

Environmental Graphic Design of Ecotourism Mangrove Surabaya as Efforts to Provide Information to Visitors

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Abstract—Pamurbaya area has a very good tourism potential, considering the area of mangrove conservation has a diverse wealthy flora and fauna, so it has the potential as an educational tour for the people of Surabaya. The mangrove conservation area has become a new tourist destination. The presence of tourists can give a positive and negative impact to existing biota. Sign system with the concept of ecogreen is a necessity as well as hope in directing and educating the community towards the sustainability of the conservation area of mangrove forest. Research Methodology used is qualitative approach. While the methods of collecting data are through interviews, observations, literature studies, and study competitors. Data analysis techniques include data reduction, data presentation and conclusions. This is followed by the exposure of design ideas, design alternatives, and design decisions. From the research results obtained key message "informative and green" with Airfly typeface. The colors used and corresponding to the key message include dark green (C: 79, M: 52, Y: 82, K: 66), the light green color (C: 81, M: 35, Y: 93, K: 27), and the light brown color (C: 23, M: 39, Y: 66, K: 0). While the basic form of EGD is designed in a form which can be interpreted as a tree. The dimension of EGD has a height of 180 cm and a width of 80 cm. The sign system has been designed to provide easiness and convenience for tourists in getting information.

Keywords: Mangrove conservation area, unfriendly signs system, EGD model

I. INTRODUCTION

Mangrove Wonorejo is a protected area which is located on the East Coast of Surabaya (Pamurbaya) and it extends from the coast of Kenjeran to the mouth of the Dadapan River. Dadapan River itself is adjacent to Sidoarjo city. East Coast Surabaya geographically has a coastal length of 26.5 km. Pamurbaya area has a land area of 2500 hectares functioning as a region of *Ruang Terbuka Hijau* (RTH) which is left and it is also as the last bastion protecting Surabaya from the threat of abrasion, sea water intrusion and decline in the ground surface. The rivers around this area, such as; Wonokromo River, Wonorejo River, Dadapan River and Keputih River are contributing to the sedimentation at the river estuary as well as of course the influence of the region's position on the sea. Where the area is located in the narrow area of Madura strait. The rivers themselves have a tilt 0-30 dengan pasang surut

1,67 metres. Pamurbaya area is located on 07 16' 03 " LS- 112 50' 31" BT, east coast of Surabaya is a fertile estuary area, breeding ground of various biota due to supply of nutrients that continually brought waves. The soil condition of this area is homogeneous (Sandyclay) with a root penetrating at about 90 cm. This condition is very suitable for the growth of mangroves, so that in sanamangrove encountered can grow well [1].

Based on data of Environment status of Surabaya area in 2011, Wonorejo mangrove ecosystem has a potential wealth with total area of 51.38 hectares. Mangrove Wonorejo has 15 Mangrove species, 7 primate species of primates, 83 bird species and 53 insect pecies of insects. Mangrove Wonorejo has the most complete mangrove species compared to mangrove areas in ASEAN even in the world [2].



Fig. 1. The Available Signs

With a complete wealthy flora and fauna, then Mangrove Wonorejo has a potential to become the center of education and conservation area of mangrove. Apart from traveling in the ecosystem forest and enjoying the atmosphere, visitors can also learn the various types of flora and fauna that extend from the entrance to the beach. Conventional information boards, appeals and vandalism restrictions and disposing of rubbish in public places are parts of the ecogreen tour.

Nowdays, the beauty and the eco-tourism forest become less comfortable due to the existing unfriendly signs which do not unite with the beautiful comfortably environment. Environment Graphic Design is a way to solve problems, so that information boards and signs can integrate with nature and have aesthetic value. Geographically and ecologically, Pamurbaya area has a very important function for. One of them is to prevent the threat of sea water intrusion. The existence of mangrove forests in Pamurbaya also has the

function of neutralizing waste, especially heavy metals which enter the sea.

As a form of providing information, environmental graphic design has a very important position in the development of an ecotourism. Besides, it can be useful to keep natural values and aesthetic values balanced. Therefore, the design of environmental graphic design is necessary in every ecotourism.

Formulation of the Problem

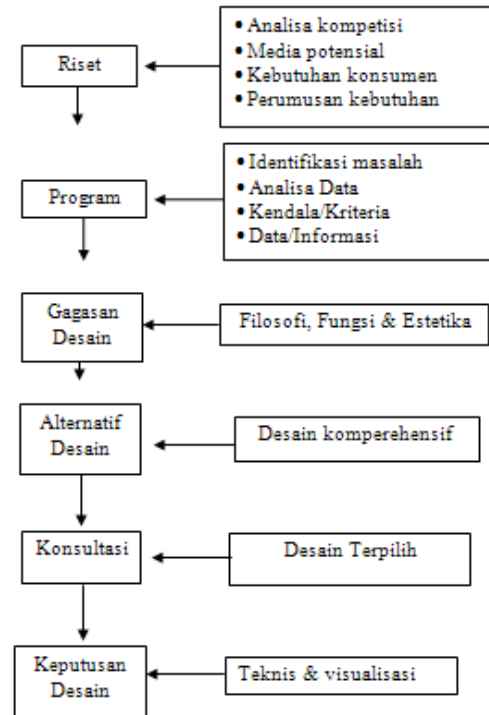
Referring to the above background, it can be described that the problem formulation in this study is how to design environmental graphic design eko tourism Mangrove Surabaya as an effort to provide information to visitors?

II. RESEARCH METHODOLOGY

This research methodology used is qualitative. This is because researchers want to get information in depth about the importance of the role of environmental graphic design in ecotourism. The informants were chosen purposively from the ecotourism and visitors. The results of the interview will be analyzed and directed to an environmental design graphic design.

Data collection was taken from interview with informant. The researcher interviewed three informants consisting of one manager from ecotourism Mangrove Surabaya and two visitors. Interviews are focused on knowledge of the importance of a design or a piece of information presented visually to visitors and about the ecotourism of the mangrove itself. Interviews with visitors are used to support researchers in complementing information of interest in the design of information which are available in Ecotourism Magrove Surabaya. Besides, researchers also made observations to find the data in depth about the background of the problem so as to form the mindset and behavior of informants. This research is equipped with supporting data that is bibliographically to strengthen the data generated in the field.

Data analysis technique is done by mapping the result of interview according to background and social condition of informant. Based on Miles and Huberman's data analysis techniques based on data reduction, data presentation and data verification or conclusion. From these results are expected to give birth to the concept of environmental graphic design design in accordance with segmentation, target, and positioning. These results will support the effectiveness of environmental graphic design as a means to inform ecotourism related information on mangroves.



Gambar 3.1 Prosedur Perancangan

Fig. 2. The Design Procedure

III. RESULTS AND DISCUSSION

A. Data Finding

This research uses qualitative approach in collecting data by using observation method, interview, literature study and competitor analysis. The data collected can be seen in the following explanation below.

1) Interview

Based on interviews conducted to Fatoni as the head of the Mangrove farmer group on the condition of mangrove forest, the information obtained is about the beginning of mangrove forest before being functioned as ecotourism, and support Pamurbaya ecosystem. This region was initially damaged by illegal logging, shipment from residents along the river, loss of biota and birds, and the threat of eroding coastlines entering deeper into the land (± 200 m). After experiencing the conservation of mangrove forests and opening mangrove forest area as ecotourism, other problems arise involving visitors. This problem involves the behavior of visitors littering the litter that adds to the natural damage caused by shipping waste along the stream.

Visitors do not appreciate the work of local people in rescuing the ecosystem. In addition, the direction board and instructions that there are even make the mangrove forest looks less comfortable to see. Visitors also lack of knowledge about the biota and the benefits of mangroves and others.

Interviews with visitors who do not want to be named informed that the garbage either shipment at the edge of the river flow and waste due to undisciplined visitors in throwing garbage, the smell of garbage smells sting, signs of information that looks uncomfortable seen and not merged with nature, there is no shelter, the ecotourism location is closed during the rainy season, the ecotourism guard is very limited, the absence of tour guides for the general public who visit individually, and the lack of shelter in the jogging track area.

2) Observation

Observations held in the ecotourism area of Wonorejo mangrove forest towards the natural environment of mangrove forest and visitor's behavior. The results of the observation include: The chaos of signs and information boards, no linking between the signs and the environment, the garbage with various types littered under mangrove trees, there are various types of birds and river biota, many mangrove trees are collapsed, information signs that disturb visitors, visitors feel uncomfortable with the presence of garbage, although there is a trash but visitors are still littering grabages at any places, there are mangrove planting activities by students, fishing activities by some people who do it routinely every day, some boats perched on the edge of the pier and the availability of canteen on the dock.

3) Literature Study

Based on data on the Environment Status of Surabaya City in 2011, the mangrove ecosystem in Wonorejo had a total area of 51.38 ha. From that area, mangrove conservation area suffered damage at about 14,006 ha or about 27%. Besides, the heavy metal content in the mud substrate at the bottom of the waters and biota on the East Coast of Surabaya have also exceeded the FAO / WHO thresholds who specify the accumulative and chronic heavy metals content for marine biota. Rubbish carried over the river also contributes to the destruction of mangrove forests in the east coast of Surabaya.



Fig. 3. Shenzhen Bay Checkpoint
source:<https://www.tripadvisor.com/LocationPhotoDirectLink-g297415-d2630813-i229518669->

In addition, mangrove forest serves as a coastal protector of abrasion and erosion, keeping the shoreline stable, treating

toxic waste, producing oxygen and absorbing CO₂, into a buffer zone of the ecosystem from infiltration of seawater into groundwater, holding the mud to in order to provide the possibility of building new land.

Conserved ecosystems provide possibility for breeding of marine biota and birds, fish, shellfish and crabs, as well as a natural habitat of various types of biota.

4) Competitor Study

Mangrove Ecological Park at *Shenzhen Bay Checkpoint* which is located in the west of Shenzhen, China (see figure 4). Signage Mangrove Shenzhen_Bay_Park-Shenzhen_Guangdong.html Ecological Park dominated by brown color and white color. Readability and legability fonts are pretty good. The design is pretty good, but less united with the environment. This can be understood by observing from the concept of signage used instead of green concept (friendly environment).

B. Data Analysis

Data analysis uses three stages which include data reduction, data presentation and conclusion.

1) Data Reduction

Data reduction aims to focus data and reduce data that is inconsistent with research objectives.

a) Interview

Based on interviews obtained data that support the purpose of the study include: the number of waste shipment or behavior of visitors who are not discipline, signs less information integrated with nature, visitors less gain knowledge about marine biota and mangrove.

b) Observation

From the results of observation and after data reduction, the data obtained include: Signs are less clear and impressed chaotic, no harmony between signs and nature, the presence of garbage that interfere with the visitors' comfortness.

c) Literature Study

Based on the literature study, the data collected are: river flow that brings the family waste which potentially destroys the natural beauty of mangrove forest, mangrove forest is potential to be a breeding ground for marine biota, birds, fish, shell and crab.

2) Data Presentation

From the results of data reduction, then the data is presented in the form of domains. Domain data includes: visitors are less informed as well as natural education of mangrove forests, garbage carried by the river as well as garbage tourists, signs of information that is less clear.

3) Conclusion

With some improvement from the side of the signs in the ecotourism area of Wonorejo mangrove forest and the problems found in the presentation of the above data, then the area can be developed as an alternative tourist attraction to

increase tourists interest. The beauty and mangrove forest as the mainstay ecotourism of Surabaya city government become the mainstay in satisfying and providing comfort to the tourists.

C. Creative Brief

1) Issues

Mangrove Wonorejo is a protected area located on the East Coast of Surabaya (Pamurbaya) and stretches from the coast of Kenjeran to the mouth of the Dadapan River. Wonorejo mangrove forest area of Surabaya is developed as an alternative tourism object to attract tourists with different nuance in the middle of dense urban life. However, the beauty and eco-tourism forest become less comfortable with the following problems:

- Lots of garbages
- Information signs (*signage dan wayfinding*)
- Sign (*signage dan wayfinding*) are not clear
- Visitors get less information about ecotourism

2) Objective

Environmental Graphic Design is a way to solve problems, so that information boards and signs can align with nature and have aesthetic value.

3) Consumer Insight

The needs of tourists who visit the ecotourism mangrove Wonorejo, can enjoy nature with comfortable and affordable natural trip (price and location)

4) Consumer Benefit

Tourists can get information related to Mangrove forest tourism

5) Target Audience:

a) Demographic

Social Economics Status (SES):
 SES B : 2.000.001 – 3.000.000
 SES C : 1.000.001 – 2.000.000
 SES D : 700.001 – 1.000.000
 Age: 15-30
 Teenage, adult, family

b) Psychographic

They live in urban areas and in general, people who want to travel nearby to unwind or release the stress after working or doing other activities.

6) Tone and Manner

Informative, persuasive, factual, natural

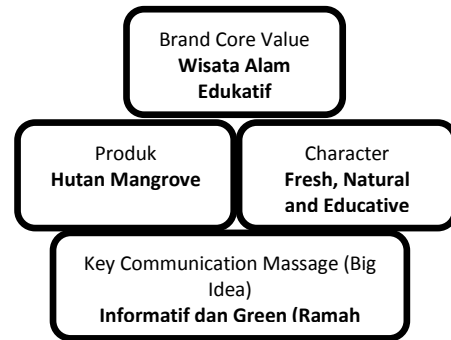
7) Desire Response

Providing the right information so that visitors can enjoy useful educational tours. Use of materials that are friendly environment and align with nature.

8) Key Message

From the findings of the data obtained in the field either through observation, interview, literature study, and after searching the key message (see Figure 4), then it is obtained the key message "Informative and Green (Environment Friendly)". A friendly Environmental not only saves the environment, but also makes life healthier and more comfortable [3].

This concept is used to create the design of the signs in the mangrove Wonorejo, so the signs that will be created more informative and more friendly to the environment.



Source: Result of researcher (2017)

Fig. 4. Key Message

D. Creative Strategy

Based on the key message "Informative and Green", the message translated as a friendly informative environment, the creative strategies of each element include: typography, color.

1) Typography

The selection and determination strategy of the typeface is based on the selected key message. From the results of selection and search through literature study found Airfly font (see figure 5)



Fig. 5. Typeface Airfly

Source: <https://freedesignresources.net/airfly-typeface-free-demo/>

2) Color

Color has a psychological role to the visitor. The right color composition will give a strong impression and character to the environment in which the colors are applied [4] The concept of green is always associated with back to nature [5] According to Jacci Howard Bear [6], green is a symbolic color of foliage and forest, so it has the meaning of renewal, growth, balance, harmony, and environment. Accoding to Anda

Rahayu RetnoWulan also states that the green color has a psychological meaning of natural beauty, freshness, purity, eternity and a new life which is included in pastel colors (see figure 6). The pastel color leads to a light color of a bright color. The green color with white color combination will produce a lighter color and look brighter. Pastel colors give a comfort to visitors.

Color selection is based on natural tone and manner. Nature is represented by those colors. The dark green color (C: 79, M: 52, Y: 82, K: 66) is used as the base color of the sign board. the light green color (C: 81, M: 35, Y: 93, K: 27), is used as the base color for sebagai the basic colors of tourist attractions and icons. The lightest green color (C: 78, M: 22, Y: 96, K: 11), is used as the leaf color and the light brown color (C: 23, M: 39, Y: 66, K: 0), is used as the mangrove iconic wood color

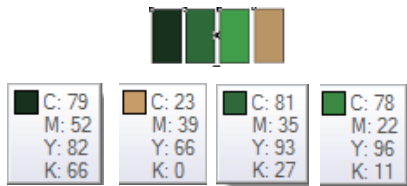


Fig. 6. Chosen Color dan CMYK Percentage

3) *Material*

The material chosen is in the form of acrylic plastic as the main material and finishing. Acrylic plastic material has a lighter weight than other materials, the transport process is easier. In addition. it is more robust and stronger and has a longer age. This material is used for all sign systems, ranging from sign system location area, sign system entrance, sign system toilet, sign system exit, sign system on street lighting and others.

E. *Communication Strategy*

The selection of information and visual placement in the overall design affects to the target audience's response. Communication strategy is based on tone and manner and desire response. Tone and manner chosen are informative, persuasive, factual and natural. While the desire response from the creative brief gives clues, that a proper inormasi expected visitors can enjoy educational tours and take advantage.

F. *EGD Implementation*

Based on the creative briefs and creative strategies that have been compiled, then the implementation of EGD Ecowisata Mangrove Wonorejo was prepared. Informative is visualized by the size of sign system that has high readybility and legibility. The basic form of EGD design has the meaning of a tree, so it is expected to blend with nature



Fig. 7. Icon-forming elements

1) *Icon Sketch*

From the findings of the data through interviews and observations and literature studies, drawing up the design of icons based on leaf, fruit, and root elements.

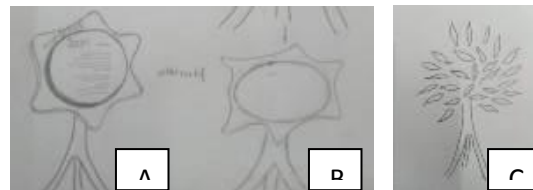


Fig. 8. Alternative Icon Result

Through a simple survey conducted by showing to fellow researchers and lecturers, the more representative icon is an alternative icon C. Selected icons will be applied in all Sign Systems that relate to Wonorejo mangrove ecotourism. Sign System that will use the selected icon, include: Dock Page Area, Tour Type, Tour Area Location, Lighting Light, Entrance gate, Exit gate. While other sign system, such as information on the type of mangrove, or animals that inhabit the mangrove area to stay adjust the design. All sign systems use a dark green base color ((C: 79, M: 52, Y: 82, K: 66).

2) *Dock Yard Sign System*

All sign systems (except sign systems on street lights) have a form of freestanding with pylon type (monolith). Sign system on street light using freestanding with lollipop type. The Sign System dock yard is located around the location where boats are ready to take visitors to the Wonorejo mangrove ecotourism site. This sign system form can be seen in Figure 10, with a height of approximately 180 cm with a width of approximately 80 cm made of acrylic plastic material.



Fig. 9. Dock Yard Sign System

3) *Tour Type Sign System*

Types of tourism in the ecosystems in the mangrove forest Wonorejo has three types of tourism, which include: fishing area, jogging trackhutan mangrove and boat trip to mangrove gasebo at the edge of the coastline. This sign system is placed between boat ticket location with jogging track area.



Fig. 10. Sign system of Tour Type

is also used as a campaign media starting from the intersection of MERR Jl.Soekarno Hatta to the location of Ecotourism Mangrove Wonorejo. With the installation of directional signboards on street lights, it becomes an informative tool for visitors.



Fig.12. Street Light Sign System

4) *Sign System of Facilities and Infrastructure eco-tourism*

Sign system of facilities and infrastructure Mangrove Ecotourism Wonorejo are placed in the visitor arrival area. With an approximate height 180 cm and a width of 100 cm, it will provide comfortness towards visitors in getting information, even from a considerable distance. The dimension of the system sign of ecotourism facilities and infrastructure is different from the dimensions of the sign system of the dock yard and the sign of the type of tourism system.



Fig. 11. Sign System of Facilities and Infrastructure eco-tourism

6) *Entrance Gate Sign System*

From the ticketing area to the jogging track which is also used as the location of Wonorejo mangrove natural education, there are two roads that direct toward the ponds and the other toward jogging track area. Although it has been already distinguished by the road conditions that paving blocks, but the entrance gate is still less informative. With the dimension of height 180 cm and width 80 cm, sign entrance system



Fig. 13. Entrance Gate Sign

5) *Street Light Sign System*

The design of sign system design towards the location of ecotourism mangrove Wonorejo using zone mounting overhead zone (above eye zone). Installation of sign system at the height above 4 m on street lights. Sign system is placed towards the location of ecotourism mangrove Wonorejo which

7) *Exit Gate Sign System*

The Exit Gate Sign system has the same design as the Entrance Gate Sign system design. The same design gives easiness and convenience to the visitor when going out from the location by looking at the sign-out door system from a considerable distance. Exit Sign System signature offered can be seen in Figure 15. This sign system has dimensions with a height of 180 cm and width of 80 cm



Fig. 1. Exit Gate Sign System

CONCLUSION AND SUGGESTION

A. Conclusion

From the results and discussion that has been done, it can be concluded:

1. Concept finding is based on the key message in the form of "Informative and Green"
2. Typeface Airfly has a green concept.
3. The designed sign system educate people, especially visitors of Ecotourism Mangrove Wonorejo
4. *The available Sign system* provides easiness for the people in getting the information
5. The basic shape design of EGD has a tree interpretation.

B. Suggestion

From the results of this study, researcher suggests the development of research in terms of:

1. Development of sign system design on boat media and ecotourism area in Wonorejo mangrove gaseboo
2. Hold the same research with different ecotourism objects like in Anyar Wonorejo Tourism
3. Can be developed into EGD with infographic concept

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