

Planning and Designing the Lapindo Mudflow Museum in Sidoarjo

Theme : Metaphoric Architecture

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Abstract. Disasters are events caused by natural factors (such as earthquakes, tsunamis, volcanic eruptions, flash floods, and droughts), non-natural factors, or human activities that disrupt human life. These events result in the loss of life, property damage, environmental destruction, and psychological distress. One significant natural disaster in Indonesia was the hot mudflow eruption in Porong, Sidoarjo, East Java, on May 29, 2006. Known as the Lapindo Mudflow, this disaster remains an ongoing event with no indication of cessation. The proposal to construct a Lapindo Mudflow Museum stems from the lack of such a facility, despite the disaster's profound impact on Indonesia. The museum's planning and design adopt the theme of metaphorical architecture, as it is considered an appropriate approach for this type of building. Metaphorical architecture emphasizes the creativity of architects in connecting objects, metaphors, or expressions to create forms that deviate from their original appearances while maintaining symbolic similarities. Structures designed with metaphorical architecture are characterized by unique features that convey specific messages intended by their creators. The Lapindo Mudflow Museum is planned to be built in Sidoarjo, specifically in Gelam Urban Village, Candi District. The museum will not only function as an educational facility but also as a symbolic monument commemorating the 2006 Lapindo Mudflow disaster and honoring its victims.

Keywords: museum, Lapindo Mudflow, Metaphorical Architecture

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1. Introduction

One of the most significant disasters to have occurred in Indonesia was the hot mudflow eruption in Porong, Sidoarjo, East Java, on May 29, 2006. To this day, the Lapindo Mudflow shows no signs of stopping. The continuous eruption of hot mud over the years has submerged 600 hectares of residential, agricultural, and industrial areas across 16 villages in three districts: Jabon District, Porong District, and Tanggulangin District.[1]

Given the significant impact of the Lapindo Mudflow disaster on the surrounding communities and economic activities in East Java, the planning and design of the Lapindo Mudflow Museum is warranted. In addition to serving as a museum, this building will also function as a symbolic monument commemorating the 2006 Lapindo Mudflow disaster and as a tribute to the victims affected by the mudflow.

2. Literature Review

2.1. Metaphoric Architecture

A metaphor is a type of figurative language used to explain something through analogy and comparison.[2] The term "metaphor" originates from the Latin word *metapherein*, which is composed of two parts: *metha*, meaning "after" or "beyond," and *pherein*, meaning "to carry." Etymologically, a metaphor can be understood as the use of words not in their literal sense, but as representations based on analogy and comparison.[3] Metaphoric architecture is a creative method employed by architects to connect objects, symbols, or expressions into forms that differ from their original (abstract) shapes while still maintaining a logical resemblance. Buildings designed with the concept of metaphorical architecture typically feature unique designs. The uniqueness of the elements in these buildings is often related to the message the creator seeks to convey.[4] The types of metaphoric architecture are :

- *Intangible Metaphor*
Intangible Metaphor is a metaphor that cannot be physically touched, originating from ideas, concepts, or human essences such as individualism, communication, naturalism, tradition, and culture. The intangible subject is symbolized and represented as something tangible.
- *Tangible Metaphors*
Tangible Metaphors are concrete metaphors that arise from visual forms or specific characteristics of a real object or entity, such as a tree or an animal.
- *Combined Metaphors*
Combined Metaphors are a blend of Intangible Metaphors and Tangible Metaphors, where one visual object is compared to another, while still maintaining conceptual similarities between the visual objects.[5]

2.2. Lapindo Mudflow (Lumpur Lapindo)

Lapindo Mudflow, or better known as Lumpur Lapindo, is a disaster of a hot mudflow at the drilling site of PT Lapindo Brantas in Balongnongso, Renokenogo and Jatirejo Villages, Porong Subdistrict, Sidoarjo Regency, East Java, Indonesia. The central location of the eruption is located at Siring Village, Porong, Sidoarjo, East Java, about 12 km south of Sidoarjo. The central location of the eruption is 150 m from Banjar Panji-1 (BJP-1), a gas drilling well, owned by PT Lapindo Brantas in Renokenongo, Sidoarjo. This disaster is expected to persist for an extended period, with some geologists predicting that the hot mudflow may continue for over 30 years.[6]

2.3. Museum

Museum, as defined on Kamus Besar Bahasa Indonesia (KBBI), is a building or a structure being used as a venue for exhibiting historical objects, cultural heritage, art, and science, or as a place to store ancient artifacts.[7] According to Peraturan Pemerintah Nomor 66 Tahun 2015 about Museum, museum is an institution that serves a purpose to protect, develop, utilize collection, and advocate them to the public.[8] The functions of museums, defined by the International Council of Museums (ICOM) are:

1. Documentation and scientific research
2. Collecting and protecting natural and cultural heritage
3. Preservation and conservation
4. Dissemination and equitable distribution of knowledge to the general public
5. Recreational facilities
6. Introduction to cultural diversity across regions and nations
7. Visualisations of cultural and natural heritage[9]

According to the International Council of Museum (ICOM), museums can be classified into 6 categories, which are:

1. Art Museum
Art Museum is a building or a room used for the exhibitions of art objects, usually in a form of visual arts such as painting, drawing, illustration, sculptures, ceramic, metal art, furniture, etc.
2. Archeology and History Museum
Archeology and History Museum is a museum that provides education for history and its relevance to the present time and the past. Some history museums keep many curatorial aspects of a certain local region. This kind of museum has vast collections ranging from documents, artefacts, arts, to archeological objects.
3. Ethnographical Museum
Ethnographical Museum is a museum in which its collection consists of different objects that originated, represent, and connected to material evidence of humans and their environment from all regions of Indonesia with a national character.
4. Natural History Museum
Natural History Museum is a museum that exhibits a wide variety of specimens from different segments of natural history.
5. Science and Technology Museum
Science and Technology Museum focuses on scientific and technological issues and their history. To explain complex discoveries, visual media are often used.
6. Specialized Museum
Specialized Museum focuses on specific topics. The collections of such museums typically consist of material evidence of human life and its environment related to a particular branch of art, science, or technology, such as music museums, children's museums, glass museums, and others.[10]

2.4. Correlation between Object and Theme

The planning and design of the Lapindo Mudflow Museum, approached through the lens of metaphorical architecture, represents an effort to create a museum that serves not only as a space for exhibiting collections but also as a symbol of the perseverance of the victims. Metaphorical architecture, often employed as a method for conveying messages or information, facilitates the subtle communication of meaning through the building's form itself.

3. Methods

The research methods used are qualitative methods and case studies. Qualitative methods are a type of descriptive research method that uses an analytical approach. Qualitative methods emphasize the observation of phenomena and examine the substance of the meaning of these phenomena.[11] The case study method is chosen based on buildings that are related to the selected theme or specific objects. Case studies are divided into two types: field case studies and literature case studies. Each case study focuses on two building objects that share a similar theme or selected architectural features.

- *Field Case Study 1 – Museum Angkut, Batu*
The selection of Museum Angkut as the first field case study is due to its similarity in building type, specifically as a museum building.
- *Field Case Study 2 – Museum Sepuluh November, Surabaya*
The reason for choosing Museum Sepuluh November as the object of field case study 2 is due to its similarity in building type, specifically as a museum building.
- *Literature Case Study 1 – Aceh Tsunami Museum, Banda Aceh*

- The selection of Museum Tsunami Aceh as the first literature case study is due to its similarity in both building type and theme, specifically as a museum and its use of Tangible Metaphors in architecture. The design of the Museum Tsunami Aceh takes inspiration from the analogy of the epicenter of a sea wave. The concept of sea waves, which is the primary form of the building, contributes to the museum's status as an iconic tourist attraction, drawing both local and international visitors.

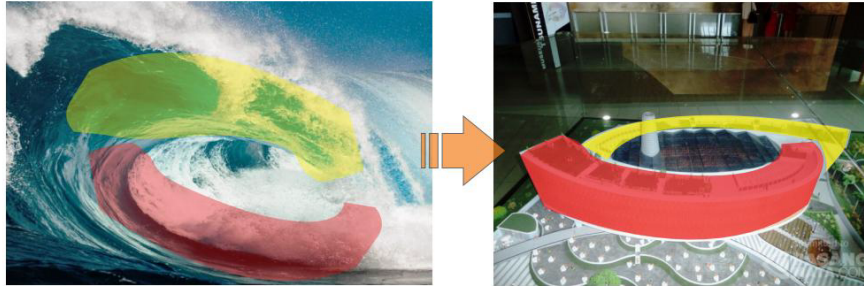


Figure 1 A metaphor of sea waves transformed into the form of the museum building

- Literature Case Study 2 – Jewish Museum, Berlin, Jerman*
The selection of the Jewish Museum as the second literature case study is based on its similarity in both building type and theme, specifically the museum building and the Intangible Metaphor architectural theme. The design of the museum employs the concept of an intangible metaphor, derived from the feelings of loss and despair experienced by the Jews during World War II and the Holocaust. This is represented through the zigzag-shaped room configuration, which includes numerous empty spaces and dead ends. The intention behind this design is to evoke a sense of being "lost," mirroring the emotional and physical disorientation that the Jews endured during this period.

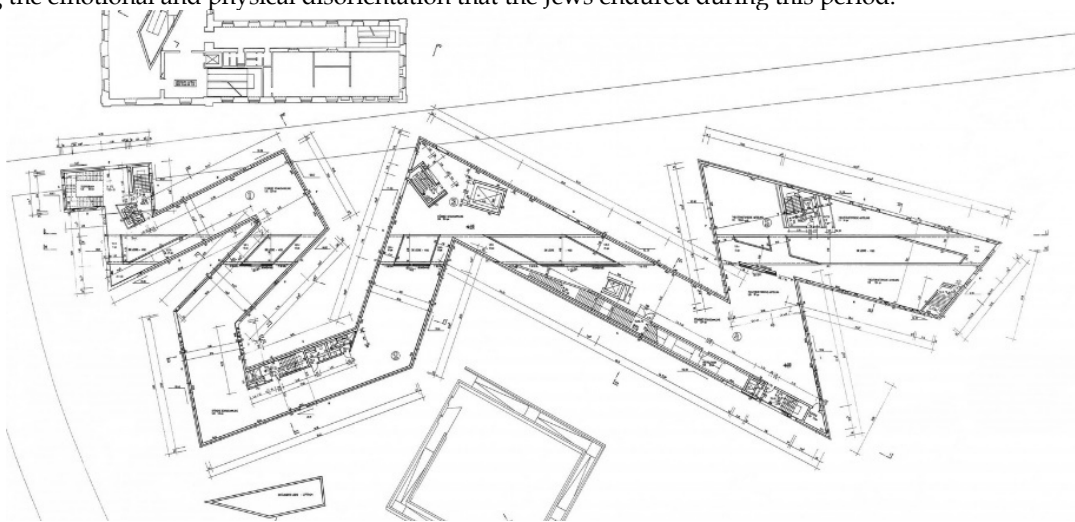


Figure 2 Floor plan of the new Jewish Museum building

According to Vitruvius in his book *De Architectura*, a good building must possess beauty/aesthetics (*Venustas*), strength (*Firmity*), and utility/function (*Utility*). In modern understanding, architecture must include considerations of functionality, aesthetics, and psychology. However, the element of functionality inherently encompasses aspects of aesthetics and psychology.[12]

4. Design Results

4.1. Site Location Description

The site is located on Jalan Raya Candi, Candi Subdistrict, Sidoarjo Regency, East Java. The area covers an area of 25,000 m². The boundaries of the site are as follows: to the north, there is residential housing; to the south, there is M. Ridwan Street, commercial areas, and residential housing; to the east, there is Jalan Raya Candi; and to the west, there is vacant land.



Figure 3 Site location and surrounding buildings

4.2. Land Use

The site is located within the administrative area of Candi Subdistrict, specifically in Gelam Village, Sidoarjo Regency. The site is designated for land use as a medium-density residential area. Although the site falls within the land use allocation for medium-density residential areas, the construction of a museum building is permitted under certain conditions (Candi Area RDTR, 2019).

4.3. Design Concept

The theme selected is Metaphorical Architecture. The choice of this theme is based on the belief that Metaphorical Architecture is particularly suitable when applied to museum buildings. The macro concept for the Lapindo Mudflow Museum incorporates two elements: Tangible Metaphor (Concrete) and Intangible Metaphor (Abstract). The Tangible Metaphor (Concrete) will be applied to the micro concept of land layout, while the Intangible Metaphor will be applied to the micro concept of form.



Figure 4 Concept Hierarchy Diagram

4.4. Design Results

4.4.1. Land Organization Design

The mass arrangement uses a radial pattern, derived from the analogy of Tangible Metaphors (Concrete Metaphors) of the mud eruption, with the main facility building at the center (similar to the central mudflow point of the mud) and the other supporting facilities surrounding the main facility (similar to the spreading of the mudflow).

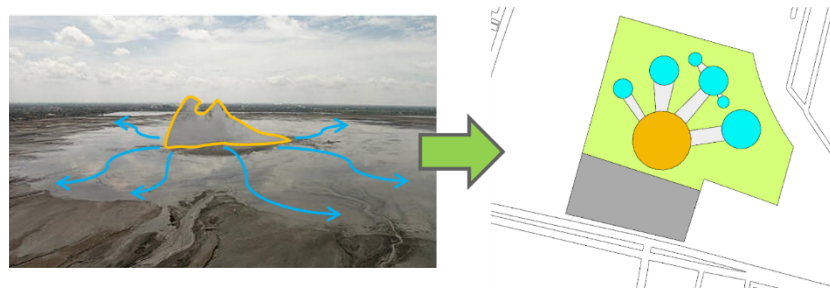


Figure 5 Transformation of the micro-concept of site layout

The mudflow centre (indicated by the orange line) is singular and located at the centre, with the mud spreading in all directions (indicated by the blue line). This condition is then applied to the site layout. The main facility building (orange) serves as the central point (similar to the mud eruption centre) and located in the middle, while the other facility buildings are arranged surrounding the main facility building (similar to the spreading of mud in all directions around the centre point).

The design outcome for the site layout is derived from the micro-concept design of the "Radial" layout, with the Main Facility Building (museum) serving as the central point. Meanwhile, other facility buildings, such as the Administrative Facility Building, Supporting Facility Building, and Service Facility Building, are arranged to surround the Main Facility Building while maintaining interconnectivity.



Figure 6 Siteplan

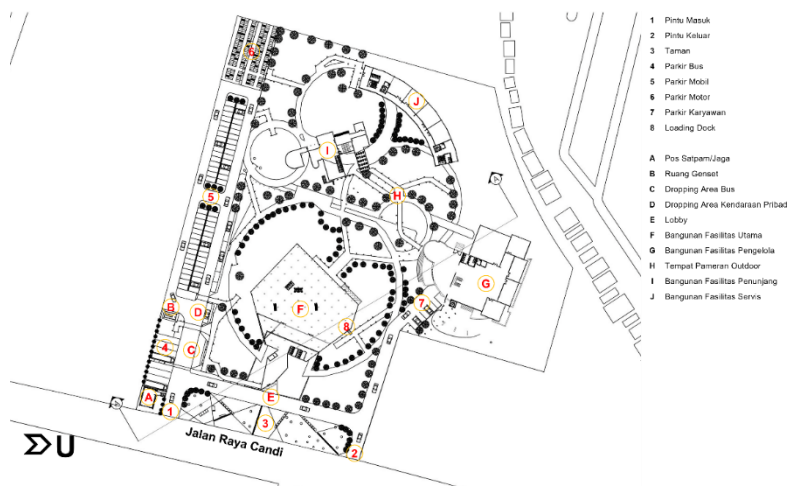


Figure 7 Layout Plan

The site is divided into three zones: the Public Zone (Main Facility Building, visitor parking area, garden), the Semi-Public Zone (Supporting Facility Building, Service Facility Building), and the Private Zone (Administrative Facility Building, management parking area, loading dock, generator room).



Figure 8 Bird's-Eye View of the Site



Figure 9 Exterior Front View of the Lapindo Mudflow Museum

At the front of the Lapindo Mudflow Museum building, there is a garden that can be used by museum visitors as well as the local community for playing, exercising, or simply relaxing and socializing. Anyone passing by Jalan Raya Candi can view the main facility building of the Lapindo Mudflow Museum from the front of the site.

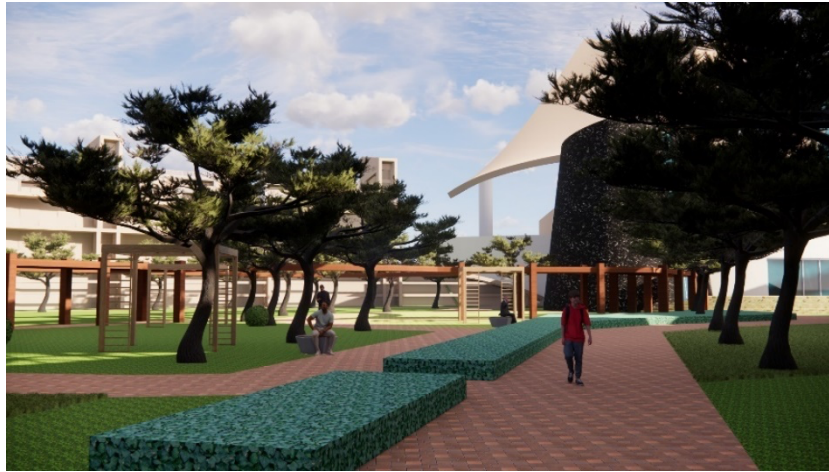
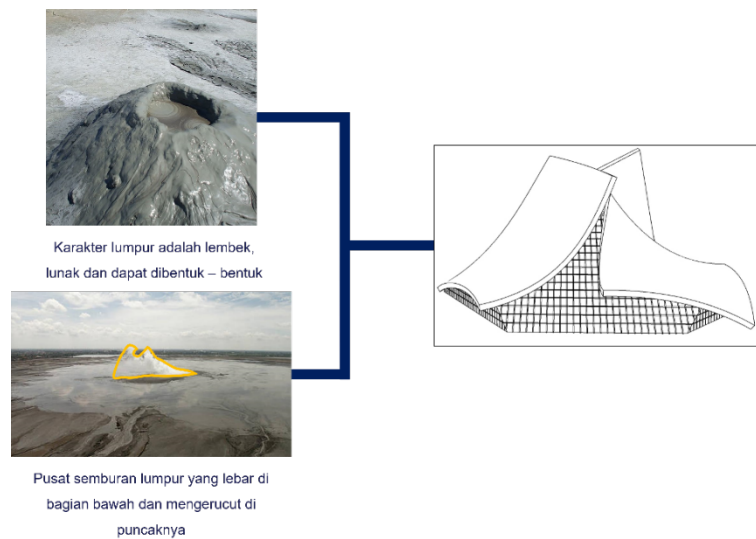


Figure 10 Garden Atmosphere within the Lapindo Mudflow Museum Area

There is another garden within the site that visitors can use for relaxing and socializing. This garden can also function as a fire assembly point as it is centrally located between all the buildings.

4.4.2. Form Design

The design outcome is derived from the micro-concept of form, based on "Deconstruction Architecture," which draws inspiration from the Intangible Metaphor (Abstract) of the characteristics of mud. The characteristics of mud – soft, pliable, and



malleable – serve as the basis for the design's conceptual analogy.

Figure 11 Application of the micro-form concept of Deconstruction Architecture to the building form

4.4.3. Room Design

The spatial design outcome is based on the micro-concept of space utilizing a Linear Organization Pattern, where the division of spaces is arranged according to zoning and function. The Linear Organization Pattern was chosen as the micro-concept of space to ensure a clear and straightforward circulation flow within the interior, avoiding confusion for visitors.

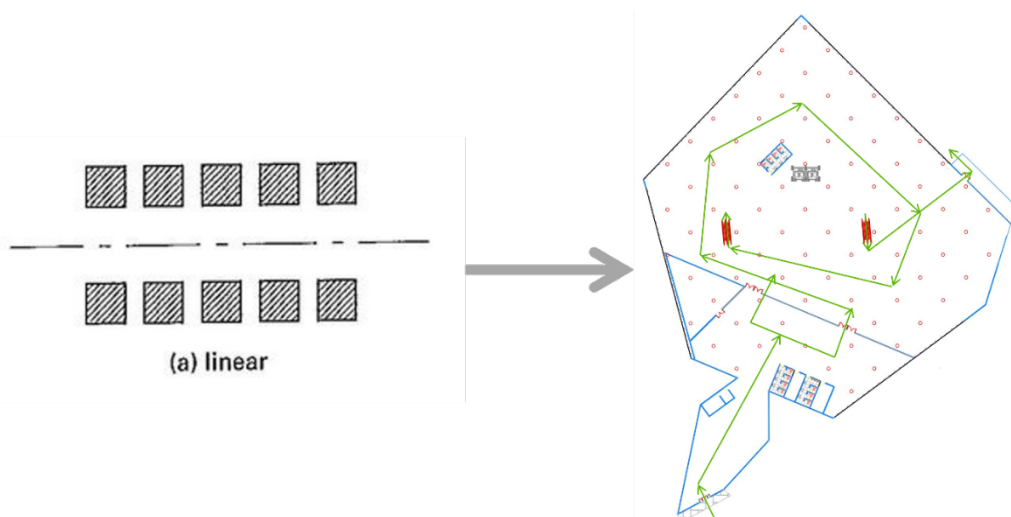


Figure 12 Application of micro-space concept Linear Organization Pattern on the circulation flow in the room

5. Conclusion

The Lapindo Mudflow Museum is planned to be constructed in Sidoarjo Regency, specifically in Gelam, Candi District. Beyond its primary function as a museum, the building is designed to serve as a symbolic monument to commemorate the 2006 Lapindo Mudflow disaster and to honor the victims impacted by the tragedy.

The Land Organization Concept adopts a radial pattern inspired by the Tangible Metaphor of the mud eruption. The main facility building represents the central eruption point, while the surrounding facility buildings symbolize the spreading mud.

The Form Design Concept employs principles of Deconstruction Architecture, drawn from the Intangible (Abstract) Metaphor of mud's characteristics. Mud's inherent qualities—soft, pliable, and shapeless—are reimagined and reflected in the building's abstract architectural form.

The Room Design Concept applies a Linear Organization Pattern, with spaces divided according to their zoning and functional purposes. This pattern was chosen to ensure clear and intuitive circulation flow within the museum, preventing confusion for visitors.

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