

Colour Characteristic of Architectural Buildings in Bandung City, Indonesia

Ainun Hasanah*, Bing Chang*,

* Urban and Rural Planning Department, Northeast Forestry University, Harbin, China

DOI: 10.29322/IJSRP.10.04.2020.p10026
<http://dx.doi.org/10.29322/IJSRP.10.04.2020.p10026>

Abstract- This paper tries to identify the colours of 30 architectural buildings that become icons and can represent the character of Bandung city. The architecture buildings are classified into 7 groups according to their functions, namely, worship places, museums, hotels, schools, banks, offices, and cultural-social activities. This research was conducted with literature studies, field investigations, and analysis using Photoshop software to obtain the colour of Bandung city, the factors that influence colour formation and composition, and the challenges faced concerning the colour of Bandung city.

Index Terms- architectural building, Bandung, city colour.

I. INTRODUCTION

Colour is one component in the identification of the character of an object or location. Colour is also an essential visual component related to the psychological needs of humans and their relationship with the surrounding environment [1]. Colour can give different meanings depending on geographical location, climate, country, and community (gender, age, culture, religion, etc.) [2].

Regarding the city, colour directly shows the character of the city and acts as a carrier of history, memory, and the direction of further city development [3]. Each city shows its unique style based on natural conditions, humans, and culture that develops in it. Increased urbanisation causes massive changes in natural conditions so that cities can lose their unique style. Also, the lack of understanding in the selection and application of colours in the city scale causes cities to lose their features and look similar to each other [4]. Therefore, the topic of city colour is significant in city development.

This paper tries to identify the colour characteristics of Bandung city that is influenced by various factor and to identify the city colour problem in Bandung so that it can be taken into consideration by the government of Bandung and other cities in Indonesia as a lesson learned.

II. CITY COLOUR

The colour of the city becomes a marker of identity that can create public perception, beautify the city, as a facility to combine human-made forms with the natural surroundings, and can be an attraction in the city. The colour of the city is divided into four levels, from the largest to the smallest, namely the city or district

level, road or square, individual buildings (units), and building details [5].

2.1 Influencing Factors of City Colour

The colour of the city is influenced by several factors that can be grouped into two major groups, namely, dominant factors, and recessive factors. Dominant factors are vegetation, climate, hydrology, and morphology, while those related to social aspects are recessive factors [6]. However, the dominant factor will fade over time due to the influence of a more significant recessive factor in the development of the city.

The use of colour is influenced by the relationship between colour and shape, natural and climatic conditions, and the perception of the community formed by the surrounding cultural identity [7]. The natural colour in the city becomes the core of the location's identity. As a carrier of history and culture, the replacement of traditional colours in the city is also a result of history and culture that is not preserving. The colour of the city must be in harmony with nature, the culture of the population, and the orientation of the city itself because the colour of the city is the way we share information about the city in the past, present, and future.

Therefore, it can be concluded that essential factors in shaping the colour as a character of the city are geography and climate, history and culture, and development of technology [8]. In terms of geography and climate, cities located in the tropics and sub-tropics certainly have a different character, as well as cities that are located in coastal areas and mountains. In historical and cultural contexts, cities that have different religious, ethnic and racial backgrounds also have different characters. Besides, cities that have experienced colonialism also have a different character from those who have never experienced the colonialism era. And finally, but no less significant is the influence of rapid technological developments that can support the production of materials related to the colouring of cities and supporting the distribution of building materials. If in the past, the limitations of tools and materials made urban development take place traditionally, but in the present, almost everything can be done in a modern and machine-assisted manner.

2.2 Environmental Colour

Environmental colour is a combination of natural and artificial colour in an area. The elements of environmental colour are colour of natural features that consist of vegetation, natural landscape, geographical location, weather, climate, and seasons; artificial colour (built form) consist of material colour, painting, building

façade colour, building functional use, and the variation or unification of artificial colour in urban area [9]. In the past, the development of the city was not as fast as in the present because of the limited material and supporting technology. This condition causes most buildings to use local materials that are easily found around the location so that it is made harmonious with the colour of the surrounding environment. The colours produced during this period are referred to as traditional colours or historical colours [10].

Environmental colour mapping can be done with digital technology to identify and document the natural colour character and artificial elements as the indicators of the character of a particular area. The use of digital technology can simplify the process of colour mapping because of the ability to obtain and process more visual information when compared to the Lenclos manual method. However, the use of digital technology can also be influenced by daily or seasonal weather conditions so that it can produce colour differences in different weather conditions [11]. What is needed in colour mapping using digital technology is digital cameras and Photoshop software.

2.3 Colour and Architecture Works

In architecture, colour is considered as a decorative element that serves to beautify architectural forms. In other words, the shape produced is the main part while the colour is the accessories. Colour in an architectural context is not only limited to the results of painting the surface of a building but also includes the natural colour of building materials. Colour can make an architectural building contrast with the surrounding environment and make building details stand out compared to other parts [12]. Colour in architecture is closely related to what architectural style is the design inspiration and at the location where the architectural building is built, as well as other influences related to the subject that plays a role in the design process, for example, the architect or designer background.

Colour has a role that can be divided into 3 points, namely colour dynamics, colour tectonics, and colour imagery. Colour dynamics play a role in the conceptual phase, namely the purpose of colours that can represent a dynamic relationship between the primary and decorative parts of architectural buildings, especially the use of colour contrast and juxtaposition. In the phase of form-making, the role of colours is known as colour tectonics, namely the role of colours to define, clarify, and express shapes. Also, the colour tectonics can add complexity to architectural design and be able to combine architectural forms with the background colour or environment. And in the final phase, the role of colour is called colour imagery, which is the role of colours related to culture, symbols, emotional responses and perceptions of architectural design results. In other words, colour imagery has a direct impact on the visual environment and many parties, so this role becomes the focus of attention [13].

The colour in architecture works can change over time due to weather conditions, solar intensity, pollution, quality of building materials, and building maintenance processes. In the process of maintenance and restoration of architectural buildings, colour changes often occur as a result of the original colours that are

replaced with other colours used to attract the attention of tourists and other reasons. Also, changes in the colour of architectural buildings in the area with different functions have different rates of change, for example, in the trade and settlements area [14]. However, changes occur to not only the colours of architectural buildings but also the natural colours of the surrounding environment. Therefore, chromatic stability and harmonisation of the colours of architectural works and the natural colour are needed, coupled with the ability to adapt to changes that occur.

III. METHOD

This study tries to investigate the colour characteristics of architectural buildings in Bandung city through literature and supporting documents review obtained from the local government. In addition, a field investigation was conducted to capture the photographs of architectural buildings that could represent the character of Bandung city. The selected buildings are managed by the local government, which have historical value, as well as being included in the cultural heritage buildings of Bandung city, and buildings that are personally owned are not included in the sample. Building photographs are taken during the daytime in the right weather conditions and use a camera to maintain colour accuracy. The data obtained were analyzed using Photoshop software.

IV. RESULT AND DISCUSSION

4.1 Formation Factors of Bandung City Colour

The colour formation of Bandung city in the scope of architectural buildings is influenced by many factors which can be described as follows:

1. Climate and Geographical Conditions

Bandung is an important city on the island of Java, Indonesia, which is included in a tropical climate. Bandung is located in the highlands and is at an altitude of 700 m above sea level, and the average temperature is 23.8 °C, lower than the temperature of other tropical cities. The natural Colour of Bandung city which is the background colour is divided into several parts, namely: (a) the colour of vegetation which tends not to change throughout the year because it only experiences two seasons (dry and rainy season) namely green for leaves and dark brown for the trunk, (b) colour rivers in the inland-city region which are brownish because Bandung is flowed by two large rivers namely Citarum and Cikapundung Rivers; and (c) the natural colour of the soil in the city of Bandung is a brownish yellow and grey as the typical alluvial soil as result of the eruption of the Tangkuban Perahu volcano which is located in the northern part of Bandung city.

2. History

Most important buildings in Bandung city were built during the colonial period as facilities that support the lives of European communities in Bandung, and Dutch architects designed the buildings. Therefore, the architectural styles and tastes of Europeans who became

dominant were attached to these buildings. Even the development planning advisor named Herman Thomas Karsten from the Netherlands helped develop the city of Bandung as a residential city for the European community [15]. Twenty-nine of the buildings studied were built between 1867-1974, another building was built in 2003 is an Arabic-style mosque. The architectural style of Bandung city buildings varies, such as indische style, neo-classic, modern colonial, western traditional, and so on. However, the majority of buildings in the city of Bandung are in the art deco architecture built in the 1920s. This architectural style became a popular decorative architectural style in the period between World War I and II [16]. A distinctive feature of the art deco architecture is that it displays a variety of unique decorations and emphasizes the modern style of the building [17]. Art deco architectural style uses bold colours with high contrast, for example, bright or vibrant colours combined with additional and ornament colours in black, silver, gold, deep yellow, grey, blue, red, green, etc. The use of colour in the art deco architectural style gives the impression of luxury and modernity. In general, the architectural style and colours applied to buildings in the city of Bandung are adapted to the climatic and geographical conditions of Bandung for the convenience of European society at that time. Efforts were being made to achieve comfort for the European community in Bandung by made buildings with wide and high roofs, installed canopies above doors and windows, made many ventilations, and light colours façade [18]. So that, Bandung city had earned the nickname as Europe in the tropics [19].

3. Social and Culture

Based on data from the Central Statistics Agency in 2018 [20], the city of Bandung is occupied by 92.26% of the Muslim population, 5.42% Christian, 2.24% Catholic, and the rest are Hindus. Especially in Muslim religious buildings, Arab culture tends to be influenced by Colours that give the impression of luxury such as greyish orange and gold on the dome of the mosque. Besides various religions, the city of Bandung is also inhabited by residents from different regions and tribes, but as a Sundanese land, the population of the city of Bandung is dominated by Sundanese. Sundanese traditional houses utilize materials available in nature as building materials, such as wood as the primary material and roofing material from palm fibre and leaves. Therefore the distinctive colour of the timber and withering leaves become the typical Colour of traditional Sundanese houses. In addition, conventional Sundanese people whose sources of livelihood are farming know five basic colours, namely red, white, black, yellow, and green, all of which are identified by the colour of plants and fruits. The Sundanese traditional clothes are grouped according to their position in the community, but in general, black is the basic colour with golden accessories.

4. Technology Development and Building Materials

The buildings that became the majority of the research samples were built during the Dutch colonial era when viewed from the use of technology and building materials; there were many influences from the colonial period. Technological developments in the early 20th century have enabled the production of colour industries that produce chemically cheap and varied colours. In addition, the development of modern architecture was characterised by flat roofs and white buildings in the colonial period, along with the development of concrete technology to support buildings construction [21]. So that, buildings that were built at that time used concrete and several buildings were also built with a combination of other materials, such as wood, natural stone, shingles and roof tiles made of clay. Decorative elements of buildings use fairly sophisticated techniques such as stone carvings of various shapes to create facade elements of high aesthetic value that support the applied architectural style. The use of materials such as concrete makes it easy to apply the desired colour, whereas for the use of wood, natural stone or roofing materials from clay material, it usually retains the natural colour of the material.

5. Government Policy

Bandung city government realises the legacy of the Dutch colonial era is part of the identity of the city of Bandung, which should be maintained. The efforts made by the government to preserve the authenticity of historical heritage buildings is to make regulations on the management of the cultural heritage area and buildings as a concrete step in protecting the historical heritage. In addition, the Bandung city government also plays an active role in the efforts of restoration, reconstruction dan revitalisation of cultural heritage buildings to make these buildings as similar as possible to the original conditions. However, specific and detailed rules and policies related to the use of colour are not regulated in the existing regulations, thus allowing inaccuracies in the use of colour in buildings in Bandung city.

4.2 Colour Characteristic of Bandung City Architectural Buildings

In identifying the colour of architectural buildings in the city of Bandung, the building is grouped according to function. Architectural buildings are divided into seven groups, namely buildings that function as places of worship, museums, hotels, schools, banks, offices, and socio-cultural activities.

4.2.1 Worship Place (W)

The buildings of worship place used as samples are the worship places of Muslims and Catholics. The mosque, located in the centre of Bandung, called the Great Mosque of Bandung, was completed in 2003, which has an Arabic architectural style and uses natural stone materials. The primary colour of the mosque building is greyish orange, with additional colours of dark moderate orange and detail colours of dark greyish-green. As for the church building is a historical heritage building by a Dutch architect built-in 1922. This church has a primary colour and

details that are similar to greyish blue with an additional colour of dark greyish cyan.

4.2.2 Museum (M)

There are six museum buildings surveyed with locations in downtown Bandung. The buildings were built between 1920 and 1974 which are included in historical heritage buildings. Four of the six buildings were constructed in the art deco architectural style designed by Dutch architects, while the other two were in the old and traditional style of West Java. The main colour of the buildings are light grey and one building has greyish orange as basic colour. While the additional colours tend to be darker mostly black and dark greyish orange. While detail colours and ornaments tend to vary, such as black, dark orange, greyish-yellow, and greyish-blue. The material used for the walls is concrete with some parts of the building using wood materials such as door frames and windows, while for the roof covering are clay tiles and shingles.

4.2.3 Hotel (H)

Hotel Preanger and Savoy Homann are hotels located in the centre of Bandung precisely on the Asian-African road. Both of these hotels are the result of a Dutch architect design with art deco architectural style and using concrete materials. The Preanger Hotel was built in 1929, while the Savoy Homann Hotel was built in 1880. The Preanger Hotel has main colour of white; additional colour is very dark greyish orange and light greyish-yellow detail. Whereas the Savoy Homann Hotel has the main colour of dark greyish orange, additional colour is white, and light greyish orange as ornament colour.

4.2.4 School (S)

School buildings in the city of Bandung that are sampled, namely Cicendo Special School, Junior High Schools 2 and 5 Bandung, and Senior High Schools 3 and 5 Bandung. These four buildings were built between 1920 and 1953, with a typical Dutch architectural style and combined with tropical climate conditions in Indonesia. These buildings had experienced some conversion functions until finally made as schools. The material used is concrete and wood as additional material, especially in the construction of roofs and door-window frames. The main colours of the building are dark greyish cyan to light greyish-blue and bright greyish-yellow. While the additional colours vary, such as dark orange, very soft blue, desaturated red, and dark greyish orange. The detail colours and ornaments tend to be very dark (mostly black) and dark greyish-blue.

4.2.5 Bank (B)

Some historical buildings by Dutch architects in Bandung city today functioned as banks. The buildings were built between 1899 and 1936 with the main building materials in the form of concrete and several wooden and clay roofed buildings. The colour composition as the main, additional, and ornament colours of buildings are described as follows: Bank BJB (dark greyish yellow-greyish blue-light greyish orange), Bank Mandiri ex. Trading Bank (greyish blue-very dark greyish red-very dark grey), Bank Mandiri ex. Exim Bank (greyish blue-very dark greyish red-dark greyish blue), Bank Indonesia (very light grey-very dark greyish yellow-moderate blue), and Bank OCBC NISP (De Vries) (light greyish red-very dark greyish orange- greyish orange).

4.2.6 Office (O)

Seven buildings in Bandung city functioned as offices and supporting government activities and community services which also became an icon of Bandung city. All of these buildings are heritage buildings of the Dutch colonial era which are witnesses of history that deserve to be cared for. Therefore, the Bandung city government makes these buildings as offices, to facilitate their maintenance and management. The buildings were built between 1867 and 1940, where the architectural style was influenced by the tastes of Dutch architects at that time, namely art deco style, modern dutch indies, indische empire and typical colonial style. The main colours used in these buildings are light grey to white. Additional colours tend to be darker, for example, dark greyish-yellow, dark greyish violet, dark greyish red, and dark greyish magenta. The detail colours and decoration also tend to be darker and more varied, such as very dark greyish lime green, greyish blue, very dark greyish orange, very dark greyish red, and very dark greyish-yellow.

4.2.7 Culture and Social (CS)

One effort to facilitate the maintenance of cultural heritage buildings that are assets of Bandung city is to make it a place for cultural and social activities. Four buildings are sampled in this study, namely De majestic, the National Gas Building, the Indonesian Menggugat Building, and the Paguyuban Pasundan Building. This historic building was built between 1907 and 1930, in the style of art deco architecture, European indische and western traditional works by Dutch architects. The basic colours of these buildings are very light to white, with additional colours that are very dark to mostly black, while the colour of the ornaments varies such as light greyish orange, dark greyish-yellow, dark greyish orange, and very dark desaturated cyan-lime green.

4.3 Buildings Colour Composition

The colour composition of 30 buildings used as samples in this study was divided into 3 parts, namely the main colour, additional colours, and detail/ornament colours. The main colour is the colour of the biggest area such as the colour of the building walls, while the additional colour is the colour of additional building elements with less coverage than the main colour. Detail/ornament colour is the colour with the smallest coverage in the composition of the building colours, which includes the colours of the building's additional elements.



Figure 1 : Buildings Colour Composition W1-B1

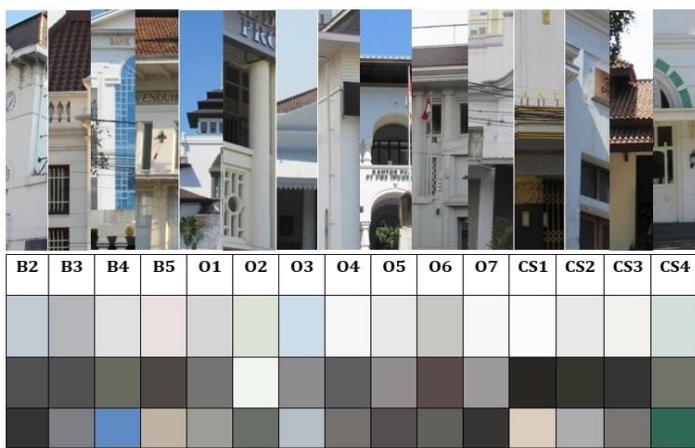


Figure 2 : Buildings Colour Composition B2-CS4

The naming of buildings in the colour composition table is given based on the category of building functions and the number of building samples analysed. For example, for the W code indicating the building is used as a worship place, W1 and W2 indicate that there are 2 buildings with the same function being analysed.

Many factors greatly influence colour analysis, namely lighting conditions, position when shooting, and the sensitivity of the software used. The colours shown in the results of this study are colours that are considered capable of representing colours with varying tones in a part of the building under review.

V. CONCLUSION

Based on the results of the analysis, it can be concluded that the formation of the colour character of Bandung city is influenced by several factors, namely climate and geographical conditions, history, social and culture, technological development and building materials, and government policies. However, the colour characteristics of the city of Bandung has mainly been passed on by the Dutch colonial era in its heritage buildings. Important architectural buildings that are icons of Bandung city are divided into several functions, namely as places of worship, museums, hotels, schools, banks, offices and social and cultural activities managed directly by the Bandung city government.

The colour of Bandung city architectural buildings is dominated by white and grey for the facade walls, while for the colours of the roofs, doors, windows, frames and other additional colours tend to be darker, namely light brown, dark brown to black. Detail colour for decoration and aesthetics is very diverse, namely gold, black, green, blue, yellow, dark grey, and so on.

The architectural buildings that are sampled in this study show that the colours that until now exist in these buildings are colours that have maintained their authenticity from time to time and show the unique colour character of tropical cities in the highlands that once passed through the colonial period. However, the challenges faced in maintaining the colour character of the city of Bandung include (1) inaccurate colour selection when restoring or reconstructing cultural heritage buildings, (2) additional attributes installed on buildings, such as billboards that do not pay attention to colour harmony, and (3) the use of material that has a colour that is not

in harmony with the colour of the building. These three challenges can cause visual chaos and colour pollution in Bandung city.

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AUTHORS

First Author – Ainun Hasanah, Urban and Rural Planning Department, Northeast Forestry University, Harbin, China.

Second Author – Bing Chang, Urban and Rural Planning Department, Northeast Forestry University, Harbin, China.

Correspondence Author – Ainun Hasanah,
ainunhasanah2013@yahoo.com, ainunhasanah@nefu.edu.cn.