and the traffic of goods and people from China to the archipelago and vice versa [2]. After the Indonesian state became independent, Chinese people who were Indonesian citizenship were classified as one of the ethnic groups in the Indonesian national sphere, in accordance with Article 2 of Law Number 12 Year 2006 concerning Citizenship of the Republic of Indonesia.



The existence of the Chinese in Indonesia, of course, cannot be separated from the philosophy and culture that they have adhered to for generations. Chinese culture is the result of the mindset of the ethnic Chinese community that forms a unity of interests so that it can image the Chinese community as the main actor of Chinese culture. The basic thing about Chinese tradition and culture is respect for ancestors and their teachings. Chinese culture itself is one of the formers as well as an integral part that is inseparable from Indonesian national culture to date [3]. Although Chinese culture in Indonesia is rooted in ancestral culture, Chinese culture in Indonesia has been very local in nature by undergoing a process of assimilation with local culture in Indonesia [4, 5, 6]. There are three forms of culture according to Koentjaraningrat [7]; 1) as ideas/ideas that include values/norms; 2) second, as activities or human action patterns in society; and 3) third, as objects (products) created by humans.

As one of the ethnic groups that enrich the diversity of customs and culture in Indonesia, the Chinese people have a cultural characteristic that their ancestors brought more than 400 years ago to Indonesia. This certainly gives a great influence on various aspects, one of which is a building architecture [6, 8]. Architecture began as a shelter, but nevertheless, it can also be an art form that shows the identity of a community [9]. The architecture brought by the Chinese shows the people's tradition and identity through the building characteristics [10, 11].

This research aims to identify how Chinese culture can influence the existence of its architectural characteristics. In addition, this study will also study the philosophical understanding or symbolization meaning of the Chinese in the traditional building elements that arise as architectural expressions. This research also aims to examine the use of processed wood as a building material in preserving traditional Chinese buildings.

2. Research method

This research examines traditional Chinese buildings in the China Benteng area, Tangerang, and is more focused on the architectural form and wood materials usage. In addition, this research also examines the Chinese philosophy in their traditional building designs. The research method used is a qualitative rationalistic approach with qualitative data analysis. This qualitative rationalistic research approach is in accordance with the nature of the research problem, which is to uncover or understand the symbolization of ethnic Chinese homes in the China Benteng area. Qualitative data analysis will be used to obtain Chinese architectural characteristics in the research area. The data used are primary data through direct observation and using secondary data through document review.

3. Result and discussions

3.1. General condition of China Benteng area

Benteng China region is a place of the Chinese community existence in Tangerang city. Chinese ethnic in Tangerang City is known as Cina Benteng, the term Cina Benteng appears inseparable from the establishment of Makassar Fortress which is located on the banks of the Cisadane River in the Center of Tangerang City, Tangerang District, Sukasari Urban Village, built in the Dutch colonial era which is now razed to the ground [12]. Benteng China area, located in the Old Market area of Tangerang, and reportedly has been inhabited by Chinese people since the 17th century. The development of China Benteng in Tangerang has led to modern by leaving various traditions from the ancestors.

The China Benteng area has historic buildings, including the Boen Tek Bio Temple, the Jami' Kalipasir Mosque, and the Benteng Heritage Museum. The Boen Tek Bio temple is estimated to have been built in 1684 which literally means the gathering of intellectuals to do well. The Jami' Kalipasir Mosque is the oldest mosque in Tangerang City which was built in 1700' by Tumenggung Pamitwidjaja of Kahuripan [13]. Meanwhile, the Benteng Heritage Museum is located not far from the temple; and are both located in the middle of the Old Chinatown. The Benteng Heritage Museum building with Chinese architecture is a restoration result of an ancient house building estimated to stand in the 17th century (Figure 1).



Figure 1. (a) Boen Tek Bio Temple; (b) Jami' Kalipisir Mosque; and (c) Benteng Heritage Museum

Source: (a) <http://jakarta.panduanwisata.id/files/2014/01/19-Wihara-Boen-Tek-Bio.jpg>; (b) <https://www.republika.co.id/berita/dunia-islam/islam-digest/18/02/12/p40zmb313-sejarah-pembangunan-masjid-kali-pasir>; (c) <http://abouttng.com/benteng-heritage-museum-peranakan-tionghoa-satu-satunya-di-indonesia/>, accessed on October 11, 2019

The environmental quality of the China Benteng area for a waste condition that is abundant in the traditional markets (Old Market) on Jalan Cilame there looks a lot of garbage. The merchandise rubbish results in clogged drainage canals can also cause pools of water and unpleasant odors. This is due to the landfill's unavailability around traditional markets. Meanwhile, the parking conditions in the China Benteng area are not well organized, China Benteng area is also a culinary tourism center that provides various types of food. Tangerang City is the forerunner of soy sauce products that are jet black in color and is now generally well known in the market. Soy sauce is not separated from the role of the ethnic Chinese (China Benteng) who settled in the city of Tangerang. One of them is Ketchup "Siong Hin" (Ketchup Benteng) which has existed since 1920.

3.2. Traditional Chinese architecture

According to David G. Khol [10] in his book writing characteristics of Chinese architecture in Southeast Asia are as follows; (a) courtyard; (b) open structural elements; (c) emphasis on the distinctive shape of the roof; and (d) the use of distinctive colors. The courtyards are open spaces inside Chinese houses (Figure 2). Open space also functions as a more private park [14]. Indonesian Chinese houses in China Benteng area rarely have a courtyard. Even if there is, it is more functioning to enter natural light during the day or just for ventilation. Generally, the courtyard in Chinese architecture in the China Benteng area is replaced by a fairly large terrace.

Open structural elements, sometimes accompanied by decorative ornaments. Chinese expertise in decorative crafts and wood construction is not in doubt. Wood carving and construction as part of the building structure can be seen as Chinese building characteristics (Figure 2). Constructive details such as roof support (tou kung), or confluence of columns and beams, even the roof truss is made so beautifully that it does not need to be covered, even opened without certain finishing, as part of skilled carpentry expertise. Chinese architecture is full of concepts and meanings, which can be developed to keep up with technology and building materials [15].



Figure 2. Courtyard and Structural Elements

Source: <https://nationalgeographic.grid.id/read/13300953/indonesia-rama-di-benteng-heritage?page=all>, accessed on October 11, 2019

On the shape of the roof of a house or Chinese tribal building, has a unique shape emphasis. The frame structure system is very appropriate for this kind of roof construction, to maintain strength, durability and building stability [16]. Among all forms of Chinese architectural roofs, there are only a few that are most widely used in the China Benteng area (Figure 3a). Among these are the type of saddle roof and bird tail wallet with an upward curved tip. The use of distinctive colors is very prominent in Chinese architecture in the China Benteng area (Figure 3b). Color in Chinese architecture has a symbolic meaning. Red and golden yellow are the most dominant colors used in Chinese architecture in Indonesia. The red color is widely used in interior decoration and is commonly used for pillar colors. Red is a symbol of the color of fire and blood, which is associated with prosperity and luck. Red is also a symbol of virtue, truth, and sincerity. The red color is also associated with the direction, namely the south, and something positive.



Figure 3. (a) Roof Shape and (b) Typical Color Usage
Source: google.com, Accessed on October 11, 2019

3.3. Fengshui and Chinese architecture

In the Chinese tradition, home construction procedures cannot be separated from *Fengshui*, for example looking at the aesthetic elements and building structures, room position, door direction, lights location, and so on. *Fengshui* in Mandarin means *feng* (wind) and *shui* means (water) is a symbol or expression of life sign. *Fengshui* is the art of living in harmony with nature. Thus one gets the most benefit, calm, and prosperity from the perfect balance with nature [17, 18]. *Fengshui* is very important in determining the building direction that is profitable so that it will get blessings and avoid disaster. A good and right application of *Fengshui* will certainly provide higher benefits for the residents [19], and by using *Fengshui* will produce the best design results in architecture, structure, and interior that can provide the best benefits for users [20]. For *Fengshui* analysis in this research conducted at Boen Tek Bio temple which is the oldest temple in Tangerang. The position of this temple is related to the Boen San Bio temple and the Boen Hay Bio temple. Based on *Fengshui*, the three temples (Boen San Bio - Boen Tech Bio - Boen Hay Bio) are connected by imaginary lines, forming a straight line that spans a distance of about 16 kilometers.

Ethnic Chinese always explore the buildings or houses location that is considered to have a good or bad influence on humans who live in the building or live in the vicinity. Some aspects that are often of concern are the mountains and the sea. Society founder Boen Tek Bio temple was very aware of the importance of the temple because apart from being a worship place, the temple also has a social function as a community gathered to resolve the problem. Based on this, the founders of the Boen Tek Bio temple should look for the ideal place according to the layout (*geomensi*) in accordance with *Fengshui* in Chinese culture.

Boen Tek Bio temple which is in the Old Market area of Tangerang, which is far from the mountains and the sea. In Chinese culture, the mountain is a source of water that drain the rivers; while the sea is a blessing because it is a collection of dragon veins. Thus, to get the figure of mountains and seas, a picture/image of mountains and seas were made. Boen San Bio temple symbolizes a mountain, and the Hay Boen Bio temple symbolizes the sea. Meanwhile, Boen Tek Bio temple symbolizes the dragon, and layout position Boen Tek Bio temple rests on a mountain and sea view. Boen Tek Bio temple has a great location and *Fengshui*, so that this temple was crowded today.

3.4. Potential of processed wood

Chinese traditional buildings, many use wood materials in its construction, as seen in Boen Tek Bio temple. The temple building rectangular in shape and sees the construction of the building is made of wood material. There are lots of carved wood on the ceiling of the building of this temple. Carved wood that are thought to be the ornament of the temple since 1800. The pillars of the temple are also made of teak wood material intact (rounded) in red and decorated with ornaments of wood (Figure 4).

The roof structure Boen Tek Bio temple building opposite curved (saddle type) that resemble birds wallet and made of wood material. On the inside of the roof structure using a system of beams and pillars frame structure is decorated with decorative ornaments. The decorative ornaments made of wood material. Meanwhile, the main sacred space, there are panels and decorative wood planks that read Chinese characters. At the front of the east, there is a round window that uses bamboo decoration.

The use of wood material in the Boen Tek Bio temple is commonly used on solid poles, panels, roof structures, and ornaments. If necessary renovation or replacement of the wooden material, of course, it's been hard to find solid wood with good quality, such as when construction of the Boen Tek Bio temple. Availability of solid wood from natural forests increasingly limited and scarce, thus, necessary raw materials from plantations. Generally, wood from plantation forests has a small diameter and is still considered low value, so it needs to be improved in quality.



Figure 4. Wooden Pole by Ornaments and Wood Panels

Source: <https://viriyaps.wordpress.com/tag/boen-tek-bio/>, Accessed on October 11, 2019

Nowadays, the development of technology-industrial wood through the wood processing industry has been quite advanced. The wood processing industry has been able to process small-diameter logs from plantations into processed products to meet human needs. The processing is undertaken to aim to produce a final product that has a design, structural strength, nature, and shape according to the needs or desires of the users of the processed wood [21]. Processed wood products from the wood processing industry can be in the form of plywood, laminated boards, particle boards, fibreboard, cement boards and other imitation boards. For building preservation needs, processed wood or engineering wood is commonly used as one of the building materials and can be considered if replacement of damaged wood material is needed in traditional Chinese buildings.

4. Conclusions

The China Benteng area has historic buildings, including the Boen Tek Bio Temple, the Jami' Kalipasir Mosque, and the Benteng Heritage Museum. The environmental quality of China Benteng area for the waste conditions that is abundant in the traditional markets (Old Market) on Jalan Cilame there looks a lot of garbage. This is due to the landfill's unavailability of around traditional markets.

Generally, a courtyard in Chinese architecture in the Cina Benteng serves to incorporate natural light or replaced by a terrace large enough. Structural elements that are exposed, sometimes accompanied by decorative ornaments, such as those found on roof supports or confluences between columns and beams. A widely used type of roof is gable and birds' wallets with the tip curved upward. The use of distinctive colors are also very prominent in Chinese architecture in the region, such as red and golden yellow.

Chinese people always reviewing the location of buildings or houses that are considered to provide a good or bad effect on the people who live in the building or living in surrounding areas through *Fengshui*. Some aspects are often a concern is the mountain and the sea, like the Boen Tek Bio temple.

The layout of the position of the Boen Tek Bio temple leaning on the mountain and looking at the sea. Boen Tek Bio temple has a great location and *Fengshui*, so that this temple was crowded today.

The use of wood material on Boen Tek Bio temple is generally used on poles, panels, roof structures, and ornaments are solid wood. If necessary renovation or replacement of the wooden material, of course, it's been hard to find solid wood with good quality, such as when the construction of the Boen Tek Bio temple. For building preservation needs, processed wood or engineering wood is commonly used as one of the building materials and can be considered if replacement of damaged wood material is needed in traditional Chinese buildings.

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