Blue Papers 2026 (Vol. 5 No. 1), pp. 146–55
10.58981/bluepapers.2026.1.10
Received 04.12.2024; Received in revised form 02.06.2025; Accepted 29.09.2025

Adaptive Reuse of Maritime Infrastructure: Case Study of Colonial Harbormaster Towers in Java's Port Cities

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Abstract
The north coast of Java has been well known to overseas traders as a hub for commodities, as well as spices brought from the Spice Islands (now Maluku Islands or the Moluccas). By the early nineteenth century, the Dutch government took control of the maritime trade in the region through the Dutch East India Company and developed the major port cities of Jakarta (formerly Batavia), Surabaya and Semarang, where the remnants of the colonial past continue to exist. After Indonesia's independence, several colonial port structures, such as the harbormaster tower and its riverside facilities, were neglected until recently, when cities began programs to restore them. This article examines the preservation and adaptive reuse of historic towers in Java's three major port cities and attempts to revive them amid the climate crisis challenges.

Policy Recommendations

- Encourage application of the adaptive reuse approach to maritime infrastructure, transforming them into functional spaces with modern roles while preserving their historical essence for future generations as living heritage.
- The adaptive reuse approach should go beyond the existing structures and should be developed as one narrative with the surrounding environment.
- Further planning should consider and take advantage of relevant water bodies as an integral part of maritime infrastructure.

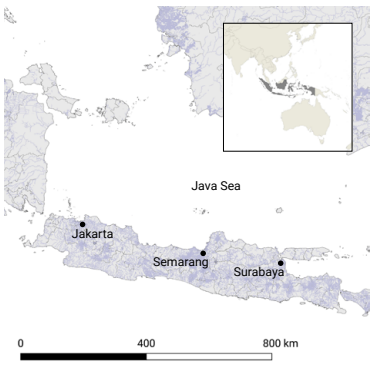
KEYWORDS

heritage management
harbormaster
Syahbandar
Spice Route
Java

WATER VALUES

CLIMATE

Am: Tropical monsoon climate



< Fig. 1 The Harbour Canal with the Uitkijk in Batavia (Source: Leiden University Libraries. CC BY-SA 4.0, via Wikimedia Commons).

Introduction

Cities are dynamic entities and cannot be frozen in time (Damayanti 2021). However, most cities have a layer of history that includes a variety of older buildings. The presence of neglected historic buildings in the middle of a city is a double-edged sword: the buildings represent values and narratives but can reduce the visual quality of the city (Aprilian and Widiastuti 2021). In Java's case, some cities are taking the initiative to protect and rejuvenate the heritage buildings. Jakarta designated its heritage sites in Kota Tua Jakarta (Old Town Jakarta) in 1973, followed by conservation projects of several buildings in 1975 and the Masterplan for Kota Tua Jakarta in 2014. Surabaya regulates the preservation of cultural heritage buildings and environments in 2005. Semarang has also designated its old city compound as a cultural heritage with a Mayor's Decree in 2018.

In Java's major cities, the neglected port infrastructures are results of ports' relocation to accommodate larger ships. In 1883, the colonial government relocated the former port of Sunda Kelapa in Batavia (now Jakarta) to Tanjung Priok to accommodate rapidly growing shipping activities (Yusuf 2023). For Semarang, the old port suffered from sedimentation and the new port was built in 1872. The same situation developed in Surabaya, where the port was moved from the mouth of the Kalimas River to an area further north in Tanjung Perak during 1910. These conditions left the old port and the harbormaster tower unutilized for decades until revitalization efforts began in the 2000s.

The national government later updated the regulation to protect the cultural heritage through Act No. 11/2010 on Cultural Heritage, which identifies preservation as an effort to maintain the existence of cultural heritage and its value by protecting, developing, and utilizing the buildings. Protection focuses on preventing and addressing damage to buildings. Development focuses on increasing value potential, information and promotion through research, revitalization and sustainable adaptation. Utilization stresses service to the people of Java and attention to sustainability (Soedarsono 2011). One of the strategies to make it possible to utilize heritage buildings is through an adaptive reuse approach.

According to Wong (2017), adaptive reuse is not a new concept and has been practiced since prehistoric times when humans first began repurposing caves as dwellings. Today, adaptive reuse involves a dialogue between old and new, balancing harmony with contrast, and tradition with innovation. Beyond heritage preservation, adaptive reuse supports climate goals by reducing carbon emissions through the reuse of existing structures (Stone 2020). This article discusses the preservation strategy and alteration of historic towers in Java's three major port cities using cross-case analysis, site visits and archival studies.

Adaptive Reuse Methodology

Remodeling or adaptive reuse is a building alteration process to utilize buildings with cultural significance for different functions. Brooker and Stone (2004) liken this method to reading a palimpsest and present a framework for understanding old buildings that guides designers in adaptive reuse and helps them evaluate, reinterpret and revitalize projects. The most critical aspect of an adaptive reuse project is understanding how old and new elements will mesh, which requires knowledge

^ Fig. 2 Views of the harbormaster tower: (A) façade; (B) tower, Museum Bahari, and surrounding landscape; (C) view from the top; (D) view toward the pump station; (E) interior of the tower top; (F) historical information display (Source: Ricky Purbaya, 2025).

of the building, utilities, code requirements and financial implications (Plevoets and Cleempoel 2019; Brooker and Stone 2004).

Analysis is the first step in adaptive reuse, focusing on understanding the existing building. This includes form and structure, history and function, context and environment, as well as the intended new purpose for the building. *Strategy* is the next step, with an approach chosen after the analysis. Brooker and Stone introduce three types of adaptive reuse strategies based on the level of treatment. First is *intervention*, which means permanent modifications integrating new and old elements into a single entity. Once made, these changes cannot be reversed without damaging the original structure. Second is insertion, which makes additions that attach to the building but are not permanent, and can be removed without damaging the original structure. Third is *installation*, which makes temporary additions, such as art installations, which can be easily removed without causing physical harm to the original building (Brooker and Stone 2004).

Case Study: Adaptive Reuse of the Harbormaster Towers in Java's Port Cities

Harbormaster tower in Jakarta

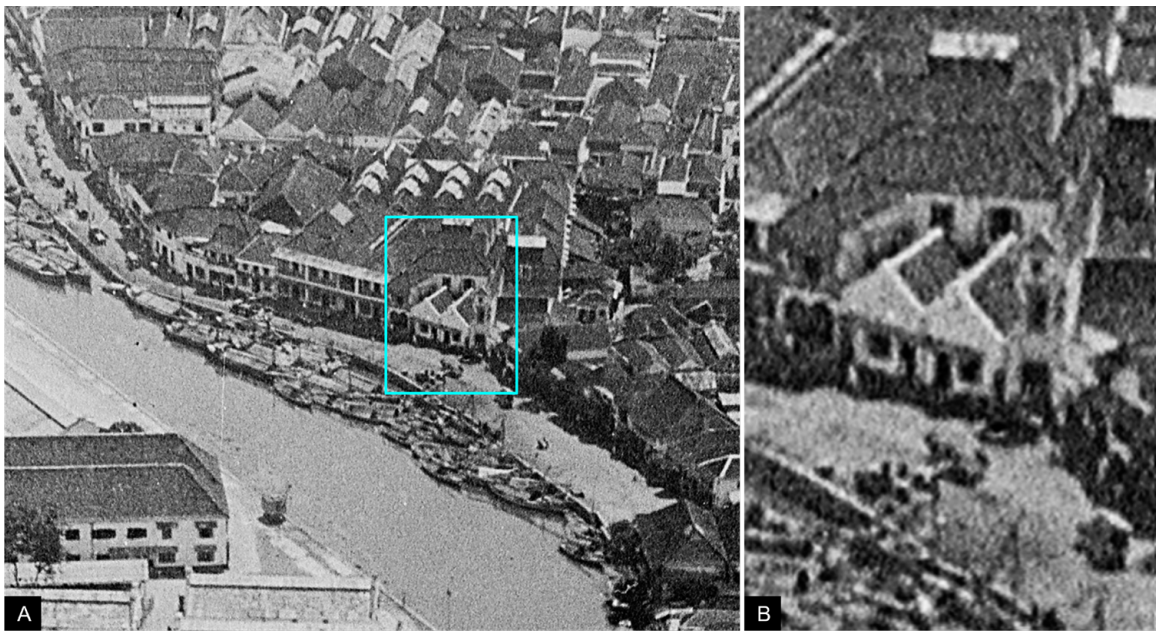
Before its restoration in 1977, the tower had significantly deteriorated due to changes in the soil's bearing capacity and the frequent passage of heavy vehicles along the road, which caused the structure to tilt. In April 2007, the tower underwent renovation, with efforts focused on preserving the existing structure through an installation strategy. The color of the top of the tower was changed from white to red (fig. 1, 2A), and the Maritime Museum logo was added to the right-hand side wall. While the overall exterior design saw no ma-

^ Fig. 3 The harbormaster tower Sleko in 1915 (Source: KITLV Digital Collection, item 117602, Leiden University Library).

^ Fig. 4 Views of the harbormaster towers in Semarang after adaptive reuse: (A) overall view; (B) main entrance; (C) renovated pedestrian walkway; (D) curtain-wall intervention restoring the tower's original configuration; (E) glass addition distinguishing old structure from new (Source: Ricky Purbaya, 2024).

jor alterations, the interior was repurposed to prioritize tourism, with the addition of galleries and graphic information panels (fig. 2E, 2F). However, these changes did not compromise the authenticity of the original materials, as the additions were minimal and reversible.

In addition, the surrounding area was revitalized using a permanent modification or intervention strategy. The connection between the water body near the tower (fig. 2B) and the syahbandar (harbormaster) structure is essential, serving as an integral part of the site's



^ Fig. 5 Views of the harbormaster tower: (A) aerial view of the tower, ca. 1900–1940; (B) close-up view of the structure (Source: KITLV Digital Collection, item 6402, Leiden University Library).

historical narrative, and thus are the results of careful preservation. In the past, the water functioned solely for transporting goods to the center of Batavia, but today it faces the threat of sea level rise that could lead to submersion. In 2022, the surrounding water was redesigned using a polder system and sluice gates to regulate the basin (fig. 2D). This basin now functions as a freshwater reservoir for the surrounding area (fig. 2B, 2C), playing both a protective and adaptive role in relation to climate-related challenges.

Harbormaster tower in Semarang

The harbormaster tower known as "Sleko" in Semarang offers a notable example of adaptive reuse. Originally part of the Nederlandsch Indische Gas Maatschappij, the tower fell into neglect after the harbor's relocation in the late nineteenth century and by the 1980s it had been abandoned (fig. 3). It deteriorated over time, collapsing in 2017 and causing casualties. In 2022, Perusahaan Gas Negara (Indonesia's National Gas Company) restored the Sleko tower through an intervention strategy that combined preserved brickwork with a contrasting glass structure and steel staircases (fig. 4).

The building was repurposed as a tourist site, blending historical authenticity with modern functionality. The revitalized riverside area as a promenade restores the visual connectivity between the tower and the river. This project goes beyond simple preservation; it revitalizes the structure by merging historical authenticity with contemporary expression. The result is a space that not only honors the building's historical significance but also embraces innovation and forward-looking use. This restoration demonstrates how heritage sites can evolve, maintaining their significance while adapting to contemporary needs. It illustrates

^ Fig. 6 Views of the harbormaster tower in Surabaya: (A) façade; (B) view toward the Kalimas River; (C) masonry detail; (D) emblems of Surabaya (left) and Batavia (right) (Source: Ricky Purbaya, 2024).

how heritage structures can be reimagined as dynamic spaces, alive with new meaning and public relevance while remaining rooted in their historical contexts.

Harbormaster tower in Surabaya

Located along the Kalimas River and dating to the nineteenth century, this tower originally served as a key navigation point, an aid in monitoring maritime traffic, managing trade and ensuring security in Surabaya during the Dutch colonial period (fig. 5A, 5B). Over time, as a new port was created and the old port lost significance and was overshadowed by urban development, the tower's function diminished. However, it remains an important historical landmark, symbolizing Surabaya's maritime past.

Compared to the towers in the other two cities, the tower in Surabaya has not undergone adaptive reuse; instead, it has only been subject to maintenance work. The tower is still abandoned, with its structure and facades showing signs of decay (fig. 6). At the entrance on the first floor, the original doors have been replaced with an iron gate, which now serves as an access point to the nearby local settlements. The riverside is still used to transport goods to the warehouses and fish market next to the tower. Still, the tower's current condition seems to be completely disconnected from any historical narrative.

Conclusion

Indonesia's maritime heritage is deeply embedded in its coastal cities, yet many historical sites face decay, disuse and escalating environmental threats such as flooding, sedimentation and climate change. The harbormaster towers in Jakarta, Semarang and Surabaya illustrate varied and often uneven strategies in adapting maritime heritage to contemporary needs.

Jakarta's tower has been carefully preserved with minimal alteration, emphasizing authenticity and the redesign of the adjacent canal aids adaptation to climate change challenges. Semarang offers a more architecturally impressive yet fragmented approach. The tower was innovatively restored with contemporary materials, and the redesigned riverscape adds to the tower's historical function and narrative. In contrast, Surabaya's tower has not undergone adaptive reuse, and the preservation initiative is limited to maintenance work only. It is informally repurposed as a passage to nearby settlements and suffers from a lack of a clear heritage strategy.

True preservation requires more than restoring buildings. It demands ecological and spatial reintegration. Without reconnecting heritage structures to their natural and urban contexts, Indonesia risks turning its maritime legacy into static monuments. A stronger, more integrated vision is needed, one that aligns cultural memory with environmental resilience and urban continuity.

Acknowledgment
This contribution was peer-reviewed. It was edited by members of the editorial team of the UNESCO Chair Water, Ports and Historic Cities: Carola Hein, Kaiyi Zhu and Matteo D'Agostino.

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