

## CASE STUDY

# Projecting resistance: A study on the architectural practice strategies of Kunming's Nanping Theater in 1939

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## KEYWORDS

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Unconventionality

**Abstract** Architectural practice in Yunnan during the Second Sino-Japanese War of Resistance Against Japanese Aggression exhibits characteristics of diversity, openness, and pragmatic rationality, fundamentally representing a creative breakthrough amid multiple liminal states. This study examines the Kunming Nanping Theater during wartime through the lens of construction technology. By integrating fieldwork, historical archival research, and oral history interviews with structural analyses, the study reconstructs the decision-making chain and implementation pathway of the theater's design and construction. It explores the modern architectural practice in Yunnan under unique historical conditions. The research aims to investigate the intrinsic mechanisms of localized transformation in contemporary architectural design and construction during exceptional periods, revealing the driving forces and operational logic behind architectural creation during the war. By expanding the perspective of construction technology in the history of modern Chinese architecture, this study further discusses the historical lessons and theoretical insights it offers for global wartime architectural practice and contemporary architectural practice.

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## 1. Introduction

### 1.1. Background

In 1931, with the full-scale outbreak of the War of Resistance Against Japanese Aggression in China, the successive

fall of the southeastern coastal ports created significant logistical challenges for the transportation of strategic materials that relied heavily on foreign aid. Yunnan, serving as China's southwestern rear area during the war bore immense costs to establish and maintain key transportation routes, including the Yunnan-Vietnam Railway, the Burma Road, and the Hump Route. These routes became China's

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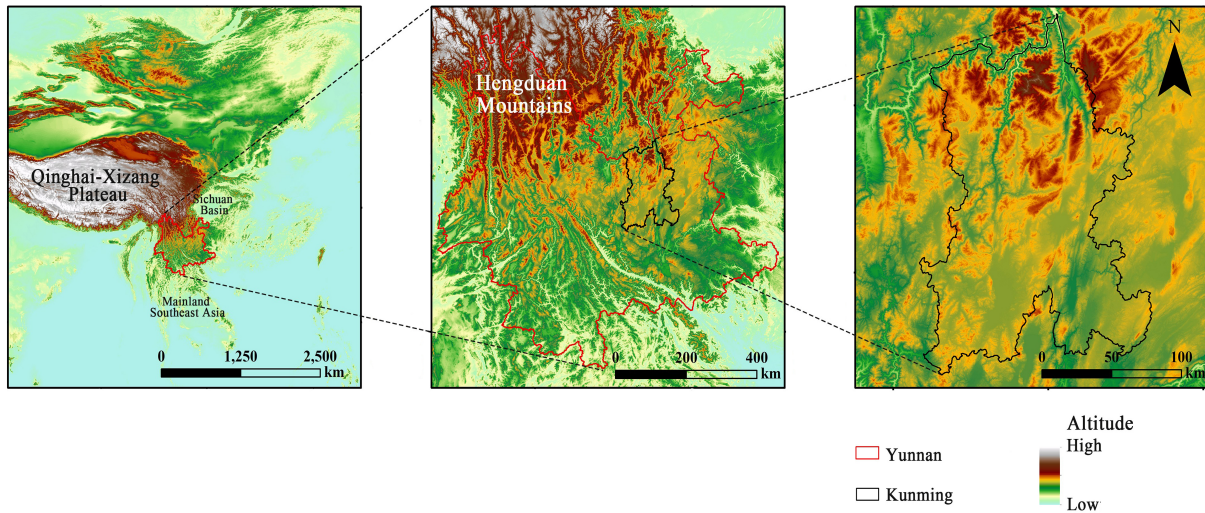


Fig. 1 The geographic location of Kunming, China.

vital arteries and lifelines for receiving international assistance, transporting strategic supplies, and conducting foreign trade during the war (Zhuo and Zhu, 2001). Meanwhile, Kunming, the capital of Yunnan Province (Fig. 1), leveraged its position as the terminus of the Yunnan-Vietnam Railway and the starting point of the Yunnan-Burma Road's central segment, rapidly emerging as one of wartime China's most strategically significant rear-area cities through the interconnected network of these vital transportation routes.

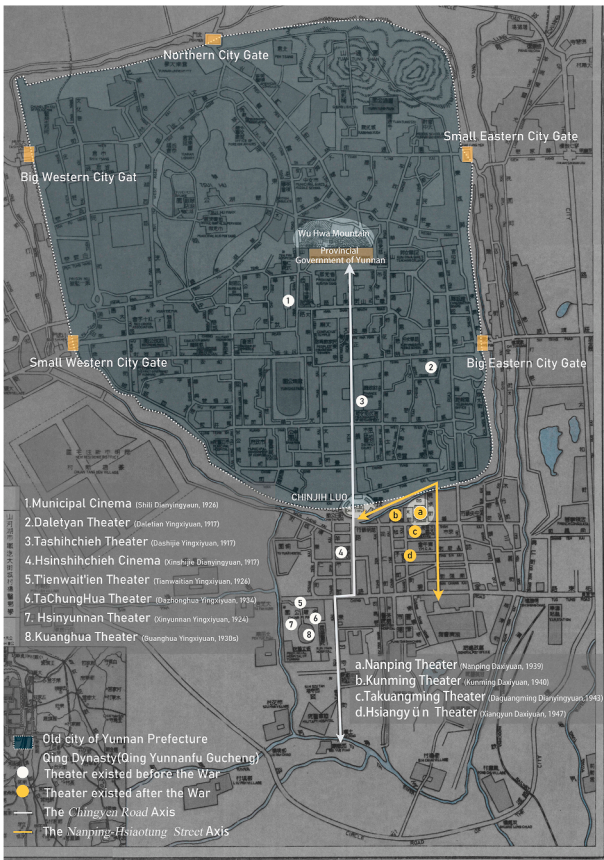
Since 1938, a continuous influx of foreign populations migrated into Kunming, causing a dramatic increase in the city's total population. By 1942, the foreign resident population in Kunming reached 100,000, equivalent to 143% of the native population (Kunming City Local Chronicles Compilation Committee, 2003), driving urban space into an extraordinary phase of construction fueled by both civilian demands and military-industrial needs. During this period, an emerging cluster of entertainment buildings served multiple roles: they embodied the cultural nostalgia of displaced intellectual communities, met local residents' aspirations for modernity, and more importantly, reflected the profound integration of wartime architectural techniques with regional construction practices.

The spatial evolution of film screening Venues in Kunming essentially represented a material process of localized adaptation of modern technologies. In its early stages, film screening spaces in Kunming were typically parasitic, relying on existing venues such as photography studios, temples, citang (Ancestral halls), huiguan (A building in a city during the Ming and Qing dynasties in China where a group of townspeople or peers gathered together) or even theatrical stages. In 1907, Jiang Xuan (a modern industrialist from Jianshui, Yunnan) screened films in the living room on the ground floor of the "Shuiyuexuan" photography studio near Cuihu Lake, marking the widely recognized beginning of modern film screening in Kunming (Kang, 2021). This spatial dependency persisted until the 1920s, when the widespread adoption of electricity triggered a shift toward specialized cinema space. Independent cinemas began to emerge in the city, with

gradual improvements in facilities and spatial environments. By 1935, more than a dozen large-scale professional cinemas had been established in Kunming's urban area, including Hsinshihchieh Cinema<sup>1</sup>(Xinshijie Dianyingyuan, 1917), Tashihchieh Theater (Dashijie Yingxiyuan, 1917), Hsinyunnan Theater (Xinyunnan Yingxiyuan, 1924), T'ienwait'ien Theater (Tianwaitian Yingxiyuan, 1926), Municipal Cinema (Shili Dianyingyuan, 1926), Kuanghua Theater (Guanghua Yingxiyuan, 1930s), Tailo Cinema (Dayile Daxiyuan, circa 1931), Tachunghua Theater (Dazhonghua Yingxiyuan, 1933), and Tachung Theater (Dazhong Yingxiyuan, 1934), alongside several smaller, short-lived cinemas. These cinema spaces retained vestiges of traditional entertainment layouts—such as Takuan Theater (Daguan Yingxiyuan), adapted from a traditional theater while preserving its basic structure. Meanwhile also incorporating modern technical features like standalone projection rooms, as exemplified by Hsinshihchieh Cinema, constructed in 1917 "following the contemporary cinema model (Yunnan Provincial Committee of the Chinese People's Political Consultative Conference, 2004)". This blend of old and new spatial forms served as tangible evidence of a technology-mediated cultural transition.

War acted not only as a destroyer of architecture but also as a catalyst for new architectural practices (Pilav, 2020). Following the outbreak of the war, the influx of internal migrants led to structural changes in Kunming's urban entertainment demands. The spatial distribution of cinemas was reconfigured, clustering along the "Nanping-Hsiaotung Street" axis (Fig. 2). Newly built cinemas became more diverse in spatial form and more comprehensive in facilities, commonly integrating cafés (Fig. 3), reading rooms, and other auxiliary spaces. Against this backdrop, Nanping Theater, designed by Zhao Shen of The Allied Architects and completed by the end of 1939, introduced a column-free auditorium, an Art Deco style façade, and a

<sup>1</sup> Chinese postal romanization system is used for all historical place names in this study to facilitate cross-referencing with historical maps.



**Fig. 2** Map of the urban layout of Kunming City and distribution of cinemas in Kunming City before and after the war. Source: map of Kunming City in 1946, Published by Yaguang Geography house.



**Fig. 3** The Nanping Café. Source: book launch live stream: *Allied architects at war*.

well-integrated fire evacuation system, marked the ultimate realization of cinema space modernization in Kunming. This structure not only resolved the historical inconvenience of “viewers dodging columns” but also materialized wartime Kunming’s cultural aspirations through its streamlined spatial narratives. The coupling of technical rationality and symbolic expression signified an evolution in rear-area architecture from mere functional fulfillment to cultural self-awareness.

Globally, wars have profoundly reshaped the developmental trajectories of architecture, disrupting the singular paradigms of peacetime architectural practice. Completed during China’s Anti-Japanese War, Nanping Theater emerged as the first truly modern cinema in Yunnan’s film history (Zhu and Cui, 2023), with its influence extending to Southeast Asian countries, earning it the title of “the premier cinema of the Far East” (Yunnan Provincial Local Chronicles Compilation Committee, 2002). From the perspective of architectural historiography, the construction process of Nanping Theater holds paradigmatic significance. Its design integrated modern functional elements—such as German projection equipment, acoustic construction materials, and cantilevered structures to overcome site constraints—with local craftsmanship systems, resulting in a regionally appropriate modern architectural solution. This fusion of construction techniques offers a critical lens for understanding the development of modernity in China’s wartime rear-area architecture and positions Nanping Theater as a key case study for examining the localized practice of architectural modernity in global wartime contexts.

### 1.2. Literature review

Existing research on architecture during the second Sino-Japanese War in China suffers from two primary limitations. First, the research perspective predominantly focuses on wartime temporary structures (Zhu, 2020), munitions factories, or airfields and other preparedness facilities (Wu, 2022), with a lack of systematic exploration of the technological history value of urban entertainment buildings. Second, existing studies on urban architecture tend to emphasize social functionality analysis, failing to uncover the technical choices and improvements shaped by the specific historical context. In fact, modern architectural practices in Yunnan during the first half of the 20th century generally reflect an open, diverse, inclusive, and pragmatic rationality responsive to contemporary needs (Tang et al., 2024). Encouragingly, in recent years, Li Haiqing’s team has conducted case studies on various building types from the wartime period, including university buildings, bank structures, and industrial facilities. By integrating interdisciplinary approaches such as spatial design analysis and structural mechanics, they have identified the technical characteristics of these buildings, highlighting an “efficiency turn” (Zhu et al., 2023) in design thinking and “localized” improvements in building techniques in China’s rear area during the War. Their work further uncovers the historical logic and mechanisms behind these technical advancements and selections (Li and Jing, 2019; Li, 2019),

providing valuable perspectives and methodological insights for this study.

Research on Nanping Theater currently exhibits a markedly fragmented character, with no systematic academic framework yet established. Jiang documented relevant information about the theater in his book *The Architectural Heritage of Modern China Kunming*, while Su (2009) narrated the historical story of its preparation and construction through an architectural biography. Jiang (2008) from the perspective of Zhao Shen, an architect at The Allied Architects, explored the design style of Nanping Theater and its connections to modernist architectural trends. Zhu and Cui (2023) examined its paradigmatic value in the evolution of early cinema buildings in Yunnan from a film history perspective. However, existing studies predominantly focus on historical narratives and style analysis, leaving significant gaps in systematic investigations into core issues such as the generative mechanisms of the building's form, its structural techniques, and construction strategies. Only Yang (2022) has offered preliminary discussions on the design, structure, and material use strategies of the theater, addressing these aspects to a limited extent.

## 2. Research aims and methodologies

This study aims to reconstruct the design decision-making chain and construction implementation pathway of Nanping Theater, using construction techniques as an entry point to systematically examine its architectural context and understand its practical logic. The focus is on investigating the context-specific adaptation of modern spatial organization within a constrained site, as well as the coordination between regional craftsmanship and modern building practices. Through a micro-level perspective, the study seeks to reveal the driving mechanisms and realization logic of architectural creation during the Anti-Japanese War period.

The study develops an interdisciplinary research approach integrating history, architecture, and structural engineering. The specific implementation pathway is outlined as follows: First, a systematic review of literature and historical archival materials is conducted to organize fragmented information and reconstruct the historical context of the building's construction. Second, a multi-source data collection strategy is employed, utilizing fieldworks and referencing historical drawings to obtain primary data, thereby addressing gaps in the historical literature. Third, the information and data gathered are used to produce architectural drawings and construct parametric building models, enabling the recreation of the construction process and analysis of the architectural design logic and strategies. Finally, structural engineering analysis is applied to interpret the building's structural system, combined with additional data to examine its construction techniques and strategies.

### 1) Document research

The study involves extensive reading and analysis of primary and secondary sources, including academic papers,

books, historical archives, drawings, newspapers, and official documents. Through critical evaluation of these materials, fragmented information is collected to construct the architectural historical background and restore the historical context of the building's construction.

### 2) Fieldwork

The fieldwork adopted in this study comprises two main components: spatial data collection and oral history documentation. For spatial data collection, digital techniques for surveying and mapping (using 3D laser scanners to acquire point cloud data) are combined with traditional mapping methods to gather primary spatial data, allowing a comprehensive examination of the building's spatial design, structure, and construction techniques. Oral history documentation involves interviews with administrators of Nanping Cinema (a former projection staff), recording their recollections and narratives to obtain information on building management and renovation changes. This supplements historical archival records and facilitates the compilation of the history of architectural transformations for Nanping Theater.

### 3) Parametric modeling

Using data obtained from the above methods, a comprehensive and in-depth understanding of the research subject is achieved, enabling the construction of an idealized structural model. This approach enhances the understanding and analysis of the building's structure and construction techniques.

### 4) Structural analysis

This study employs structural engineering methods to analyze the theater's structural system, dissecting the "efficiency-driven shift" in its structural design. By integrating information on fire safety, materials, and other aspects, the localized construction strategies of its modern architectural techniques are thoroughly examined.

## 3. Results and analysis

### 3.1. The preparation of Nanping Theater

#### 3.1.1. The modernization goal of the building

The preparatory process for constructing Nanping Theater (also known as Nanping Cinema and presently as Nanping 3D Cinema, Fig. 4) vividly reflects the synergistic mechanisms between wartime technical capital and elite networks. In 1938, Kunming's population surged overnight to over 200,000 (Zhang, 2021). Against this backdrop, Liu Shuqing, a female entrepreneur at the time, keenly recognized the emerging business opportunity and resolved to establish a "first-class, large-scale, and fully equipped cinema" in Kunming. She collaborated with influential women such as Gu Yingqiu (Modern philanthropist, wife of the Yunnan governor and warlord Long Yun) and Long Zeqing (Modern patriotic democrat, entrepreneur, wife of the famous Yunnan warlord Lu Han) to form an investment alliance,



Fig. 4 Current state of Nanping Theater.

then known as the “Madam Consortium.” Beyond the fixed capital raised by this group, the remaining funds were secured through bank loans, using newly constructed buildings as collateral (Su, 2009). This “investment plus loan” model broke from traditional financing approaches, providing the economic foundation for an extraordinary construction endeavor.

At the initial stage of Nanping Theater’s architectural preparation, Liu and other investors explicitly set the goal of achieving full modernization. Wei Boguang, the project’s chief coordinator, emphasized at the outset: “Great determination has been made in the construction of *Nanping Theater*. The sole objective is modernization—no expense will be spared, as long as *Nanping Theater* becomes an ideal cinema of the 20th century” (Anon, 1940). Historical records indicate that “the investors committed one million yuan to the project, with 300,000 yuan

allocated for building construction,” and that “its scale was intended to rival first-run cinemas in Shanghai” (Anon, 1939).

### 3.1.2. The operational model

The Allied Architects, founded in Shanghai on January 1, 1932, by Zhao Shen, Chen Zhi and Tong Jun, aimed to “create organic and functional new architecture”, advancing the localized development of modernist architecture in China.

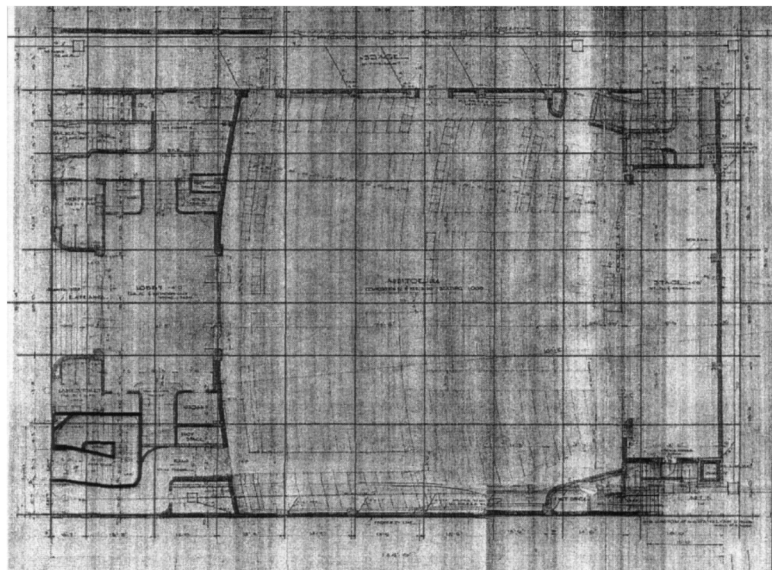
The three founders of The Allied Architects, all graduates of from the Department of Architecture at the University of Pennsylvania, received systematic training in the “Beaux-Arts” system. During their studies in the United States, Art Deco emerged as a central style of modern artistic expression, representing the latest modern architectural trend they deeply engaged with before returning to China (Jiang, 2008). However, their design practice did not merely replicate the Art Deco style but rather integrated it with modernist approaches.

In 1933, The Allied Architects designed the Metropoli Cinema, featured a façade with the rhythmic vertical lines characteristic of Art Deco style, while incorporating the simplified treatments of modernism. The interior spatial layout, guided by functionalism, adopted a column-free auditorium with tiered seating arrangement (Fig. 5), reflecting a rational exploration of cinema architecture in both style and function. In 1934, Zhao Shen was invited to design the Tailo Theater in Kunming (a single-story brick-wood hybrid small-scale theater with an auditorium seating over 1000), marking his first project in the city. These early endeavors established an aesthetic paradigm and technical foundation for his subsequent wartime architectural practices in Kunming.

Following the fall of Shanghai in 1937, The Allied Architects saw its business nearly came to a standstill. In



(a)



(b)

Fig. 5 The Metropoli Cinema in Shanghai, China. (a) The appearance of Metropoli Cinema; (b) Floor plan of Metropoli Cinema. Source: (a) Chinese Architecture, 1934, Volume 2, Issue 3; (b) Jiang (2008).

1938, Zhao Shen decided to relocate to Kunming and establish a branch office. This move was not merely a passive response to wartime displacement but also an active choice by a Chinese architect to preserve cultural continuity and transplant technical expertise. Leveraging the social networks formed during the Tayilo project in 1934, Zhao established collaborations with Yunnan's local warlord-affiliated capital, forming a tripartite structure of "technical elites-local power capital-management practices" (Fig. 6). This innovative model transcended conventional design market operations and provided an institutional framework for the transplantation of modern architectural technologies in Yunnan.

Zhao Shen returned to Shanghai in 1945, and the Kunming branch of The Allied Architects was subsequently closed. During his eight years in wartime Kunming, Zhao Shen undertook numerous architectural projects spanning banks, public buildings, residences, and industrial structures (Table 1). Many of these buildings remain extant today.

### 3.2. Function-oriented modern architectural design

The construction of Nanping Theater began in late 1938 and was completed in early 1940, with a total floor area of 1654.9 m<sup>2</sup> and a seating capacity of 1,427, including 1049 seats in the ground-floor auditorium and 378 seats in the upper balcony. Unlike the temporary, rapid wartime construction typical of China's rear-area cities, Nanping Theater took over a year to complete. This duration did not stem from a pursuit of specific forms or styles but rather reflected a function-driven rational exploration guided by the goal of completion. The core concept of "localized modernity" embodied in this process can be broadly categorized into the following three aspects:

- 1) Intensive land use: Spatial integration and dynamic balance

By the early 20th century, Kunming's urban form consistently retained the "turtle-shaped" outline and traditional grid layout of the Ming-Qing ancient city (Fig. 2). In 1924, to enhance municipal infrastructure and meet urban development demands, the Yunnan government decided to demolish the city wall between Chengji Gate (Zhengyi Men) and Hukuo Gate (Huguo Men) on Kunming ancient city's southern side, creating a new street now known as Nanping Street. The new urban plan extended the geometric grid layout of Kunming's ancient city, transforming the former parade ground adjacent to the central axis in the southern suburb into a commercial district (Han and Li, 2017). The demolition of the city wall and the adoption of the grid layout significantly increased urban compactness (Ždímalová, 2017), enabling Nanping Street to rapidly evolve into a thriving commercial area and, by the 1930s, become the core of Kunming's new commercial market.

Nanping Theater was strategically located in the financial and commercial core of the newly developed outer district. As a newly planned area, the district featured densely packed streets lined with predominantly low-rise traditional wooden structures. To establish the theater as a central node in the region, the site was ultimately chosen at the intersection of Poshin Kai (Baoshan Jie) and Hsiao-tung Kai (Xiaodong Jie) (Fig. 7). The site featured a narrow, north-south elongated layout, with street frontages of approximately 89.3 m on the east and 25.6 m on the south, yielding a length-to-width ratio of nearly 3.5:1. Zhao Shen shifted the main building northward, reserving approximately 400 m<sup>2</sup> for a public plaza (Fig. 8) at the street corner (data above estimated by the authors based on a satellite map from 1965 and current building survey data provided by Kunming Movie Business Co., Ltd). This design broke the enclosed nature of traditional street spaces, using a fountain and curved canopy to create a visual corridor, enhancing the interaction between the building and urban space (Fig. 9). The plaza served as a pedestrian dispersal area, alleviated public space pressure from Kunming's wartime population surge, and subtly conveyed

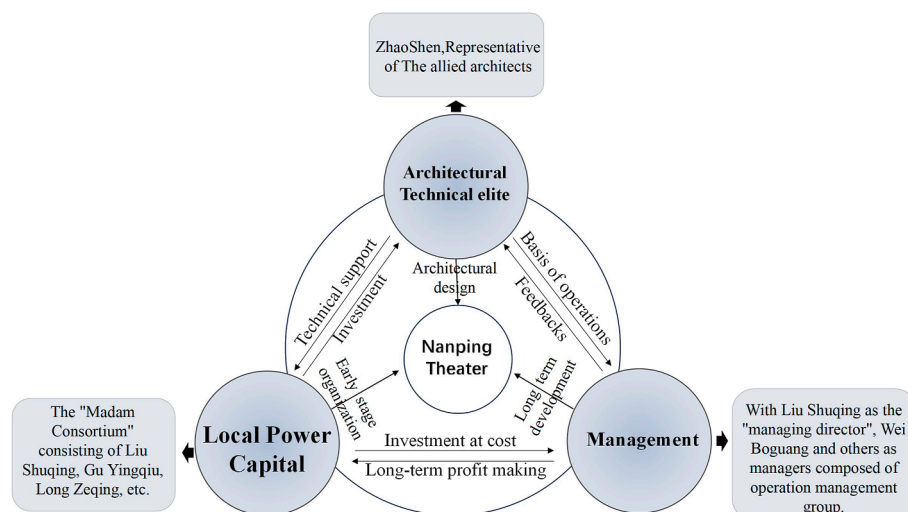








Fig. 6 The "technology-capital-management" model.

**Table 1** Overview of Zhao Shen's major architectural works in Kunming.

Building name	Year of completion	Address	Historical image	Current status	Information source
Tailo Theater	1934	Tingsin Kai (Dingxin Jie), Kunming		No longer exists	<a href="#">Zhang (2021)</a> , p. 27.
Ch'üanyeh Bank (Quanye Yinghang)	1938	No. 62, Nanping Kai, Kunming		Currently used for commercial purposes	<a href="#">Jiang et al. (1993)</a> , p. 32
Nanping Theater	1939	No. 4, Hsiaotung Kai (Xiaodong Jie), Kunming		Listed as a Wuhua District cultural heritage site in December 2012	<a href="#">Long and Ge (2001)</a> , p175.
Kunming Bank	1940	No. 67, Nanping Kai, Kunming		Unknown	<a href="#">Long and Ge (2001)</a> , p175.
Nanping Bank office area	1941	Nanping Kai, Kunming		Listed as part of Kunming's third batch of protected historic buildings in December 2017	<a href="#">Tong (2003)</a> , p. 441.
Chühsingch'eng Bank (Juxingcheng Yinghang)	1942	Intersection of Nanping Kai and Hukuo road (Huguo Lu), Kunming		Unknown	<a href="#">Tong (2003)</a> , p. 443.

Note. The place names above are all translated using the Chinese postal romanization.





**Fig. 11** The hand-painted perspective drawing of Nanping theater. Source: the exhibition of blueprints: the first generation of Chinese architects from University of Pennsylvania.

Deco style in Nanping Theater. However, Zhao Shen did not entirely abandon the style. Instead, through active adaptation, he further refined and simplified the Art Deco vocabulary using modernist design techniques. This created a distinctive and streamlined wartime modern architectural aesthetic that both adapted to the material constraints of the wartime environment and fulfilled the theater's pursuit of modernity.

### 3) Optimized spatial efficiency: Adaptability for openness and multipurpose functions

The interior spaces of Nanping Theater consist of a double-height lobby, an auditorium, and auxiliary spaces (Fig. 12). Despite its limited area (190 m<sup>2</sup>), the lobby's double-height design allows vertical spatial penetration, creating a visual dialogue with the second-floor corridor. The curved glass curtain wall at the entrance dissolves spatial enclosure and fosters fluidity, while the open corridor space on the second-floor doubles as a multipurpose area for leisure, exhibitions, or salons, upgrading functional rationality into social efficacy. The auditorium, as the core functional space, employs a double-height space design and technical controls, enabling the

multifunctional space to adapt to social needs under resource constraints at wartime. The ground-floor auditorium features a gentle 4° slope, while the upper balcony adopts tiered seating to minimize sightline obstructions. The ceiling's curved surface is segmented to control sound reflection paths, optimizing the acoustic environment for viewing (Fig. 13). Additionally, the auditorium includes a stage capable of hosting large gatherings, with wartime propaganda, theatrical performances, and dance events having been staged at Nanping Theater.

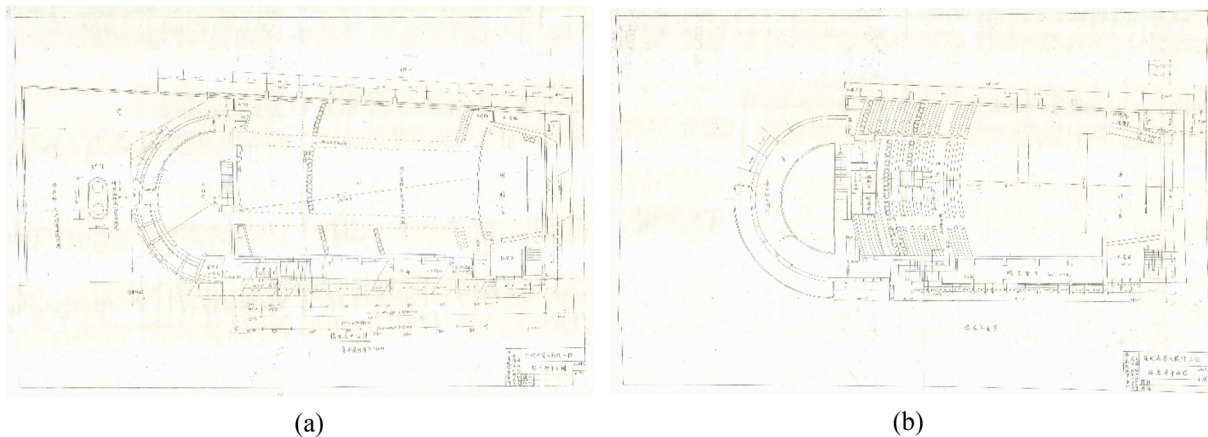
### 3.3. Adaptive structural rationality responses to the war

Nanping Theater was constructed by the renowned modern Shanghai-based construction firm Lugenji Construction Company, established by Lu Genquan in Shanghai in 1929. After the full outbreak of the war, the firm relocated to Kunming, taking on numerous public building projects in Yunnan and becoming one of the most influential construction entities in the region (Hou et al., 2021). On one hand, due to its wartime construction context, the building techniques of Nanping Theater exhibit adaptive characteristics tailored to the war environment and material scarcity. On the other hand, as a modern public building completed collaboratively by construction and architectural groups that migrated to Yunnan during the war, Nanping Theater introduced relatively advanced construction techniques in its structure, fire safety, and material use, significantly advancing the modernization of Yunnan's local public architecture.

#### 3.3.1. The spatial interpretation of a hybrid structural system

Between September 28, 1938, and December 26, 1944, the Japanese forces deployed 3599 aircraft for bombing and reconnaissance missions over Yunnan, conducting 598 bombing raids, nearly half of which targeted Kunming. During this period, air raid alerts were sounded 232 times in Kunming city alone (Yunnan Air Defense Command, 1945).

As a primary target of Japanese airstrikes during the war, public buildings in Kunming had to be designed with



**Fig. 12** Architectural floor plan hand-copied in 1989. (a) Plan of ground-floor; (b) Plan of balcony-floor. Source: provided by Kunming Movie Business Co., Ltd.

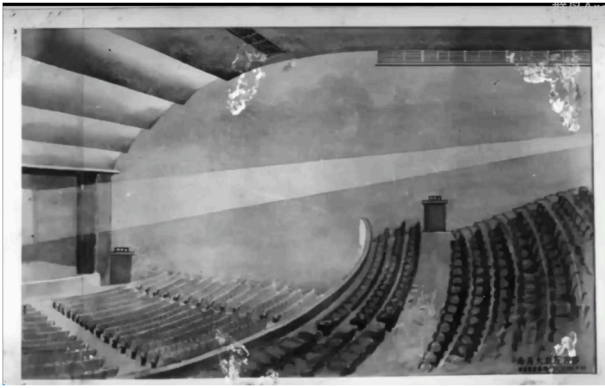


Fig. 13 Hand-drawn interior design of the auditorium. Source: book launch live stream: *Allied architects at war*.

both seismic resistance and air-raid protection. The structural design of Nanping Theater prioritized spatial efficiency, meeting both functional demands and wartime defensive needs. The auditorium, as the core space, employed a reinforced concrete bent structure topped with arc wooden trusses (Around, 1990, it was replaced with a triangular steel-truss roof which remains today, Fig. 14), achieving a large-span column-free space of  $18.9\text{ m} \times 30\text{ m}$ . Given wartime material constraints, this design abandoned the classical colonnades and decorative elements typical of traditional theaters, enabling an unobstructed indoor viewing experience. The bent frame columns, made of reinforced concrete with a cross-section of  $18'' \times 30''$  ( $457\text{ mm} \times 762\text{ mm}$ ), enhanced ductility for seismic resistance. The upper balcony ( $14\text{ m} \times 18\text{ m}$ , 378 seats) utilized a cantilevered beam-slab structure (Fig. 15), supported on three sides with one side cantilevered. This structure is simple in form and convenient to construct, but the space and structural design of the building are very demanding (Dai, 2003). Hence, the cantilevered end of the balcony formed an arc with a curvature of approximately  $0.77$  radians (arc length(s)  $\approx 18.36\text{ m}$ , radius( $r$ )  $\approx 23.70\text{ m}$ , calculated using the formula  $\theta = s/r$ ), to reduce the sense of vertical oppression. The balcony columns featured enlarged footings, while the remaining columns in the auditorium were supported by strip foundations (Fig. 16), reflecting a rational choice for structural efficiency.

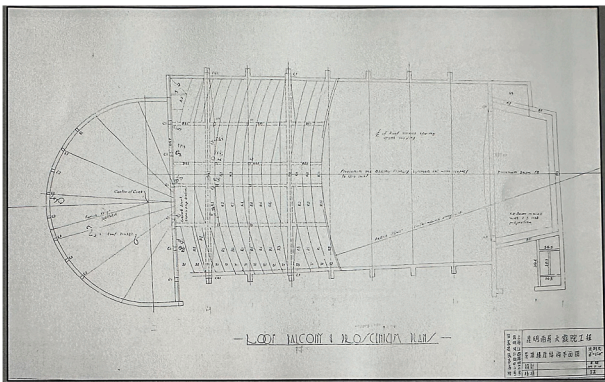


Fig. 14 The roof and balcony plan. Source: provided by Kunming Movie Business Co., Ltd.

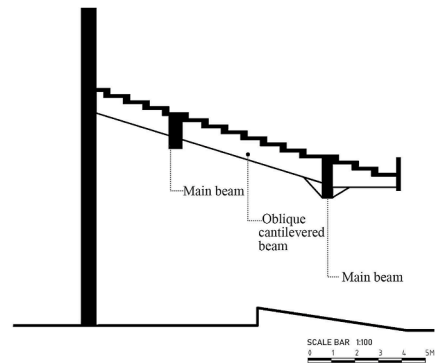


Fig. 15 The structure schematic of balcony.

The lobby of Nanping Theater adopted a curved floor-to-ceiling shear wall structure, with columns and walls radiating along the semicircular hall (the radius is  $10\text{ m}$ ) to form a continuous lateral force-resisting system. Auxiliary functional spaces employed a frame structure to accommodate offices and supporting functions. Beyond creating a fluid and elegant spatial experience and enhancing the lobby's visual appeal as previously noted, the curved shear wall structure outperformed straight walls in distributing and transferring horizontal loads. This design improved stability under lateral forces such as wind or earthquakes, and also enhanced the building's overall seismic performance.

The structural system of Nanping Theater (Fig. 17) demonstrates an efficiency-driven hybrid structural differentiation: the auditorium maximizes functional efficacy, the entrance emphasizes the sense of ceremony presented by structure, and auxiliary spaces prioritize practicality. This technical strategy broke from the form-first traditions of Classical architecture, adopting a "space-structure-function" feedback mechanism guided by efficiency. It provides a localized practice sample of "technical modernity" for the study of modern and contemporary Chinese architectural history.

### 3.3.2. The transplantation and localization of fire safety regulations

As a large-scale public building during wartime, the design of the theater's fire safety system faced two major

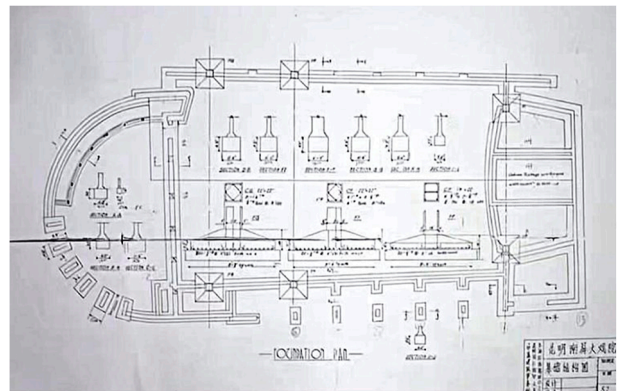


Fig. 16 The foundation plan. Source: book launch live stream: *Allied architects at war*.

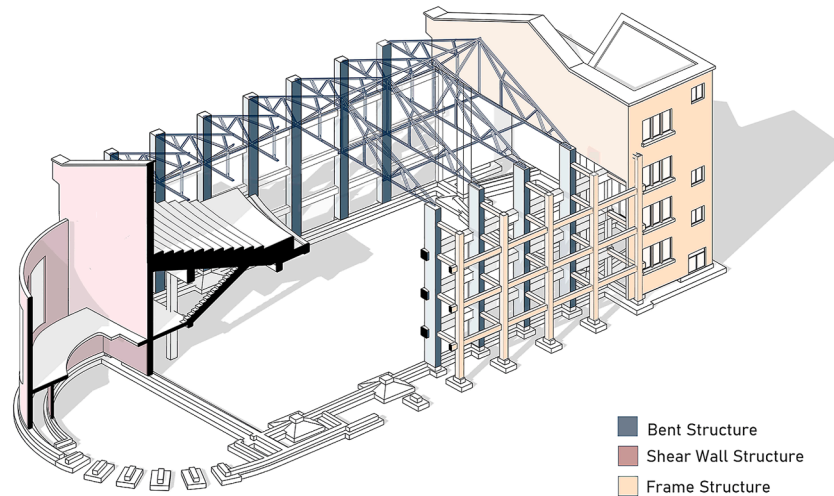


Fig. 17 The hybrid structural system.

challenges. First, ensuring efficient evacuation in a high-occupancy space, with 1049 seats in the ground-floor auditorium (approx. 800 m<sup>2</sup>) and 378 seats in the balcony (approx. 300 m<sup>2</sup>) under frequent air-raid alarms. Second, managing the high-risk chemical properties of nitrate film (used in the 1930s and 1940s, with a flashpoint of only 120 °C, a burning rate of 0.3 m/s, and releasing toxic cyanide gas) amidst a scarcity of fire-resistant materials during wartime. Against this backdrop, the fire safety system of Nanping Theater exhibited remarkable foresight, integrating both regulatory transplants from foreign concessions and adaptive modifications to local construction conditions.

In terms of evacuation system design, Nanping Theater achieved efficiency breakthroughs through a composite “main entrance-emergency exit” system:

**First, planar diversion.** The ground floor featured five evacuation exits (currently six, with the additional exit near the vertical staircase along Hsiaotung street added later), including three exits lead directly outdoors. Each exit measured 5 feet (1.524 m) wide, providing a minimum clear evacuation width of 0.73 m per 100 people, close to the 0.75 m stipulated in China’s contemporary *Code for Fire Protection Design of Buildings* (GB50016-2014, 2018 Edition). A “funnel-shaped” buffer space guided the flow of people for stratified evacuation (Fig. 18). Ideally, calculations suggest the building could evacuate approximately 290 people per minute, indicating high efficiency (This calculation assumes an exit flow rate of 0.67 people/s/m or 40 people/min/m, a maximum seat-to-exit distance of 13 m, five exits each 1.524 m wide, a walking speed of 1.2 m/s, and 1050 ground-floor occupants. The *walking time* is calculated as:  $walking\ time = distance / speed = 10.83\ s$ ; The *exit capacity* is given by:  $exit\ capacity = number\ of\ exits \times width \times flow\ rate = 304.8\ people/min$ ; The *queuing time* is:  $queuing\ time = total\ occupants / exit\ capacity \approx 206\ s$ ; The *total evacuation time* is:  $total\ evacuation\ time = walking\ time + queuing\ time = 217.52\ s \approx 3.62\ min$ ; Thus, the *evacuation rate* is:  $evacuation\ rate = total\ occupants / total\ evacuation\ time = 1050 / 3.62 \approx 290\ people/min$ ).

**Second, vertical safety.** The balcony included an independent evacuation staircase (the current emergency exit and external staircase in the west were added in 2001) leading directly outdoors, measuring 4.6 feet (1.40 m) wide, forming a vertical escape route that enhanced safety redundancy.

**Third, visual guidance.** White-background red-lettered “Taiping Men (emergency exit)” signs and wall-mounted emergency lighting ensured path visibility in smoky conditions (Fig. 19).

In terms of fire protection, due to material shortages in wartime, it is difficult to obtain fire-proof material. The enclosure structure of Nanping Theater utilized standard blue bricks (115 mm × 240 mm × 66 mm, laid in a running-bond pattern) produced by local Kunming brick factories (He, 1940), offering good fire resistance. Additionally, fire compartments were established, physically isolating the auditorium from the high-risk projection room, which was equipped with an independent ventilation system to ensure air exchange (Fig. 20).

The institutionalization of fire safety standards for modern Chinese cinemas began in Shanghai’s International Settlement. The Shanghai Municipal Council’s *Special Regulations for Theaters* (1915) established a technical framework covering fire compartments, evacuation routes, and fire-resistant materials (Shanghai Municipal Council, 1933; Wang and Zhang, 2016). Building on this standard, Nanping Theater’s fire safety design pursued a threefold innovation mechanism: “transplantation, localization, and optimization.” The details of material substitution for performance enhancement, adaptive improvements in fire-resistant construction, and the transition of Chinese cinema fire safety from “colonial discipline” to “autonomous standards” warrant further exploration, potentially shedding light on the broader value of wartime architecture.

#### 4. Discussion

The preparation, design, and construction of Nanping Theater, as detailed above, reveal architectural practice

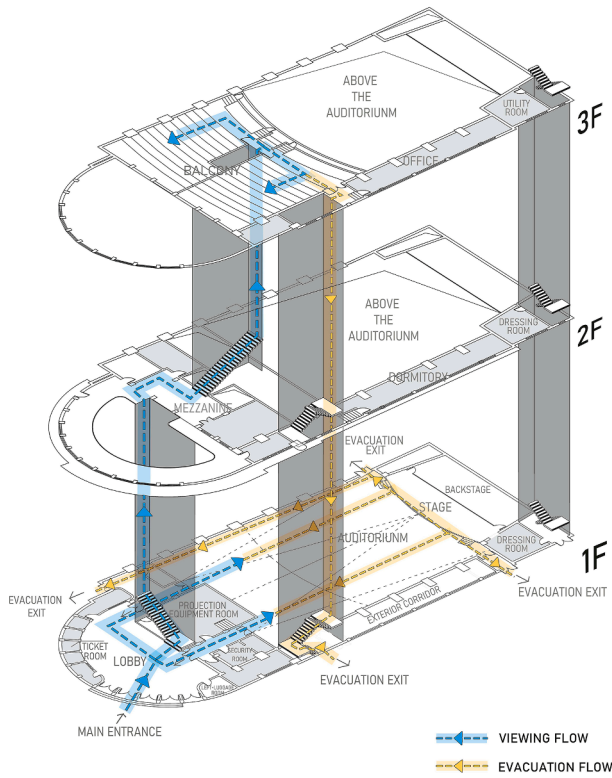


Fig. 18 The viewing and evacuation flow of the building.



Fig. 20 The ventilation opening of the projection room.

strategies shaped by the interplay of temporal, material, and regional environments, highlighting the uniqueness of wartime urban modernity in architectural practice. Public architecture often concentrated reflects the advanced levels of architectural thought and construction techniques of its era (Siláci and Vitková, 2017). Unlike other contemporaneous temporary structures in the rear area during the Anti-Japanese War, such as the makeshift campuses of Southwest Associated University, the construction of Nanping Theater was not only driven by goals of rapid building or functional utility. Instead, guided by a value

orientation of “pursuing modernity,” it overcame numerous challenges to maximize “efficiency,” presenting an “optimal solution” within the complex architectural practice environment of wartime.

Within a similar design context, public buildings in rear-area cities during the war generally adopted comparable strategies: while pursuing modernization, they adjusted design and construction strategies under real-world constraints and practical demands. The use of the most pragmatic, effective, and economically feasible techniques represented the best resolution for investors, architects, and construction teams facing numerous challenges, embodying a distinctive expression of public buildings like theaters in wartime rear-area cities.



Fig. 19 The evacuation sign.

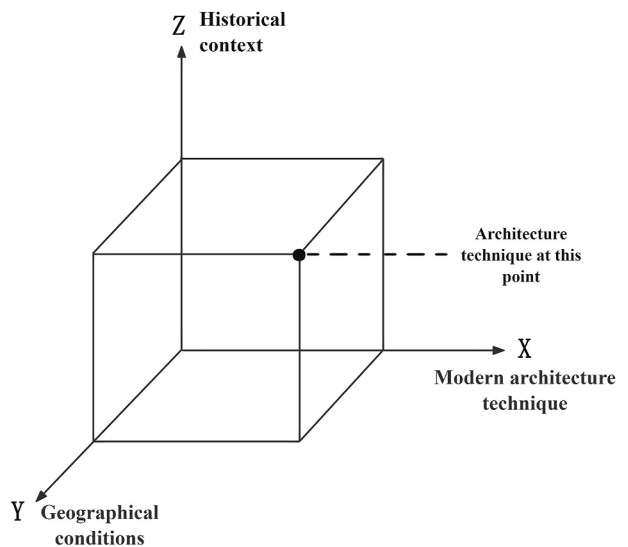


Fig. 21 Heterogeneous coordinate system for understanding modernity.

From an international perspective, wartime architectural practice exhibits global commonalities, characterized by transforming survival needs into spatial design under extreme resource constraints through technical simplification, localized material use, and efficiency-driven strategies to sustain functional modern spaces. However, unlike Europe's emphasis on industrial standardization (Wall, 2013) or Japan's reliance on policy tools (Zhang, 2017), China's wartime rear area pursued a complete expression of architectural modernity despite resource scarcity. This "constrained but uncompromising" model finds parallels in global contexts, such as during the siege of Sarajevo, where architects adapted peacetime strategies by integrating civilian experiences with professional expertise, resulting in function-oriented wartime urban architecture (Pilav, 2020). This forms a transcontinental dialogue with the Nanping Theater—both demonstrate that the essence of technical localization lies in reconstructing technical rationality under constraints, rather than outright abandonment or passive compromise.

This study systematically investigated Nanping Theater as a paradigmatic example of wartime urban architecture. By analyzing its historical material conditions through architectural history and employing structural engineering methods to examine its design and technical strategies in depth, the study fills a scholarly gap in the history of entertainment architecture in rear-area cities during the Anti-Japanese War. It also provides a replicable methodology for similar architectural study.

Based on the case study of Nanping Theater, this research preliminarily constructs an interpretive framework for urban building practice strategies in the wartime rear area. However, due to the sample limitation of a single case, it remains challenging to develop a universally applicable theoretical model. Furthermore, numerous details regarding the mechanism of "transplantation and localization" of modern fire safety standards in inland regions warrant further exploration, potentially offering new perspectives and directions for uncovering the value of wartime architecture. Our future research will proceed in two directions: (1) expanding the sample of wartime urban architectural practice to explore a more broadly applicable theoretical framework; (2) investigating additional perspectives, such as modern building regulations, to uncover the multifaceted value dimensions of wartime architectural practice.

## 5. Conclusion

Architectural practice in Yunnan during the Second Sino-Japanese War exhibits characteristics of diversity, openness, and pragmatic rationality, fundamentally representing a creative breakthrough amid multiple liminal states. The achievements of Nanping Theater's architectural practice lie not only in its construction techniques but also in establishing a heterogeneous coordinate system of "modern theory, regional conditions, and historical context" for understanding modernity (Fig. 21). This offers three paradigmatic breakthroughs for architectural history research:

1) The architectural practice of Nanping Theater represents a distinctive pathway shaped under extreme constraints through systematic restructuring (diverse

structural systems) and cultural adaptation (localized transformation of Art Deco façades). This practice demonstrates that Chinese architectural modernity is not merely a "Western-to-Eastern" transmission but rather a "context-technology" composite formed through proactive cultural adaptation under objective constraints, establishing an autonomous transitional state of construction techniques. This generative mechanism of "unconventional modernity" provides a cognitive framework for architectural history that transcends the "center-periphery" paradigm. The construction practices in this "peripheral region" offer critical insights for challenging the linear evolutionary narrative of modern Chinese architectural technology history.

2) The construction philosophy of wartime architectural practice is essentially "form follows efficiency". The synergistic operation of Nanping Theater's hybrid structural systems is not merely a technical risk or passive compromise but an ethical choice forged in the interplay of safety, efficiency, symbolism, and resource constraints. Beyond being a wartime extension of The Allied Architects' modernist ideals, Nanping Theater represents a creative fusion of technical rationality and cultural consciousness. Its "extreme creativity under limited conditions" provides a historical mirror for contemporary heritage conservation, technical inheritance, and adaptive reuse. It charts a path of modernity unique to Chinese architecture, serving as both a practice of modern technical rationality and a profound response to regional conditions and historical context. This wisdom of "creation within constraints" remains profoundly relevant for contemporary architecture addressing challenges like climate crises and resource scarcity.

3) Wartime construction practices serve as a critical juncture for understanding the technological transformation of 20th-century Chinese architecture. As a carrier of history, the value of Nanping Theater lies not only in its material remains but also in demonstrating that modernity can be achieved through nonlinear, localized pathways. Given the limitations of historical records, the writing of architectural history must shift from "positivism" to "interpretivism". Its theoretical significance does not lie in providing standardized technical answers but in constructing a critical perspective: at the points of material scarcity and technical ambiguity, new historiographical methodologies may emerge. This "incomplete modernity" eschews simplistic technical hierarchies, focusing instead on the generative logic and existence rationality of diverse technical systems in specific historical settings, offering an opportunity to rethink global technological history narratives.

In summary, the heritage value of Nanping Theater extends beyond its historical case study as the "premier cinema of the Far East." It constructs a critical historical cognitive framework: when technical modernity encounters regional resistance, constraints do not represent developmental obstacles but rather become vital arenas for fostering local technical paradigms. Amid the perpetual tension between globalization and localization, this unconventional practice strategies from a peripheral region

may serve as a key to resolving the crisis of homogenization in contemporary architectural practice.

## AI ethics statement

During the preparation of this work the authors used ChatGPT in order to improve language. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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