

Advances in Science, Technology & Innovation  
IEREK Interdisciplinary Series for Sustainable Development

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Juan Gabriel González Morales · Muhammad Nawaz Tunio ·  
Fabio Humberto Sepúlveda Murillo · Marina Checa Olivas ·  
Ayman M. Zakaria Eraqi *Editors*

# Sustainability in Creative Industries

Integrating Design, Culture, and Urban Solutions—  
Volume 2

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# Advances in Science, Technology & Innovation

## IEREK Interdisciplinary Series for Sustainable Development

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# Sustainability in Creative Industries

Integrating Design, Culture, and Urban  
Solutions—Volume 2

A Culmination of Selected Research Papers from the  
International Conference on Sustainability in Creative  
Industries (SCI), Universitas Ciputra 2022

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*The Editors warmly thank all the Reviewers who have contributed their authority to the double-blind review process, to ensure the quality of this publication.*

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## Introduction

At the crossroads between creativity and sustainability, sustainability in creative industries emerges as an understanding and convergence of creative innovation and environmental responsibility. This book seeks to represent the understanding and promotion of sustainability in a diversity of creative fields, from architecture to cultural heritage preservation, and from urban planning to human-centred solutions. In a world where resources management and environmental protection are prevailing challenges, this book is positioned as an essential compendium for those seeking to merge creative potential with environmental responsibility.

We will explore sustainable architecture in depth, where vision and practice combine to shape a more sustainable future. From materials committed to environmental quality to design systems and materials committed to buildable development, this segment not only presents concrete solutions, but also raises provocative questions about how architecture can lead the way to a more sustainable world.

The preservation of cultural heritage is seen as a connection to sustainability in the second part of the book. In this part, innovative practices and approaches are examined that allow industries to move forward with a strong innovative character while protecting the cultural legacy of past generations. Starting with the conservation and revitalisation of historic spaces, this segment unfolds a comprehensive view of how architectural creativity can ensure cultural preservation in the context of an increasingly socially and environmentally responsible world.

The third and final part brings the focus to the city, the epicentre of modern life. Here, it unpacks the complexities of urban planning and how creativity can help transform the design of urban spaces to maximize sustainability and quality of life. From disruptive technologies to human-centred approaches, this segment presents a bold vision of how the cities of the future can be engines of sustainable progress and collective well-being.

Sustainability in creative industries is a book based on the convergence of imagination and social and environmental responsibility. Through the book, it seeks to inspire innovation in architects, urban planners, and all those committed to a sustainable future and to driving creative innovation forward, grounded in social, equitable, and resilient engagement.

Juan Gabriel González Morales

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# **Creative Designs for Sustainable Architecture**



# Biomimetic as a Concept of Construction Small-Scale Building to Achieve SDGs in Indonesia

I. Z. Budiono, A. Farida, R. H. Abdulhadi, A. D. Syafii, and L. N. Amira

## Abstract

Sustainability has been an important matter recently since there are many energy crises everywhere including in Indonesia. The sustainability development goal (SDGs), agreement created by several countries, is a standard to achieve sustainable green building. Bandung city area also has an agenda to develop an urban area with SDGs as the basic requirement. Biomimetic architecture as a branch of science that is multidisciplinary to achieve the target by learning the environment, inspiring and imitating models and processes from nature for human life better, is one of the suggestions to solve this problem. Within this study, the research team chose the object of the Bandung Techno Park building since this building had a philosophical concept called *when technology meets nature*. The method we are going to use is called the basic qualitative exploration method, where we are going to visit the object field and conduct the analysis of the passive circulation air and how the light penetrates within a building as a part of achieving thermal comfort based on the biomimetic concept. Finally, we are going to create a review report of Bandung Techno Park which hopefully can be used as a guideline for other small working space building with environmental connections and reduce the impact of global warming in the future.

## Keywords

Biomimetic concept • Bandung Techno Park • Sustainability

## 1 Introduction

Sustainability has been an important matter recently since there are many energy crises everywhere, including in Indonesia. The sustainable development goal, created by several countries, has the plan to achieve sustainable green building. This SDG plan is used as particular guidance for many scholars, developers, and architects. Indonesia also has many private communities to present the importance of SDGs including the green building of Council Indonesia. According to guidelines for buildings based on the Green-ship of GCBI, the building is the creation of architects and other planners who adapt to the needs of users in their activities and use materials for building construction that come from the surrounding environment. In Bandung, the local government has an agenda to organize its development in line with the sustainable development goals (SDGs). This agenda can be seen from the arrangement of infrastructure in urban areas and the renovation of public buildings that harmonize with the sustainability program.

Nature has its regulation that follows a form and function. This design creates its own thermoregulation and energy production to sustain itself. This principle is a good example to be imitated in many fields including architecture. Therefore, based on the biomimetic concept for architecture and design, biomimetic is a phrase that means learning from natural principles to create a product for humankind with technology to optimize the process (Pohl, 2015). Then according to the Association of German Engineers, biomimetics itself has a classification to be fulfilled, which needs a natural environment as the source, then creating a hypothesis from the source, and finally transferring the idea into the object of the product we create. The method biomimetic has various approaches, yet the pool research approach is the most suitable for any kind of architectural project. Within this approach, biology is not only used as a source of knowledge, but it is put in many stages of design and combined with technology development, material, and

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markets of people; the result of this approach is unidirectional custom design.

Living organisms always try to maintain steady conditions by having a system called thermoregulation, which gains heat from solar gain during the day and sends out heat during the night. There are many options, for example, mammals using fur or using their metabolism to keep out cold. And then there are Termite mounds, one of the plant kingdoms, which can keep their temperature steady during hot and cold weather. This example of the termite mounds idea is used for many buildings to save more energy by using an air circulation system and sun penetration to achieve thermoregulation.

Bandung Techno Park is a place for young entrepreneurs to develop products resulting from innovation and research in order to compete in the industry 4.0 era, and based on the statement from the Ministry of Industry, he hopes that BTP can be a strategic location for a collection of young entrepreneurs in developing digital industry entrepreneurial ideas. So based on the vision and mission mentioned earlier, Bandung Techno Park took its design inspiration from Silicon Valley, which is a technology development center located in California. The principal architect himself designed Bandung Techno Park as an area consisting of 11 building masses with one building being the center of knowledge. In this study, the research team will focus to review the main building shaped like an ellipse and towering upwards like a transmitting tower.

## 2 Research Method

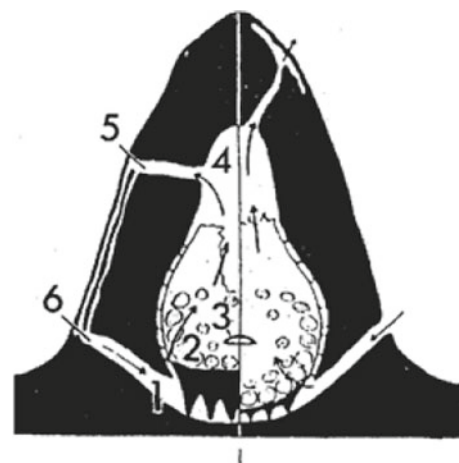
In this independent basic research, the research team is using a qualitative basic exploration method, where this research will be the preliminary of exploration depth information through many related works of literature, the result obtained will be the perfect path for sustainable design development (Trislianto, 2019). The flow of data collection is starting with getting some information from Bandung Techno Park itself, from interviewing all the staff members, investigating the location of the openings, and then measuring the area. After that, the team then compare many works of literature such as biomimetic theory, thermal comfort for the tropical country, and guidelines to create a sustainable building for working activity. The final report produced is in the form of a written description of the results of object observations.

## 3 Research Discussion

Termite mounds are one of the examples of biomimetic concept has tried to imitate since it has adaptive insulation to control the temperature inside (Pawlyn, 2016). They get sun

radiation from the top of the wall which is shaped like a chimney. The shape of the termite mound itself is elongated from north to south with the west to east being flat. For air movement, cool air will enter from the lower ducting and flow into several rooms, then when the air has warmed up, which has been mixed with the metabolism of living things will rise to the top (Fig. 1). In terms of the airflow system and light penetration, this is sufficient to achieve thermal comfort in the interior, but unfortunately, because the walls are naturally formed, it is feared that this is not as strong as concrete which has been tested from the density of the material. However, scientists have confirmed from the results of the research undertaken, the interior can stand constant at 31 Celsius with outside temperature conditions that have fluctuated according to the current season building as a place for human activity, it is necessary to have comfortable environmental conditions in order to achieve maximum productivity. Some external disturbances, such as unpredictable weather conditions and bad climate, are the main reasons for utilizing system engineering to reduce these disturbances (Sugini, 2014). Several buildings in hot climates have taken inspiration from the termite mound system, the most significant example being the large office building in Zimbabwe designed by Mike Pearce.

The city of Harare in Zimbabwe is having hot tropical climate all year round and yet enjoys little subtropical conditions since it lies on a high average elevation. Therefore, the need for high insulation material to store heat or cool temperatures, and ventilation for summer is highly necessary. The Eastgate office building in the city of Harare is using a stack effect system of ventilation based on termite mound principles. The stack effect system itself is a circulation that moves from the bottom to the top of a building based on buoyancy driving force for air movement (Latifah, 2015). According to this principle, the air movement during



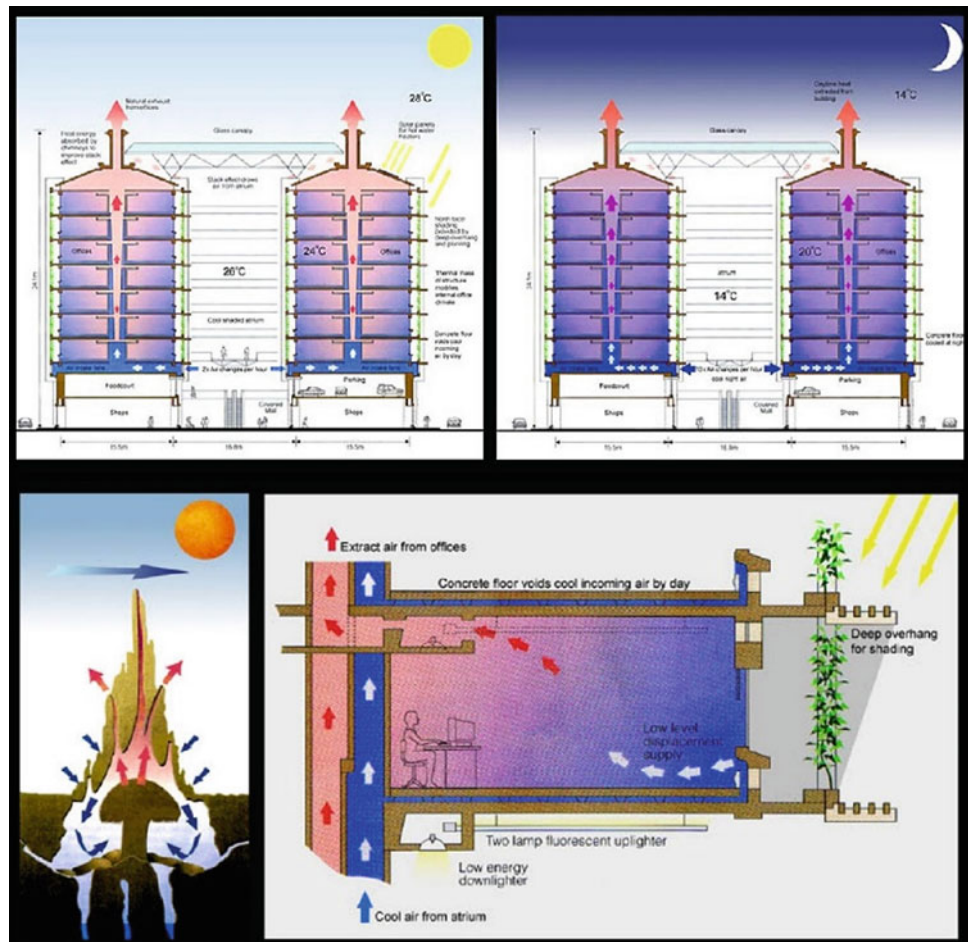
**Fig. 1** Air flow circulation in termite mound. *Source* Biomimetics for architecture

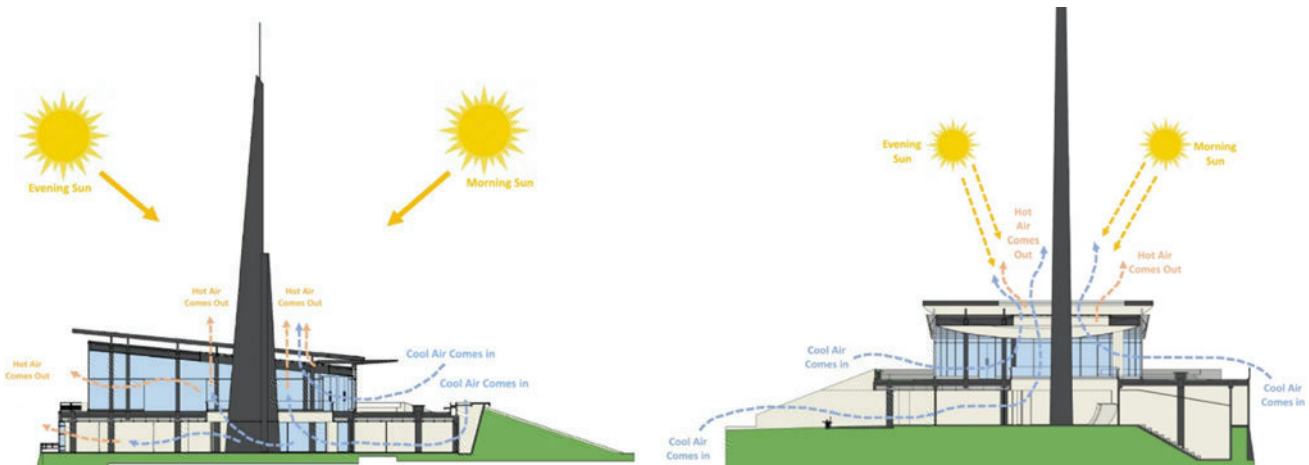
daytime is coming from the bottom which is already being cooldown by outdoor vertical vegetation, and it is helped by fans to circulate faster then when it is getting heated, it is passively moved through 48 chimneys on the top of the building. The building was also made of clay and concrete, which helped to store cool temperature from night time then release to the rooms mixing with daytime cool air. Thus, this air circulation and heating storage system is succeeding on help to achieve thermal comfort for occupants inside the building (Fig. 2).

Bandung Techno Park is located in the Telkom University area, Bandung district, which was built based on the dream of the ministry of research and technology to develop an ecosystem and research culture. The main building has a modern contemporary shape with a high tower in the middle as a symbol of hope for inventors in the technology field. Yose Ferdian Diamury, the architect of BTP, is also trying to create the BTP building as a research area for young inventors with a green design concept, in which the facade and roof are covered by vegetation, and in the middle of the area, there is an artificial lake that can function as a decrease in temperature by nature.

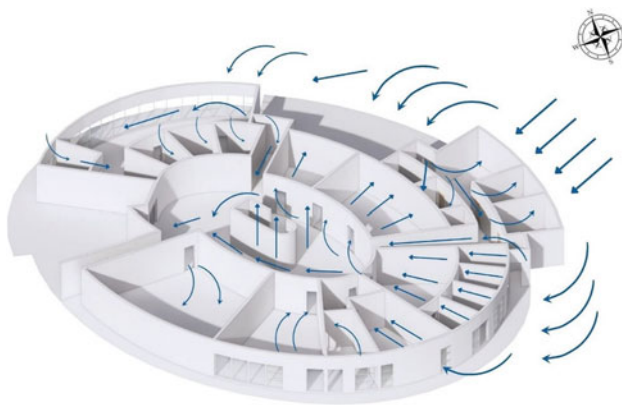
The main building of Bandung Techno Park area, as previously mentioned, has a tilted ellipse shape and is equipped with a tower in the middle of the building. Currently, there are two main doors, which for visitors is on the second floor facing southwest, and on the first floor on the east side is the entrance for employees. On the first floor, the right side of the building is covered by a concrete wall overgrown with grass and other vegetation. On the left side to the back of the building (northwest side), it is surrounded by transparent glass, and in the middle of the window, there is an opening that serves as access for fresh air to enter the room. Then, to lower the temperature and additional beauty of the scenery, on the left side to the back side, there are various types of vegetation ranging from small plants to trees and ending with an artificial lake. On the other hand, on the second floor which is also used as an exhibition area, the area is open and not covered by partitions and has view access to the environment around the building and is only limited by transparent glass. For access to air exchange, there are openings at every 1.5 m with a height of 1 m, as well as lattice openings at the top nearby to the ceiling.

**Fig. 2** Air circulation simulation at Eastgate. Source <https://www.mickpearce.com/Eastgate.html>





**Fig. 3** Air flow circulation from first floor to the second floor of building. *Source* personal sketch



**Fig. 4** Air coming from east side of the building. *Source* personal sketch

Based on *windfinder.com* information, the source of air entering the building comes from the east side and then enters from the first floor followed by cooling from the surrounding vegetation and artificial lakes, and then, the air rotates in the work area on the east and southwest sides and finally gathers at middle area (Fig. 3). Based on Bernoulli's law, air uses kinetic energy will move from high pressure to low pressure; therefore, air that rotates in the area on the first floor will move toward the second floor, rotate in the exhibition area, and finally be released outside the building (Fig. 4).

According to termite mound principle, to create a successful solar—air circulation, the position of the building needs to adapt to surrounding topographical conditions, and local microclimate will be the measure of success in thermal comfort condition. In the main building of BTP itself, there are several deficiency which causes several problems that need special attention by designers. From the east to south position, there is a second layer of the building which is

made from concrete, it prevents the flow of air and light penetration, and thus, several areas in the east tend to be humid and require artificial lighting throughout the day (Fig. 3). However, on the south side until north side from the left side of the building, it can be said that it has met the standard termite mound concept, especially by using transparent glass with openings and surrounded by vegetation so as to allow air exchange, although it is less significant because it is not in the position of air arrival (Fig. 3).

## 4 Conclusion

The city of Bandung is one of the important cities in Indonesia, based on the importance of the sustainable development goals plan. The government itself already tries to manage the city and present it in many sectors in order to understand the value of SDGs. Yet, even though this plan is important, in reality, it is difficult to be conducted since society is already comfortable with the conventional one. There are many approaches that architects use in their projects. The biomimetic method is one of the steps that borrows adaptive technology from the surrounding environment to achieve thermal comfort is one of the main problems faced by humans in general; therefore, this method is considered to be a solution for the construction of public space buildings with low energy concepts. BTP itself as one of the building centers of innovation has the vision to apply the concept of green design. This can be seen from the design of the building which adopts the sustainability design guidelines for public buildings. But unfortunately, there are some obstacles caused by several factors and returning to additional energy for air conditioning and lighting. From the shape of the building, which is elliptical and similar to a cone shape, as well as topographical conditions surrounded

by vegetation and artificial lakes, it is possible to optimize the biomimetic method so that thermal comfort conditions can be achieved by using passive energy. In addition, with the change from the Covid pandemic to an endemic era in the future, building management experts in collaboration with interior design research teams plan to continue working together to achieve sustainability goals as previously planned.

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# Green Tasting: Architectural Installations on Sustainability

Fernisia Richtia Winnerdy and S. T. Adetania Pramanik

## Abstract

The concern about the climate crisis has risen among Indonesian architects. In the first semester of 2022 in Jakarta alone, there had been at least four installations that architects used to promote the importance of sustainability. They were: (1) Melting Iceberg, by Arkitekton 5, (2) *Noto Wastu*, by monokroma architect, (3) Prolonged Aorta, by Studio Aliri, and (4) Under Our Hill, by Atelier Larasati. However, on the surface level, the temporality of installations and the idea of sustainability they brought seemed contradictory. This paper does not intend to measure or compare the degree of communication effectiveness between the installations. Instead, it aims to find out how architecture installation, which is temporary and thus seemed not sustainable, can be used to represent the idea they bring, which is sustainability. Using a narratological perspective, this research first delineated how installation was effectively used as a storytelling device; it had the characteristics to show and tell, as well as to allow people to experience the message it intended to communicate. Second, through written interviews with the architects, this research examined: the installations' context (1), the tools they used to show and tell (2), and to allow the exhibition visitors to experience the message regarding sustainability that the installations aim to convey (3), the installations' post-exhibition status (4), and the architects' reflection on their installations (5). By highlighting these installations, we hope to inspire more sustainable installations in the future.

## Keywords

Installation • Storytelling • Representation • Sustainable materials • Narratology

## 1 Background Story: Architect and Sustainable Architecture

According to World Green Building Council or World GBC (2022), Global Status Report 2022 has informed that the architecture and construction industry accounts for almost 40% of global carbon emissions per year. This situation has led many players in the industries to take action. In Indonesia, the Green Building Council Indonesia is participating in WorldGBC's global vision to achieve decarbonization by 2050 through the GREENSHIP Net Zero Healthy certification (GBC Indonesia, n.d.). However, with only a double-digit green building certification that has been awarded in the past decade (Pahnael et al., 2020), ongoing projects in the country have shown only slow progress in pursuing sustainable architecture. This implies, being market-driven at the moment, architecture becomes the product of a culture.

Luckily, throughout history, architecture has proved its capability to also be the shaper of culture. For example, with the advancement of the steel and glass industry, Joseph Paxton, although not an architect, was able to create Crystal Palace, a space for many countries in the world are able to exchange ideas regarding industrial works (Domus, 2020). Later in 1932, exhibitions curated by Henry-Russell Hitchcock and Phillip Johnson in Museum of Modern Art (MoMA) succeeded in promoting the idea of International Style (MoMA, n.d.), resulting in many modern buildings that fill up cities around the world today. Evenmore, with the help of magazines, books, and now the Internet, even the Barcelona Pavilion of Mies Van Der Rohe which was once built in 1929–1930 only for the International Exposition in Barcelona, was able to be rebuilt in 1983 and still inspires architects (Hill, 2001). These examples demonstrate how architectural exhibitions are able to change the public's way of thinking and therefore culture.

Coming back to the issue of sustainability, how can an architectural exhibition raise people's awareness of this

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issue, while the exhibition itself is always temporary? This paper will use the lens of narratology to answer that question. First, through literature study, we will shed light on the mechanism of idea dissemination; it will show how through the perspective of narratology, an architectural installation can transfer the message it brings to its audience.

Next, the second part of the paper is the case study. Among many architecture installation exhibitions held in Jakarta in the first half of the year 2022, there were five architects that raised the topic of sustainability through their installations, four of which were able to share their data and key learnings for this research. Through written interviews, we aim to study how each of the four installations communicated their message about sustainability to the public. In the end, we will discuss what the architects learned throughout the process and conclude several strategies that can be taken into consideration when designing a successful architectural installation on sustainability.

## 2 Literature Review: The Mechanism of Idea Dissemination in Architectural Installation

From a narratological perspective (Bal, 1997), the mechanism of idea dissemination involves two layers of communication: (1) the diegesis layer, which pertains to aspects inside the narrative, is responsible for showing and telling the message to the audience; (2) the extra-diegesis layer, which pertains to aspects outside the narrative, is the layer of the media that is experienced by the audience through their bodily engagement. Some examples of the media are architectural drawings and books (Winnerdy & Kurniawan, 2020), comics (Winnerdy, 2016), theater performances (Winnerdy, et al., 2020), exhibitions, etc. Below is a brief example of how the mechanism works in one of the three historical exhibitions mentioned earlier in this paper.

In 1932, Henry-Russell Hitchcock and Phillip Johnson curated an exhibition titled “Modern architecture: International Exhibition” in the MoMA (Fig. 1). The exhibition intended to underline a style of modern architecture called the International Style by communicating ideas and works of architects in Europe (predominantly Germany and France) in the 1920s and 1930s through the two layers. Through diegesis layer, it used models, drawings, and publications. Through the extra-diegesis layer, it used the ambience created by the room that hosted the exhibition itself; it is plain, unadorned architecture of rectilinear forms built of steel, reinforced concrete, and glass. The ambience of the same room was different when it hosted another exhibition held in the same year titled “American Painting & Sculpture, 1862–1932” (Fig. 2).

From the figures, it is clear that although “Modern architecture: International Exhibition” and “American



**Fig. 1** “Modern architecture: international exhibition” *Source* MoMA, n.d



**Fig. 2** “American painting & sculpture, 1862–1932”. *Source* MoMA, n.d

Painting & Sculpture, 1862–1932” exhibited drawings/paintings (and models), the space that hosted them emanated different feelings. It is clear that when an exhibition tries to deliver a certain message, the message can be conveyed through not only the show and tell tools, which are drawings, paintings, models, and text, but also through the way the exhibition is mediated for the visitors to experience.

## 3 Case Studies

Data gathering in this case study was done through a written interview (questionnaire) with the four architects of the installations. They were asked to first give an elaboration on the context that allowed each installation to be built. It included the basic information of the project such as the background and the intention, the people/parties involved,

the location, and the time where the installation took place, etc. The purpose of this first part was to identify each project and to set the limitations in which it operated.

The second and the third part of the assessment were to gather and analyze the core information of installation as a representation medium. We looked at the tools used to show and tell the exhibition content which were hosted by the installation. We also examined the form and the materials of the installation itself that were directly and embodied experienced by the audiences.

The fourth part highlighted the status of the installation after the exhibition: Are the life span of the materials prolonged? In what way are they sustainable? Lastly, the fifth part was the space for the architect to share what they learned regarding their installation.

### 3.1 Melting Iceberg (MI)

- architecture firm: Arkitekton 5
- exhibition location: Jl. Kapten Tendean no. 47, Jakarta Selatan
- exhibition type: permanent/pop-up/1 time
- exhibition date: 04/03/2022–27/03/2022
- initiator(s): PT. Arkitekton Limatama
- collaborator(s) and role(s): Byoliving
- sponsor(s): Jayaboard, Dekkson, TOTO, Propan
- targeted audience: Client, partner, architect, public

In order to commemorate the 26th anniversary of the architecture company, Arkitekton 5 created an installation to share their concern regarding the climate crisis. By exhibiting a form of an iceberg that sat in contrast to a car park area where it was located, the architect intended to create a dramatic scene for the passersby (Fig. 3a, b). The issue of the melting iceberg was raised because it was one of the biggest climate issues that the Indonesian people were

not aware of: how their disruptions had been causing significant damages to the earth globally and thus to Indonesia as well.

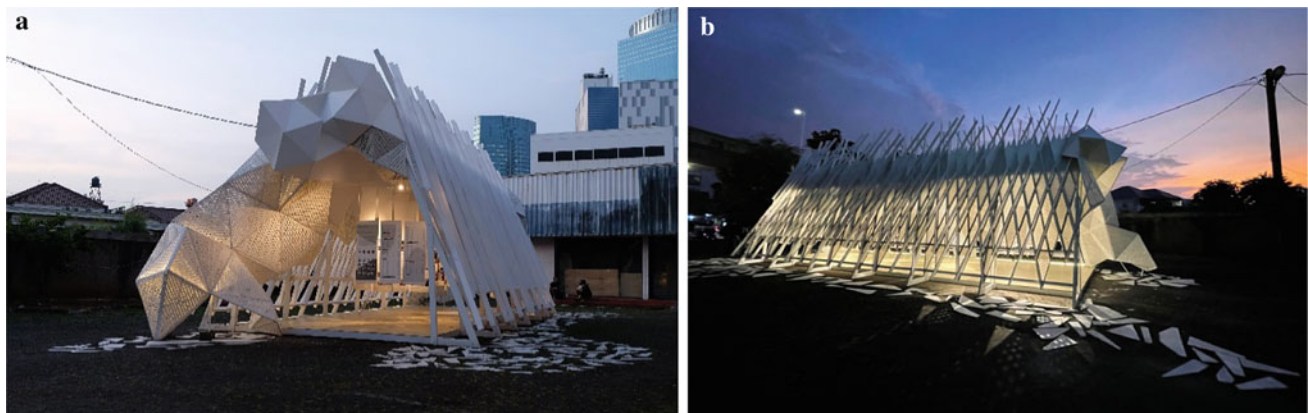
The tools to show and tell the information about the concept of the installation were exhibited as panels of illustrations and images (Fig. 4a, b). Trapezoid form of the installation was built as a simplification of the tip of the iceberg. Coated wood and Byoliving's synthetic rattan panels, which were created from recycled plastic, were used for the skin outside. For the space inside, the synthetic rattan panels formed the ceilings to represent a cave with vertical panels, showing a number of the architects' design projects, resembled the shape of the cave's stalactites. With the help of natural and artificial light, the composition created the complexity of the iceberg's atmosphere for the audience to experience. This installation was later exhibited at ArchID, 14–17 July 2022 in ICE, BSD.

The composition of materials of this installation is shown in Figs. 5 and 6.

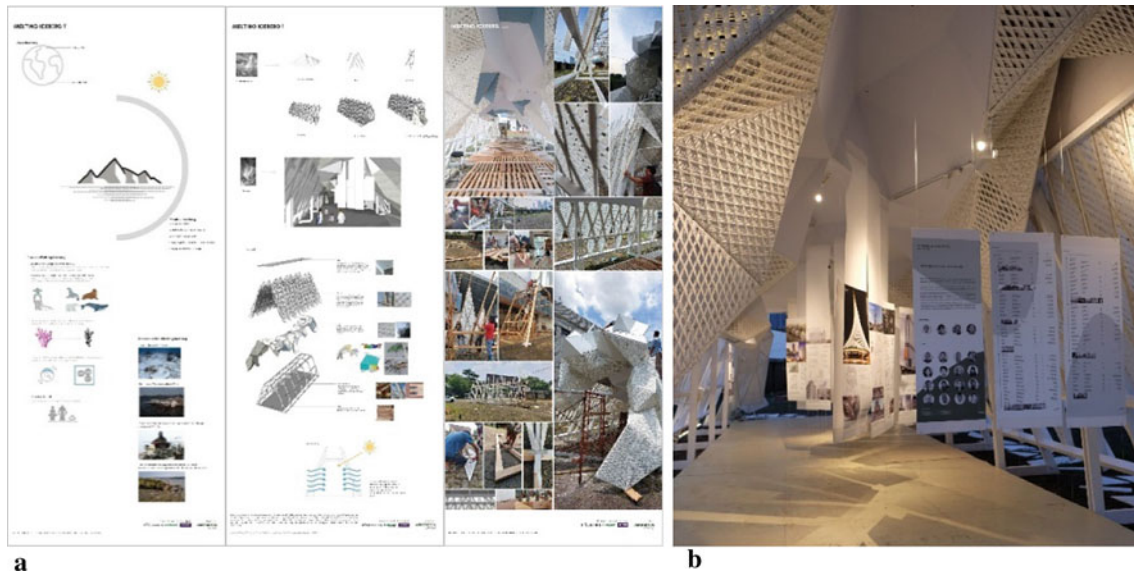
The architect's reflection on the installation: (1) That architects can help solve the climate crisis. In this current situation when convincing clients to choose more sustainable materials and construction technologies is still a big challenge, architects can help spread the awareness how to achieve sustainable architecture. They can also provide a bigger picture of how the development of materials and construction can be in line with sustainability, (2) Sustainability is also about working with different materials and craftsmanships, which are one of Indonesia's specialties.

### 3.2 Noto Wastu (NW)

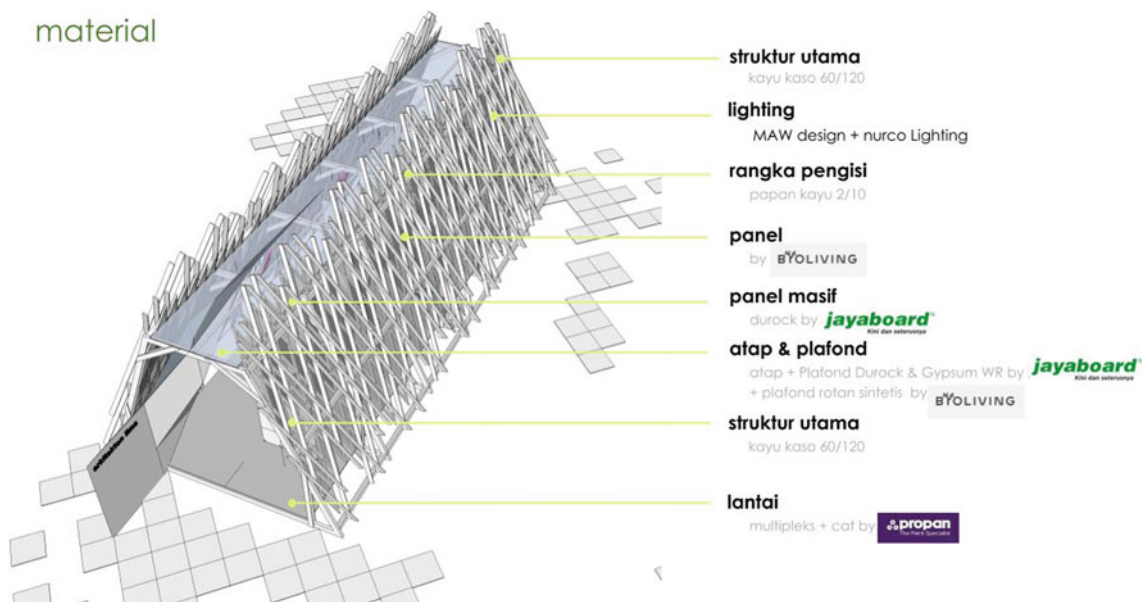
- architecture firm: monokroma architect
- exhibition location: NAIFEST of Indo Build Tech 2022, ICE, BSD
- exhibition type: permanent /pop-up/ 1 time



**Fig. 3** a MI front view. b MI side view. *Source* Arkitekton 5



**Fig. 4** a MI panels—as printed. b MI curatorial text and project list—as exhibited. *Source* Arkitekton 5

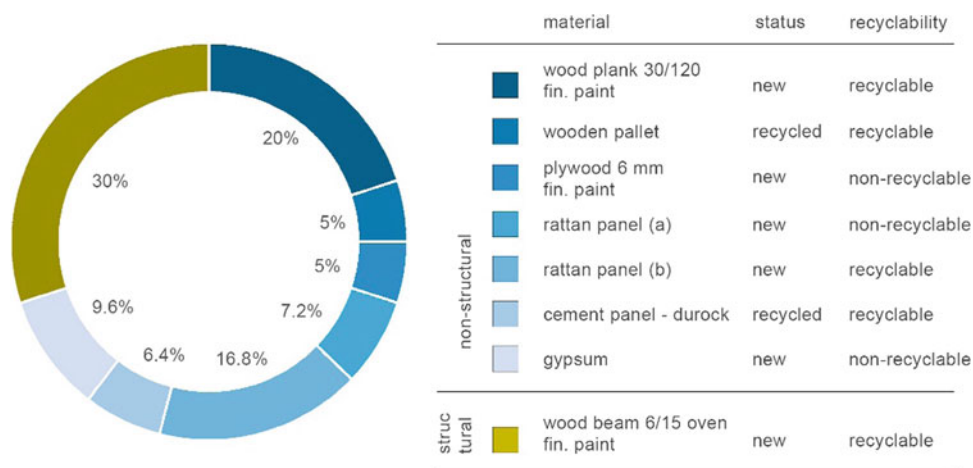


**Fig. 5** Materials of MI. *Source* Arkitekton 5

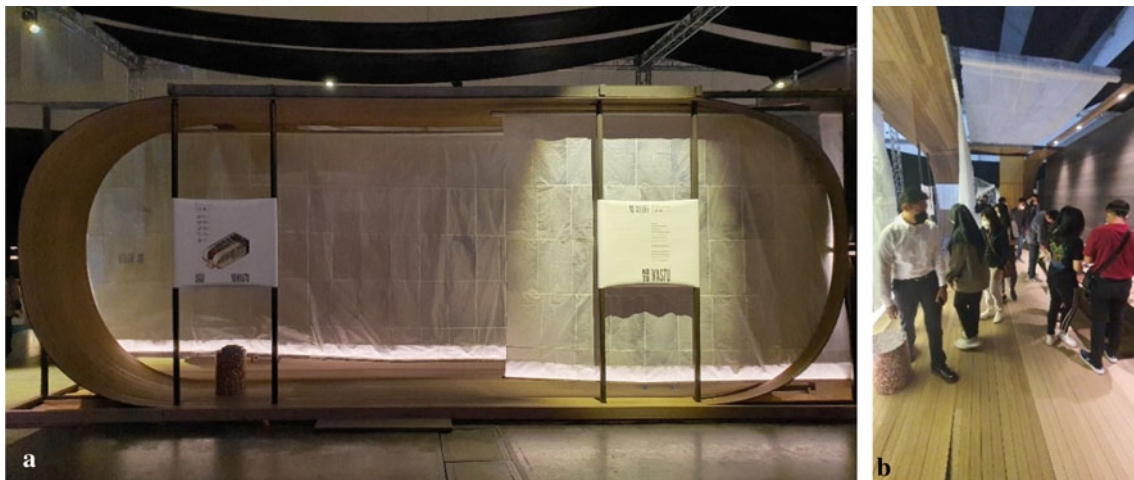
- exhibition date: 22/03/2022–27/03/2022
- initiator(s): monokroma architect
- collaborator(s) and role(s): Plana, Mortier, and Bell Society as manufacturers
- sponsor(s): Plana, Mortier, and Bell Society
- targeted audience: visitors of NAI FEST Indo Build Tech

NW was initiated by monokroma in response to an invitation given by IndoBuildTech Expo 2022. Their National Installation Festival (Naifest) program provided a space of 36 sqm for the architect to exhibit their idea in

regards to the theme, “Reinforcing the Bond of Nation.” To answer the call, monokroma worked with three material makers: (1) Plana (Plastic for Nature) for their Husk Plastic Composite deck, (2) Mortier for their LDPE plastic sheets, and (3) Bell Society for their misel sheet that they call M-Tex. The goal of this installation was to introduce the three materials as building material alternatives that were produced using recycled materials. By hosting the materials in an installation that was formed by the materials themselves, the architect aimed to demonstrate the character and the ambiance of the space that can be produced (Fig. 7a, b).



**Fig. 6** Material diagram of MI. *Source* Visualized from Arkitekton 5's data



**Fig. 7** **a** Façade NW. **b** Interior NW. *Source* monokroma architect

This is why the installation is called *Noto Wastu*, which is a Javanese term that means “arranging wealth” in English. The tools to show and tell, as well as to perform the information regarding the materials included are shown in Fig. 8a–c.

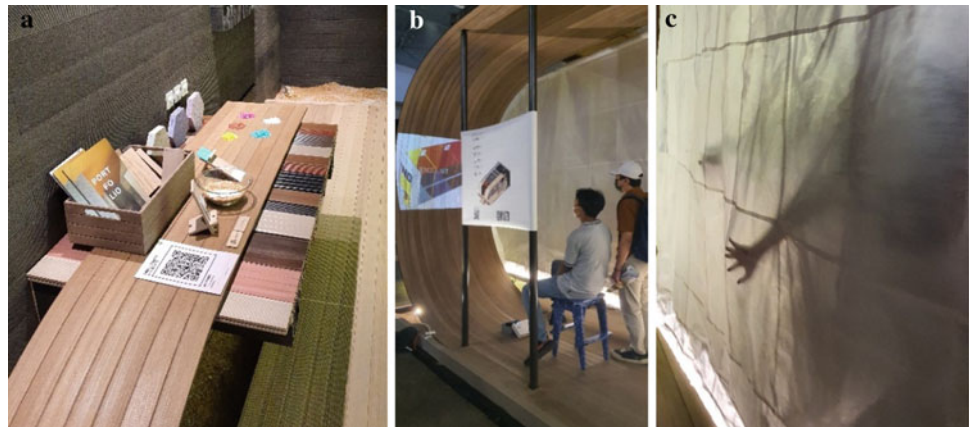
The form of the installation was born out of these three aspects: (1) practical aspect: to try out the character of each material, (2) symbolic aspect: to firmly embed the idea of circularity in the mind of the viewers, and (3) functional aspect: to give sequence for the audience to experience the space. The composition of materials used in this installation is shown in Fig. 9.

After the exhibition, all of the materials are either reused or recycled separately. With Plana, the architect worked to prolong the use of the HPC, along with the steel frames and plywood through two more pop-up installations, namely *Bukan Kayu*, in Ashta District 8 (June 14–26, 2022) and in Arch:ID, ICE BSD (July 14–17, 2022). These installations aimed to introduce the recycled material as a building

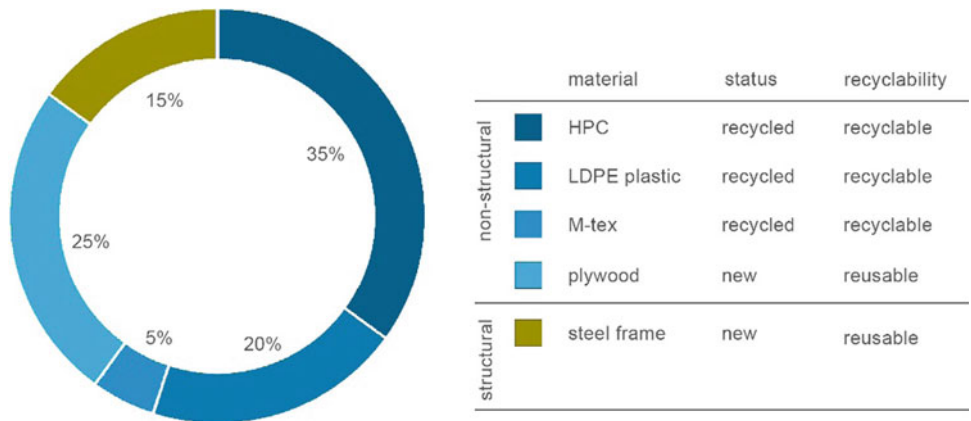
material alternative to wood and wood plastic composite (WPC) to a wider audience. As for the LDPE plastic, the sheets were reused and upcycled separately for other projects. Bell Society's Misel-TEX was recycled to make another type of vegan leather called Flex, ready to be used for new products.

The architect's reflection on the installation: (1) Installation festival in the building material expo might not be the best occasion to educate the public about three different new materials. Not only that the visitors would have been exhausted with the overall expo, but the three detailed stories of the materials introduced by the installation were also overwhelming; (2) Regarding the materials: (a) the decking still depended on simple plywood work. If the manufacturer could produce their own HPC plywood, the use of wood could potentially be reduced to 0%; (b) with the formula that the manufacturer used to make the HPC, the 1 cm thick decking could be bent with a radius of 1.5 m and still could

**Fig. 8** a Sample (show) and portfolio (tell). b Video and diagram (tell). c Material in space (experience). Source monokroma architect



**Fig. 9** Material diagram of NW. Source Visualized from monokroma architect’s data



be flattened when unplugged; (c) the degree of translucence and rigidity of the overall plastic separator depended on the number of layers of LDPE sheets used. The more the layers, the less translucent and more rigid/hard to they were (d) Pure Misel-tex was elastic; after five days of exhibition, the material was elongated. Using this material as a hung separator, it needed to be less elastic; (e) Comparing Misel-Tex and LDPE sheet: The first was more transparent than the latter. However, when a light was directed to each material, the first reflected while the latter dispersed the light around. With this character, the Misel-Tex had a potential as a screen projector; (3) The uninstalation process was the most important part of the sustainability of these materials. Without any wet joint, all the materials can be unplugged and brought back to each manufacturer’s factory to be reused or recycled (Fig. 10).

**3.3 Prolonged Aorta (PA)**

- architecture firm: Studio Aliri
- exhibition location: Lumine Department Store, Plaza Indonesia, Jakarta Pusat
- exhibition type: permanent/pop-up/1 time

- exhibition start date: 15/04/2022–19/06/2022
- initiator(s): Kokken
- collaborator(s) and role(s): Mortier (fabricator); Serrum art handling (installer)
- sponsor(s): Lumine Indonesia
- targeted audience: varied communities gathered by Kokken; regular visitors of Lumine

Lumine Department Store, located in Plaza Indonesia, intended to have an interior design and to sell only goods that were curated carefully to mirror its name, “to be lumined”. To illuminate, Kokken, the initiator of this project, aimed to share their concern about the vast amount of waste that are possibly transformed into some objects that potentially increase the awareness of people about conscious living. Through Prolonged Aorta, Studio Aliri managed to help Lumine and Kokken to not only achieve that intention but also to give a longer life to the interior design materials. To sum up, the goals of this project were to raise the visitors’ awareness of the daily consumption of plastic bags and textiles, to prolong the life of the plastic bags and textile waste, and to discover more added values in the material property itself, as well as to inspire other designers to speak



**Fig. 10** In the dismantling process, all materials were sent back to their manufacturers. *Source* monokroma architect

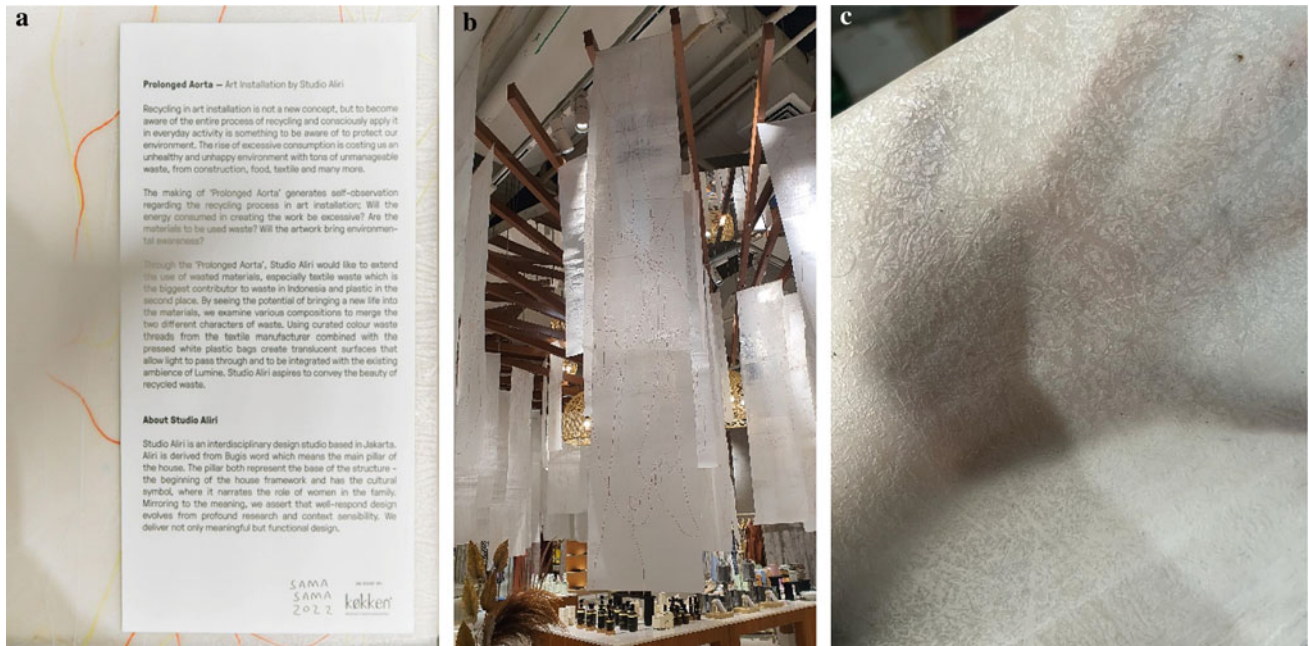
more about the ideal (healthy and harmonious) condition of our beloved space of living.

The form was derived from the existing geometry of the hanging timber structure located in every node in Lumine. The PA amplified the radial arrangement of the hanging timber structure but also hid the timber (the only contrast material in the space) so that the additional materials (paper

plastics) enhance the quality of its luminescent (Fig. 11a, b). There were 1183 panels of paper plastics hung on the radial timber structure. Technically, responded the radial arrangement was the fastest and most efficient way to assemble all the panels in 12 h. To conclude, two key drivers generated the form were: amplifying the context and installation practicality.

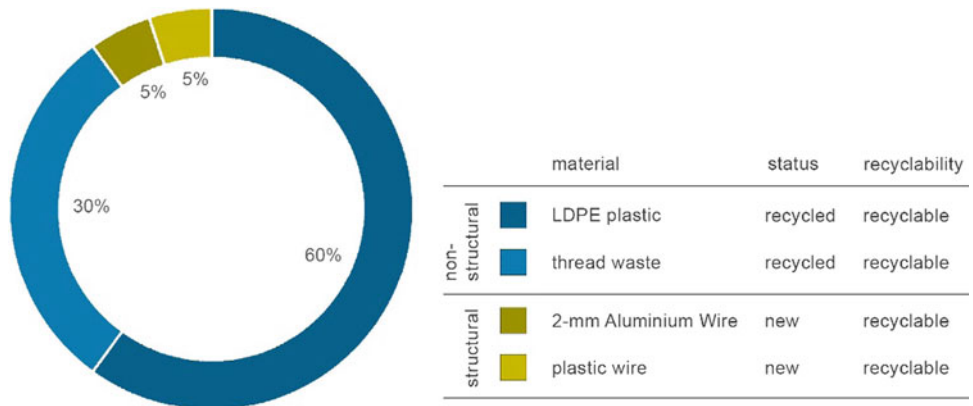


**Fig. 11** a Façade Lumine. b Detail of PA. *Source* Studio Aliri



**Fig. 12** a Text curatorial (tell). *Source* Studio Aliri. b Material to see (show). *Source* Researcher’s photo. c Material to touch (experience). *Source* Studio Aliri

**Fig. 13** Material diagram of PA. *Source* Visualized from Studio Aliri’s data



The verticality of the installation was intended as the tactile element. The visitors were expected to touch, observe, and interact intensely with the installation (Fig. 12a–c). The composition of materials used in this installation is as follows in Fig. 13.

After the exhibition, the materials were transformed into simple tote bags, which were launched in October 2022 in Bandung. The research and development did not stop at this stage. Another area to explore was the material combination (thread) that could be replaced with other materials, such as wood dust, pigment color, shredded paper bag, and many more.

The architect started this project by asking these three questions: (1) Will the energy consumed in creating the work be excessive? (2) Will the materials be wasted later?

(3) Will the artwork bring environmental awareness? Having them in mind, after the exhibition, it can be learned that the construction of the installation took 1 designer, 8 makers, 8 installers, 72 h of design and research, 3 weeks of fabrication, 12 h of assembly, and dismantling. After the 3 months of exhibition, it came out with many opportunities to sustain the use of the materials. If done correctly, the architect hoped to significantly extend the use of objects that are considered as waste.

### 3.4 Under Our Hill (UOH)

- architecture firm: Atelier Larassati
- exhibition location: Ashta District 8, SCBD, Jakarta

- exhibition type: permanent/pop-up/1 time
- exhibition start date: 04/06/2022–26/06/2022
- initiator(s): JangJo and AT-LARS
- collaborator(s) and role(s): Jangjo—waste management start-up company
- sponsor(s): Indodax, Argha Karya Prima Industry, Greenhope, InLite
- targeted audience: Mall visitors, building users, office workers, designers, business owners, etc.

Since 1986, Bantar Gebang, the 110-ha site, 25 km away from Jakarta, is now still filling fast with unsorted waste that is piling up to 40 m high. Departing from this fact, waste management start-up JangJo and architecture office AT-LARS joined forces to create an installation about waste management issues. The form of the installation itself consisted of a scaffolding structure and an envelope made of re-purposed single-use plastic waste. The envelope represented a hill of trash with different heights; its highest point reached 4 m, ten times shorter than the actual trash hill in Bantar Gebang (Fig. 14a, b). The single-use plastics were previously pasted together by the local *Ibu-Ibu* (mothers/women) and made into large plastic patchworks, which then were weaved into the scaffolding at various heights resulting in a massive colorful roof-like enclosure. A scaffolding was chosen as the core of the installation due to its versatility, quickness, and availability. Furthermore, it produced no waste and could be rented and reused for other purposes. The scaffolding structure provided a three-dimensional gridded blank canvas for composing a geometry of the trash hill. Figure 15 shows the making and the composition of the materials used in this installation.

Through the installation, the architect aimed to bring awareness to people about not only the waste problem, but

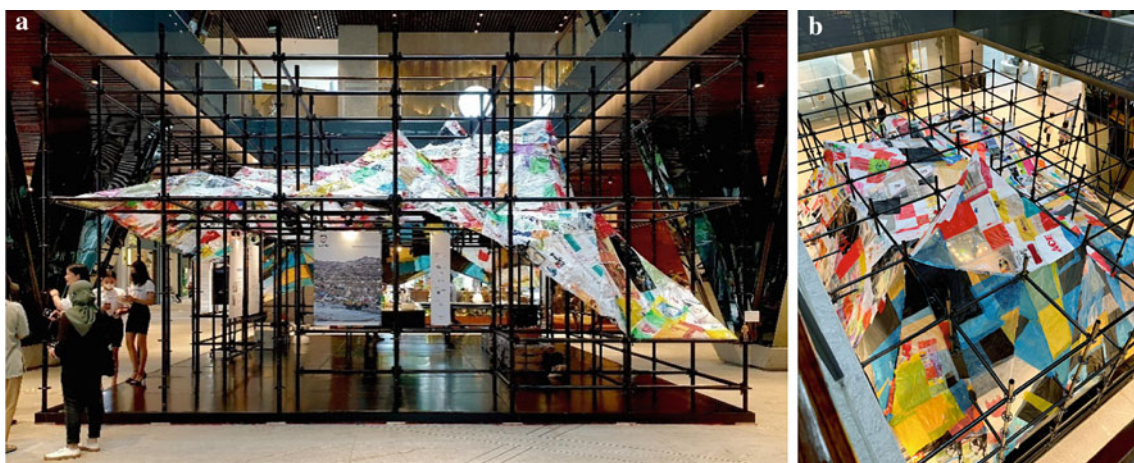
also the potential solution, which was by segregating the waste to maintain its economical value. The tools to show and tell the information regarding the materials included the items shown in Fig. 16a–c. The composition of materials used in this installation is shown in Fig. 17

The architect's reflection on the installation: (1) Temporary architecture was a platform for transdisciplinary exchange, rule-breaking structure, and play of thoughts and ideas—and with these thoughts and ideas (often not the physical thing itself), provided the biggest impact; (2) It was the fleeting experience of temporary architecture that created a memory that was unique and more meaningful, precisely because of its acknowledged time limit; (3) To be able to come up with a better communication strategy through spatial design, architects needed to be aware of how the sensitive issues in society were being perceived. Beauty and aesthetics attracted people. So it was important to create an installation that was pleasurable for the eyes, enjoyable to be in, and had a story to be told.

#### 4 Summary

Each of the four installations had its own context. However, not only did they share the same concern regarding the issue of the climate crisis, they aimed to educate the public about it. Below is the summary of the initiation of each project and their goal (Table 1), as well as their storytelling strategies (Table 2).

Through these tools that are embedded in their installation, the architects were able to communicate their message to their audience. However, since the installations themselves are the closest proof of the messages, it is important to also assess the composition of the materials they use and how the installations themselves sustain.



**Fig. 14** a UOH front view. b UOH from the second floor. *Source* Atelier Larassati