

# Research on the Strategy of Preservation and Utilization of Cultural Relics--Take the former site of the training institute for skilled workers in Nanman Army Arsenal as an example.

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**ABSTRACT:** The former site of the Training Institute for Skilled Persons in Nanman Army Arsenal is located on the campus of Dadong Vocational College in Shenyang, and it is the fifth batch of cultural relics protection units announced by Shenyang. Firstly, this paper gives a brief introduction to the "old site" buildings, and then summarizes the existing diseases of cultural relics buildings by means of on-site investigation and engineering surveying and mapping. Adhering to the tenet of "utilization is the best protection", this paper focuses on the principles and strategies of protection and utilization of cultural relics buildings, so that cultural relics buildings can be well repaired and historical information and values can be better protected.

## 1. INTRODUCTION

After the "September 18th Incident" broke out in Shenyang in 1931, the Japanese army intensified its aggression against Northeast China. In order to speed up the invasion of China and meet the expanding ambition, in 1936, the Japanese army began to build an arsenal in Wenguantun, Shenyang, that is, the South Manchurian Army Arsenal [2]. The factory belongs to the Ministry of Weapons of the Japanese Army, which is directly under the jurisdiction of the Ministry, and the Institute for Training Skilled Persons is a training institution for training technicians. After several name changes and function adjustments, it is now part of the school site of Shenyang Vocational and Technical College. The "old site" includes many buildings including the "old canteen" and the "old auditorium". This study only focuses on these two buildings, with a total area of 2,116.9 square meters (see the building layout in Figure 8). Among them, "Old Dining Hall" is a large space with single-storey brick-concrete structure, with a building area of 888.5m<sup>2</sup> and an L-shaped layout. The "Old Auditorium" is a two-story reinforced concrete-wooden frame mixed structure. The first floor is an inner corridor layout, and the second floor is a large space with a building area of 1228.4m<sup>2</sup>. Both buildings suffered from long-term damage and poor maintenance, and the structure of the building was dangerous. The roof truss, floor and other parts were damaged to varying degrees.

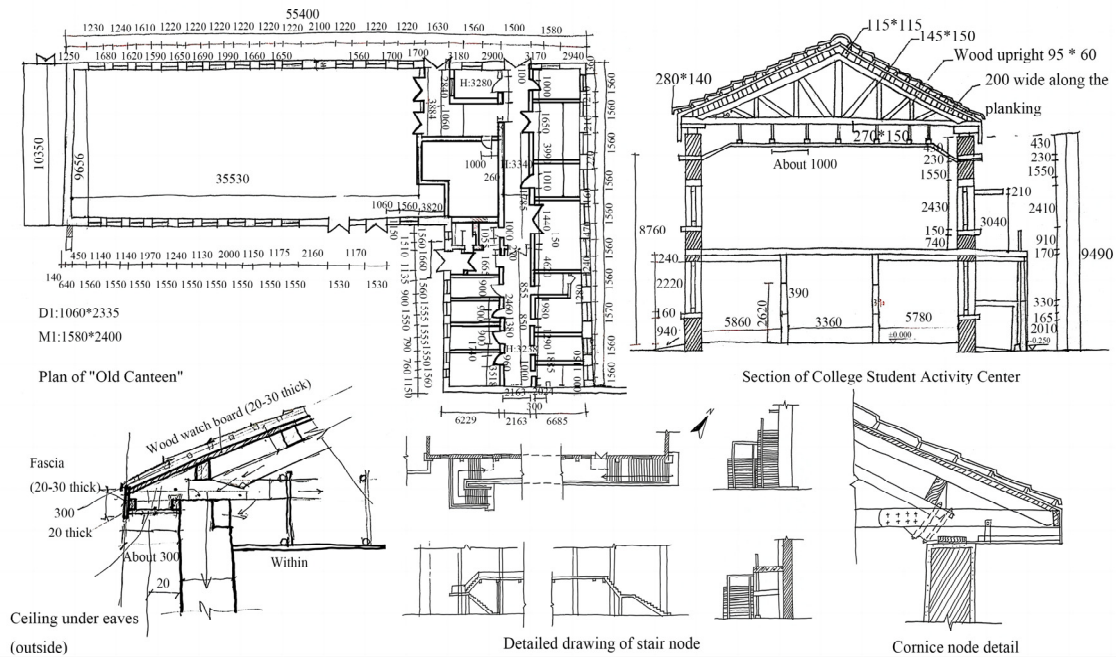
The "former site" is the remains of Japanese colonial institutions and military organizations, which undertake their political, cultural and military aggression functions, and the affiliated training institutions of huge military enterprises. It is the important material evidence of Japanese imperialism's war of aggression and colonial aggression, and has high cultural relics value and historical value. Although the heritage building constitutes a dangerous building due to various factors, it can be protected and repaired to prolong its life and leave its corresponding historical features and personality characteristics, which is exactly the value of this building to protect [8]. Therefore, it is urgent to protect and repair cultural relics in time.

## 2. SUMMARY OF EXISTING DISEASES

### 2.1. Research methods

The survey and design of cultural relics buildings is an important prerequisite for the development of protection projects [6]. On-the-spot engineering surveying and field investigation are adopted, and building surveying and mapping is carried out by measuring tape, laser rangefinder, theodolite and other instruments, taking the cultural relics and the surrounding environment as the boundary. Figure 1 is a partial surveying and mapping sketch. Through cameras, drones and other equipment, the present situation of cultural relics buildings is photographed and recorded, and the disease location and construction technology are studied and recorded.

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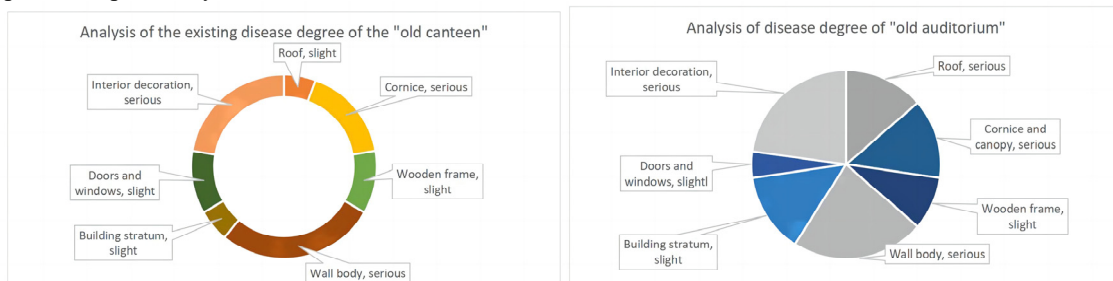
**Fig. 1.** On-site mapping sketch (Sort out according to the project)

## 2.2. Summary of existing diseases

The current disease situation of the old site is an important manifestation of its damage, hidden dangers and existing problems. The confirmation and analysis of the current disease is the basis for understanding the disease form, damage law and influencing factors of the old site building, and can also provide reference for further clarifying the protection object and work focus, adjusting the protection design scheme, and finally ensuring the performance and use of the building components, equipment and facilities of the old site [4]. As shown in Figure 2, according to the on-site investigation and analysis, the serious diseases of the "old canteen" are the outdoor walls, cornices and indoor ceilings, and the doors, windows, roofs, wooden frames and other parts also have diseases that need to be solved urgently. The internal and external walls of the "Old Auditorium" are affected by rain leakage, and the phenomenon of large-scale resurgence is serious. The second-floor roof tends to collapse, and its roof, doors and windows floors and other parts also need to be repaired emphatically.

According to the appraisal report of the project, the safety of this building seriously fails to meet the Reliability Appraisal Standard of Civil Buildings, and the superstructure of the foundation is cracked due to uneven settlement, which seriously affects the overall bearing capacity. Therefore, protective measures should be taken immediately.

As shown in Figures 3 and 4, the two buildings have different degrees of damage on the roof, roof truss cornice, wall and floor strata (see Table 1 for specific diseases). There are many diseases in the "Old Auditorium", such as some external doors being blocked, the original windows being changed to doors, the current situation of the second-floor verandah on the south side of the building, the widespread cracking of the cantilever steel-concrete floor slab, beams and protective layers, and the corrosion of exposed steel bars. On the south side, the green space pavement and materials are aging, some paths are unreasonable, the current landscape pavilion needs to be repaired, and some branches, flowers, trees and lawns need to be trimmed.



**Fig. 2.** Analysis of existing disease degree



**Fig. 3. Disease of "old canteen"**



**Fig. 4. The current disease of "old auditorium"**

### 3. PROTECTION PRINCIPLE AND PROTECTION STRATEGY

#### 3.1. Protection principle

##### 3.1.1. Authenticity and integrity protection.

Authenticity includes the protection of various factors such as the shape design, function, environmental location, spirit and feeling of cultural relics. In the process of renovation, the original functional forms and other elements of cultural relics buildings should be followed, and the value of cultural relics buildings should be respected. To carry out the research and historical protection of architectural heritage, the first threshold that can't be bypassed is the concept of "integrity" of architectural heritage [7]. Valuable structures, ancient and famous trees in the park are also included in the overall protection scope. Although we often mention the word "protection and utilization" for cultural heritage, compared with protection, the overall utilization level of old architectural heritage is still not high [1]. Therefore, on the basis of respecting the intrinsic value of cultural relics, it is a better protection for them to actively develop their "living value", make proper use of them, improve their overall value and make them glow with new functions.

##### 3.1.2. Minimal intervention.

Adhere to the principle of "minimum intervention" and

adopt protective measures, with the main goal of continuing the status quo and alleviating the damage [3]. "Protective damage" in daily maintenance, due to the lack of technical guidance, one-sided pursuit of new forms and materials, the maintenance process caused the destruction of historical features and the loss of historical information [10]. In the repair work, attention should be paid to reducing human intervention on cultural relics and avoiding damage to cultural relics.

#### 3.2. Protection strategy

##### 3.2.1. Part of the main body is reserved, and the basic diseases are repaired.

During the maintenance, the original components in the "old site" with intact features and values should be preserved, as shown in Table 2, and all the original internal and external walls, stairs, wooden frame and other components of each building should be protected in their original state. Preserving the original components is to preserve the information of cultural relics and their important values, while repairing diseases is a more critical protection for cultural relics. Based on the above protection principle, we should also pay attention to reducing the damage to the cultural relics when repairing the diseases. As shown in Table 1, we list the diseases of cultural relics and the corresponding repair measures, and restore the cultural relics to the original red brick wall. The "old auditorium" adopts the way of red brick veneer, giving up the practice of shoveling the outer wall skin, so as to reduce the direct damage to cultural relics.

**Table 1.**Disease control measures

| position          | disease  | Prevention measures  |
|-------------------|--|--|
| roofing           | Broken tile and loose ridge  | Tile repair, rafting, cornice board repair   |
| wooden truss      | The wooden house is deformed and twisted, and the nodes are loose; The upper chord of the wooden rafters is damp and rotten. Erosion; Look at the damp and rotten board.   | Maintenance of rafters, cornices, watchboards, etc. Roof truss inspection, evaluation, renovation and reinforcement; Anti-corrosion, Mothproof and Fire Prevention of Wooden House.  |
| Wall body         | The wall surface layer is often damaged and cracked, and the brick is weathered and crisp. The corner is damp and the surface layer is empty and cracked; brick setting Aging, loosening and cracking of blocks. | Waterproof, moisture-proof and reinforcement of walls; Foundation wall reinforcement; Removing and filling alkali from the wall; Windows and doors are reinforced by beams and vouchers; Masonry caulking reinforcement; Plastering, line corner and finishing layer repair; Removal of exterior wall paint. |
| Floor stratum     | Local hollowing and cracking of cement stratum; The concrete of the steel mixed floor is opened in many places. Cracking, steel exposed corrosion.   | Renovation and reinforcement of floor strata.  |
| doors and windows | The original doors and windows do not exist, the sill frame and sash are deformed, and the nodes are loose.  | Windows and doors are reinforced by beams.   |
| interior decorate | The original lath plastering shed is damp and rotten; White walls are generally damp and aging; current; The ground of cement mortar is damaged and hollowed.  | Indoor, ground and interior wall maintenance; Outdoor apron drainage ditch.  |

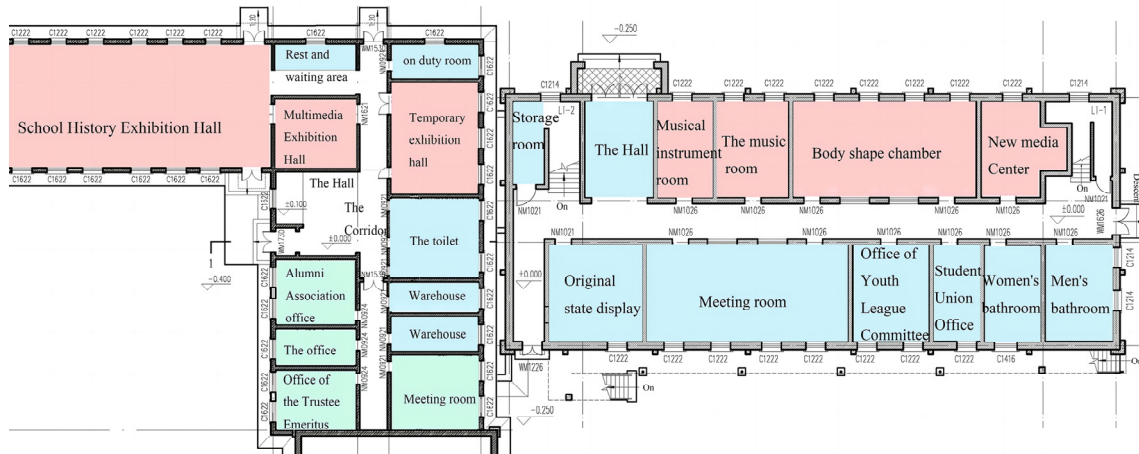
**Table 2.** Save the original components.

| Original component                              | Specific content  | Original component                    | Specific content  |
|---|---|---------------------------------------|---|
| Architectural plane layout                      | Layout of roads and buildings, all internal and external walls of each building, original stairs, entrances and exits, etc.                         | All wooden racks.                     | Methods, materials and combination of wooden frame, wooden overhanging eaves and brick sealing eaves. |
| wall  | The interior and exterior walls of each original sintered red brick. Original protection of lintel structure of doors and windows, windowsill, etc. | Original stairs and doors and windows | For stair materials, skirting boards, handrails and railings.   |
| Original indoor ground and construction methods | Original indoor ground and construction methods.  |                                       |   |

### 3.2.2. Internal function adjustment and update.

The research shows that scientific and rational activation and utilization is an important way to promote the protection level of modern cultural relics, reinterpret the heritage value, reshape the use function, rebalance the economic interests and upgrade the city quality [5]. It is a necessary design to re-plan the original two buildings with

single internal functions and unreasonable spatial planning to enhance the internal vitality of cultural relics. Figure 5 shows the designed plane. The original plane function of the "Old Dining Hall" is a single dining room and office, but the present situation is changed into a display space and office space with various functions. The "Old Auditorium" used to be a dull office function, but now it is used as an activity center, with multi-functional student activity places such as a body room, a music classroom and an office of the Youth League Committee.



**Fig. 5.** Adjustment of functions of "Old Canteen" and "Old Auditorium" (Based on project drawings)

**3.2.3. External environmental remediation and design.**

According to the summary of the above diseases, the study plans to renovate and transform the north and south green spaces of the "Old Auditorium" building. As shown in the graphic design of Figure 6 and Figure 8 on the left, keep and repair the landscape pavilion, protect valuable trees,

trim the lawn and flowers and shrubs in the garden, design and standardize the path in the garden, lay a trail centered on the landscape pavilion, as the main path, run through Wenwang Road on campus and the entrance to the south side of the building, add a green slate garden, walk along Yong Road, lay permeable bricks, keep the original main entrance on the north side of the building, and add a leisure platform in the venue to facilitate communication between teachers and students.

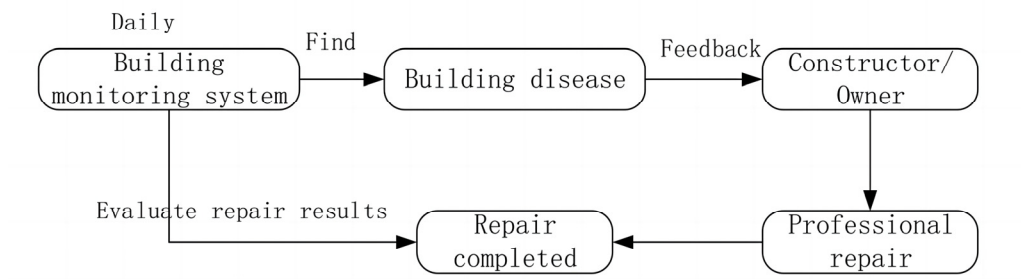


**Fig. 6.** External environment design

**3.2.4. Building information protection.**

Today, with the development of scientific and technological information, computer technology also plays an irreplaceable role in the protection of cultural relics and buildings. In order to prevent man-made damage and natural damage, it is necessary to conduct regular inspections and special inspections, deal with potential safety hazards in time, ensure the safe use of

cultural relics buildings and slow down the decline of cultural relics [9]. As shown in Figure 7, in the later routine maintenance of the "old site" building, the status of cultural relics can also be monitored in real time by computer technology, and timely fed back to the owner and the construction unit. After the professional repair, the system can also conduct professional evaluation on the repair link and the current situation of the building, so as to further protect the building safety.



**Fig. 7.** Daily protection of cultural relics disease monitoring system

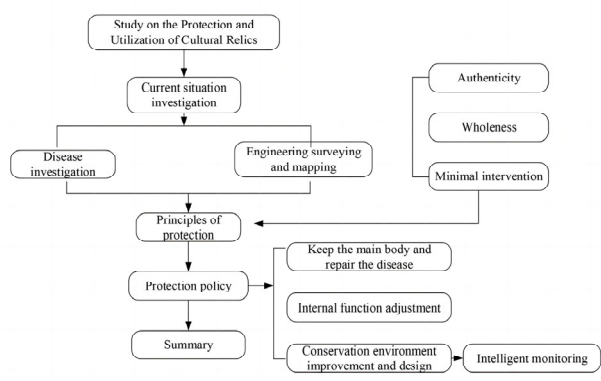


Fig. 8. Design and research route of external environment remediation

## 4. SUMMARY

Cultural relics, which integrate history, science, art and social values, are the witness of the development of contemporary society. As shown in the figure on the right, taking the former site of Nanman Army Arsenal as an example, this paper discusses the protection principle of the "former site" and puts forward the repair strategy on the basis of the current disease investigation. On the basis of the renovation of the present situation, we should re-plan the architectural functions, improve the external environment, and coordinate the internal and external vitality of the cultural relics from the holistic perspective, so that the cultural relics can be well protected and the humanistic spirit can be continuously passed down.

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