Thai Modern Architecture as Learning Ground: Case-Based Construction Studies and Reflections on Heritage

Suchon Mallikamarl | suchon.ma@ku.th
Department of Architecture, Kasetsart University
Pornpas Siricururatana | pornpas.s@ku.th
Department of Architecture, Kasetsart University
Kanokwan Trakulyingcharoen | t.kanokwan@gmail.com
Department of Architecture, Thammasat University

Abstract

This abstract reflects on an ongoing construction studio for third-year students (2023–2025), where six buildings are analyzed annually, totaling 19 case studies of structures built between 1930 and 1980. The aim is to understand early industrial construction methods in Thailand and the conditions that shaped them. How can we learn from the making of Thai modern architecture, and why does it matter?

The learning process begins with analyzing architectural drawings at different stages – preliminary design, design development, and construction documentation – allowing students to track changes over time. This is followed by site visits to the built works to observe any discrepancies or defects. Where possible, archival photographs from the construction phase support this analysis. From these investigations, students form hypotheses about each project's design logic, innovations, and construction constraints. These are later verified through interviews with relevant parties (where possible), though most original architects have passed away. Students then produce analytical drawings and detailed physical models that present their findings.

A central finding across all case studies is the consistent presence of on-site improvisation, experimentation, and breakthroughs. Although industrial materials and techniques were imported, they were seldom integrated seamlessly into the local building context. Thai architects, engineers, and contractors had to adapt these foreign technologies to local labor conditions and limitations. Ultimately, the students distilled these findings into structural analyses, detailed drawings, and models – resources that will be essential for future building restoration.

Keywords
Thai Modern Architecture, Integrated Construction Studio, On-site Appropriation.

Background and Studying Method

The necessity of selecting modern architecture as case studies in construction courses[1] arises from the convergence of two considerations:

- The current curriculum requires fifth-semester students to study industrialized building systems, with steel, concrete, glass, and aluminum as the primary materials. For example, they examine how subsystems – such as precast concrete shading devices or aluminum façade systems – integrate with structural skeletons. In today's climate of accelerated production and standardized construction, opportunities for experimentation are limited, and the pursuit of eye-catching forms often takes precedence over technical innovation. Nevertheless, empirical knowledge remains essential: understanding how design emerges from specific conditions can trigger crucial 'moments of realization'. To cultivate this awareness, the teaching team selected case studies from the early

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industrial and modern periods-eras that were less constrained by economic pressures.

- In Thailand, the study of modern architecture has largely been framed through a stylistic approach[2]. As a result, critical knowledge of structural systems and construction techniques – knowledge that is essential for accurate restoration – remains underdeveloped. Within this course, construction history is used as a tool to generate new insights, fostering a deeper awareness of the implications of architectural interventions.

The study process consists of 3 steps:

Step 1: Learning from Architectural Drawings – encompassing preliminary design and sketches, construction drawings, shop drawings, and as-built drawings. Areas of investigation include the pursuit of aesthetic development; spatial organization and structural systems; selection of construction technologies; and detailing processes in relation to aesthetic intentions.

Step 2: Building Surveys – involving the documentation of existing buildings as constructed, followed by comparison across drawing sets (e.g., sketches, construction drawings, enlarged details) and the built reality. This includes observing noteworthy construction details and identifying problems arising from construction practices, subsequent modifications, or later-added building systems that lack integration.

Step 3: Interviews – with architects, engineers, contractors, building owners, or project stakeholders involved in planning and construction, as well as relevant experts. These interviews help verify understandings or hypotheses derived from the first two phases.

Between 2023 and 2025, three full cycles of this study were conducted, examining a total of 19 buildings[3]. Each academic year adopted a distinct theme: *On Thai Modernism: Aesthetic Development and its Production 1960-1975* (2023); *Tracing Modernity: Design and Construction 1930-1950* (2024); and *Modern Architecture in Kasetsart University 1960-1985* (2025). In this conference, we would like to briefly sum up and present some thematic issues that contributed to the understanding of modern architecture construction in Thailand and place them as a relevant heritage: A. Implementation of Modernity: Imported Material and Technology, B. Implementation of Modernity: Space and Form, C. Appropriated Modern Language to Local Constraints: Climate and Budget.

Implementation of Modernity: Imported Material and Technology

The use of Construction History as a tool for studying modern architecture helps reduce bias regarding both social status and stylistic categories. The Sala Chalermkrung Royal Theatre (the first building on the list, constructed between 1930–1933) was built with the patronage of King Rama VII. Despite this, its architectural form is characterized by clean, minimalist volumes. The entrance hall, with its monumental scale, can be regarded as influenced by Modernist architecture. However, architectural historians in Thailand often believe that Modernist design is linked to liberal political ideals, which abandoned ornamentation as a symbol of hierarchical class structures[4]. If one were to analyze the architecture of the Royal Theatre solely through this conceptual lens, one would miss the underlying design intentions: the king's aspiration to introduce new forms of leisure as a way to create a modern urban atmosphere[5].

Because this building is under the stewardship of the Crown Property Bureau, the research team (2024) was unable to conduct a detailed survey of the interior. Access was limited to common areas, such as the entrance lobby and the auditorium. As a result, the study relied heavily on evidence obtained from the National Archives of Thailand, including original floor plans and construction photographs, supplemented by field measurements taken from the exterior. Since

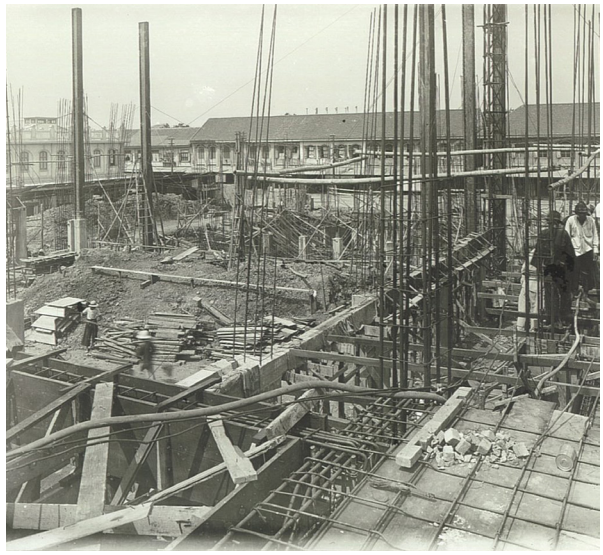


Fig. 1 Model Photo (Photo by unknown) © National Archive of Thailand, HWY. 1/1. Digital Files: CFNA01-P0019233-0003.

Fig. 2 Photo of Construction Site Shows Composite Column, H-profile steel columns encased in concrete (Photo by unknown) © National Archive of Thailand, HWY. 1/1. Digital Files: CFNA01-P0019233-0019.

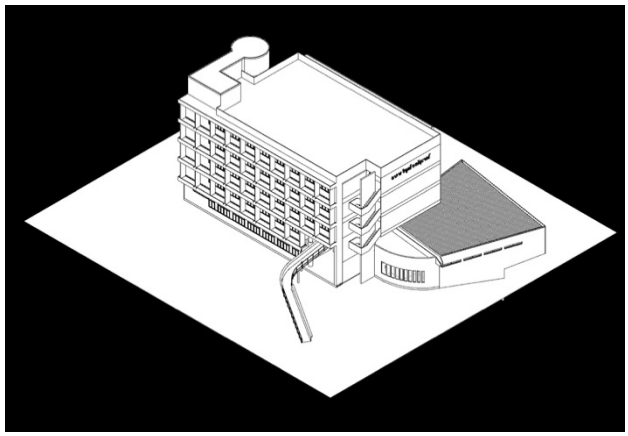
structural section drawings of the building were inaccessible, the student team coordinated information from the floor plans with height measurements of the beams at various levels in order to reconstruct the building's section. Construction photographs further revealed that the building was not thoroughly reinforced concrete as previously believed,[6] but rather a composite structure, with H-profile steel columns encased in concrete. Another set of photographs showed that the beams supporting the balcony were massive H-profiles, approximately 1.5 meters deep, connected to columns that appeared externally to be concrete but were steel inside. The archival photographs also indicated that the steel frame joints were riveted, unlike the bolt-and-nut method used today.

To better understand the use of steel in the Chalermkrung Theatre, the student team examined the contemporary Memorial Bridge (Saphan Phut), built to mark Bangkok's 150th anniversary. Initiated under Rama VII with overlapping timelines, the bridge was a 210-meter steel truss with a 60-meter central span that could be raised for vessels. Constructed by Dorman Long & Co. Ltd. of Middlesbrough, England, the project followed a lump-sum tender signed in 1929 and opened in 1932. While the bridge cost nearly 3 million baht, the theatre required almost 9 million. Dorman Long produced a wide range of steel profiles and supplied all the bridge's imported steel, recorded in Bangkok's trade reports. Although the team could not obtain construction documents for the theatre, they suggested its steel may have been sourced through the same channels, given the proximity of the sites and their simultaneous construction.

The key contribution of the student research lies in identifying the composite structural system of the theatre, consisting of steel columns and beams encased in concrete, and in proposing a hypothesis linking this material practice to the broader context of contemporary construction in Bangkok. Such findings would benefit further restoration.

Implementation of Modernity: Space and Form

Le Corbusier's architectural language exerted significant influence in the post-World War II era. The *Carpenter Center for the Visual Arts* at Harvard University, completed in 1963, is a notable example of this legacy. Its impact extended beyond the United States, inspiring the young Thai architect Ong-ard Satrabhandhu (b. 1944), who was then pursuing his studies



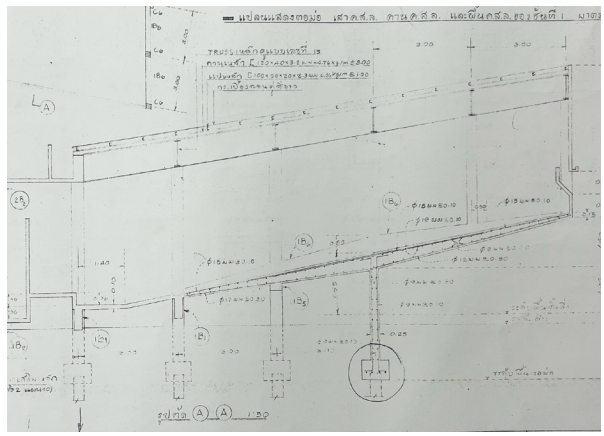


Fig. 3 Axonometric 3d Model of Department of Physics building (Drawn by Thitiwoot Chaisawataree, 2019).
Fig. 4 original structural Section show Column and cantilever beam (Department of Physics, 1967).

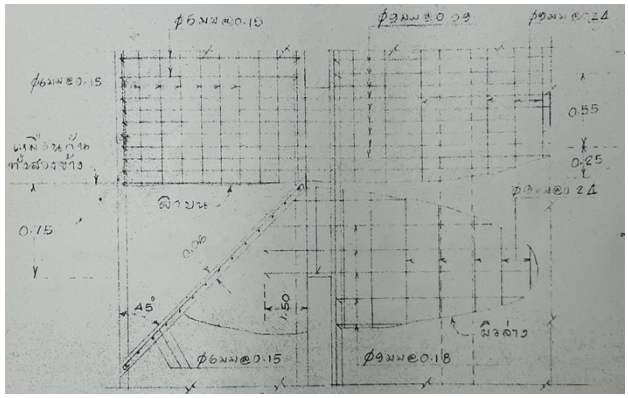
in America. Satrabhandhu graduated from Cornell University in 1965 and from Yale University in 1967. During this period, he was commissioned to design the Department of Physics at Kasetsart University in Bangkok. Completed in 1969 (15th building in the list), the building demonstrates Satrabhandhu's engagement with the architectural vocabulary of the Carpenter Center.

The Physics Department is composed of two primary volumes: a five-story block containing laboratories and faculty offices, and a sloped form housing a 200-seat lecture hall. The two volumes overlap, and at their intersection the architect introduced a diagonal passageway that cuts through the building's core. Another element directly evoking the Carpenter Center is the use of reinforced-concrete sun-shading fins across the building's south-facing façade. In 2025, a group of students had the rare opportunity to study the building extensively, with full access to both its structural and architectural drawings. Their central question was whether, in the context of Thailand's construction industry in the late 1960s, it was possible to fully import and realize a Corbusian architectural idiom.

Analysis of the floor plans, structural system, and materials revealed significant contradictions. The lecture-hall volume, for instance, projects six meters outward and appears to rely on load-bearing concrete walls. Yet, structural evidence shows that a skeleton frame of columns and beams was inserted, with the concrete walls serving merely as enclosures rather than reinforced structural elements. The cantilever of the lecture hall is achieved not through the walls but via beams integrated into the floor slabs. This suggests that the architectural form was adapted to align with construction techniques familiar to local builders.

The building's fair-faced concrete finish is especially noteworthy. Executed with exceptional precision, it conveys a refinement surpassing much contemporary construction. Examination of the concrete surfaces suggests that the formwork was fabricated from timber planks of uniform 20-centimeter width, whose texture is still clearly visible. This craftsmanship reflects the context of the late 1960s, when Thailand still had an abundance of highly skilled carpenters and timber was both accessible and affordable. Such conditions enabled the production of superior-quality formwork and, consequently, high-standard fair-faced concrete.

An additional finding concerns the sun-shading fins on the southern façade. Previously assumed to be precast, they were in fact cast in place. Each fin is 8 centimeters thick, reinforced with 6 mm bars at 15-centimeter intervals, and tied directly into the slab reinforcement above and below. This remarkable detail further underscores the technical capabilities of the



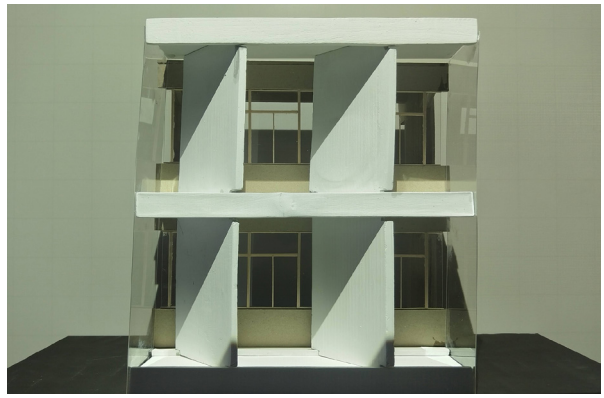


Fig. 5 Original structural detail (top view) of concrete fin facade show specification of reinforcement rebars (1967).

Fig. 6 Replicated Model for experimenting the casting of concrete fin façade by AKU student 2025 (Photo by Suchon Mallikamarl, 2025).

craftsmen of the period. Viewed from this perspective, modern concrete architecture in Thailand cannot be entirely separated from the traditions of timber construction. Regrettably, no shop drawings of the formwork have yet been located, leaving only the concrete surfaces themselves as material evidence for study.

Appropriated Modern Language to Local Constraints: Climate and Budget

Modern architecture in Southeast Asia had to adapt to tropical conditions of heat, sun, and heavy rain. A common solution was the addition of sun-shading devices, often layered over glass curtain walls and open-plan layouts. These systems balanced shading with outward views and shaped the building's visual identity. For large-scale offices, the sheer number of shading units required mass-production and assembly strategies. This article examines two case studies of how such modern forms were localized[7].

The first case, the Krung Thai Bank, Suan-Mali Branch (1970) by Amorn Sriwong, used an open-plan with waffle slabs and a Vierendeel truss system that freed lower floors of columns. Its façade shading formed a diamond-grid of precast concrete units. Students studied its modular logic through field measurements, 3D modeling, and experimental formwork, revealing the precision required for the system. The second case, the Srifueang-Fung Building (1971–2024) by Architect Intaren Office, was a fourteen-story tower with rotated square plans and post-tensioned diagrid slabs[8]. Its façade employed 3,000 hyperbolic paraboloid shading units, each 2 × 1 × 0.75 meters. Students explored how such units could be mass-produced and assembled, experimenting with molds to understand the challenges of fabricating at scale.

In the second case, the Srifueang-Fung Building (1971) was a fourteen-story structure. Its floor plan geometry comprised two overlapping squares rotated at 45 degrees, with the concrete core located at their intersection. The floors were constructed as post-tensioned diagrid slabs. The sun-shading system consisted of hyperbolic paraboloid units. Each unit had a triangular projection measuring 2 × 1 meters, with a height of 0.75 meters. Construction documents specified that a total of 3,000 such shading units were fabricated, prompting students to investigate how the architect and contractor planned the production and assembly of such a large quantity. The students replicated the process by creating experimental molds for casting.

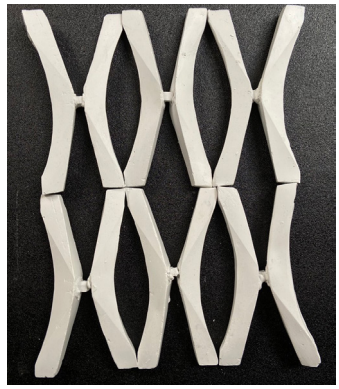


Fig. 7 Photograph of diamond-shaped grid at Krung Thai Bank (AKU student 2023).

Fig. 8 Replicated Model of diamond-shaped production by AKU student 2023 (Photo by Chayada Taweesri, 2023).

Reflections and Exhibition

Through processes of learning, construction-based study, surveying of actual buildings, and the use of archival construction-site photographs, students can gain a multidimensional understanding of modern architectural production. The importation of architectural forms could never occur in a straightforward manner; rather, they must be reshaped and translated through the specific conditions of local production. For the final outcomes, students represented their studies in the form of analytic structural drawings, structural models, and detail models. These materials are indispensable to the preservation of Thai modern architecture. Each year, upon completion of the program, the faculty organizes a small exhibition to disseminate students' findings. These exhibitions have consistently been well received and recognized by the Thai DOCOMOMO committee.

We would like to thank the students of AKU 28 (2023), AKU 29 (2024), and AKU 30 (2025) for their dedication to study and for producing high-quality academic work. We are also grateful to the building owners who allowed us to investigate their properties, and to all interviewees who generously gave their time to answer our questions.

[1] This course, 'Integrated Building Systems and Construction', is for 3rd year students (fifth semester) in the Bachelor of Architecture Program, Kasetsart University.

[2] Several Thai architectural historians have adopted diverse approaches, including work that foregrounds construction history. Pioneers include Ratchaporn Choochuey, Pirasri Povatong, and Pinai Sirikiatikul.

[3] The overall study is a part of a research project: 'Modern Architecture as Learning Ground: Case-Based Construction Studies'.

[4] CHATRI PRAKITNONTHAKAN, *Art and Architecture of the People's Party: Political Symbolism in Ideology*, Bangkok, Mathichon, 2020. [in Thai]

[5] Several scholars have advanced this argument; see, for example, CHOMCHON FUSINPAIBOON, *Modernization of Building: The Transplantation of the Concept of Architecture from Europe to Thailand, 1930s–1950s*, PhD diss., University of Sheffield, 2014, pp. 420-421.

[6] Several scholars considered that this building is a completely reinforced concrete structure. For example, SOMCHAT JUNGSIRIARAK, *Western Architecture in Siam from the Reign of King Rama IV to 1937*, Bangkok, Faculty of Architecture, Silpakorn University, 2010, p. 587. [in Thai]

[7] On localization within processes of modernization, see PORNPAS SIRICURUTATANA, *Negotiating Standards, Improvising Resources: Large-Scale Construction Projects in Thailand, 1910s–1970s,* PhD diss., University of Tokyo, 2020.

[8] Original source: Architecture + Engineering + Construction (1976), Private Archive of Rerkdee Phowanakul.