Case studies of structural preservation in Taiwan

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Case Studies of Structural Preservation in Taiwan

Conservation de constructions à Taiwan

Fallstudie einer Tragwerkserhaltung in Taiwan

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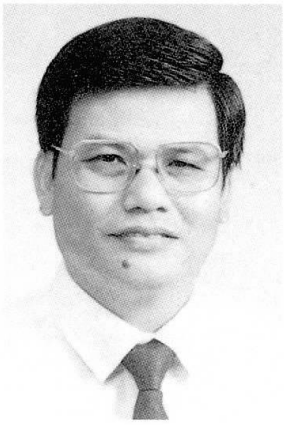

SUMMARY

Owing to the traditional custom of dividing Taiwanese family property upon succession, it is very difficult to maintain the original old buildings for more than three generations. Even if not discarded, they would not be kept intact in the process of settling property ownership. Old houses are thus often left in disrepair. Due to the economic growth and urbanization of recent years, most ancient buildings have been destroyed. However, some have been removed and reconstructed. Thus it was possible to dismantle and inspect them. This paper presents some removal and reconstruction projects of old chinese style dwellings.

RÉSUMÉ

Dû à la tradition à Taiwan de répartir la propriété familiale lors d'une succession, il est difficile de maintenir d'anciens bâtiments dans l'état original pour plus de trois générations. Même s'ils ne sont pas détruits, ces bâtiments ne restent pas intacts lors de la répartition de la propriété. Souvent les vieilles maisons sont laissées dans un état délabré. Suite à la croissance économique et l'urbanisation récentes, maints anciens bâtiments ont été détruits. cependant, certains ont été déplacés et reconstruits. Ceci a permis de les démonter et de les analyser. L'article présente quelques projets de déplacement et de reconstruction d'anciennes habitations de style chinois.

ZUSAMMENFASSUNG

Weil gemäss der taiwanesischen Tradition der Familienbesitz unter den Nachkommen aufgeteilt wird, ist es schwierig, alte Gebäude über mehr als drei Generationen hinweg in ihrer ursprünglichen Form zu erhalten. Selbst wenn nicht zerstört, überstehen sie den Besitzerwechsel nicht unbeschadet. Alte Häuser werden deshalb oft nicht unterhalten. Aufgrund des raschen wirtschaftlichen Wachstums und der Überbauungen der letzten Jahre wurden viele altertümliche Gebäude unwiderruflich zerstört. Einige werden jedoch abgetragen und an einem anderen Ort neu aufgebaut. Dies ermöglichte es, sie zu zerlegen und zu analysieren. Dieser Artikel stellt Umzugs- und Wiederaufbauprojekte altchinesischer Wohnhäuser vor.

1 INTRODUCTION

Time has developed the craftmanship and style of the construction but also destroy their production. Of course, those famous palace and castle represents the development of culture and collect the way of the life. Thus are well preserved. The old homestead are mostly simple and crude. They are disappeared or being evolve to form a new hermitage. People do not consider as their cultural property need to be conserved. Most of the Chinese homestead are the multiple winged compound or courtyard building which we called it as "Ho Yuan" (Fig.1). This kind of courtyard compund survived more than 3000 years in China and house an entire extended family for the empire as well as for the clan. Besides the hardware and shape, traditional ho-yuan also extolled a natural, layered and shifting spacial notion. Could this be applied in a vital, living way to modern architecture?

Most rural large-scale ho-yuan have not been so fortunate. With changes in the social structure, young people are flowing out to work or study in the cities, and the population has been continually outmigrating. Except for two or three of the households, most of the rooms have only a steel lock to keep them company. If tiles fall off, or pillars corrode, both traditional building materials and craftsmen are rare and costly. With no one looking after it, the whole structure just falls apart, until there is no alternative but demolition.

Another problem is the arguments on the questions whether the homestead should be torn down or not, and if the answer is "yes" whether it should be reconstruct on a new site with the way that the original structure and appearance can be preserved almost to its perfection.

In this paper we take some examples of the removing and reconstruction of the homestead, most of them are wooden structures used for Chinese immigrant clan to Taiwan or the aboriginal cottages, for case study (Fig.1,2). The way of study are thus:

First: to study the face that family life is central in traditional Chinese way of living, that it is linked closely with cultural life, and that traditional Chinese architecture reflects this humanistic social structure. In the face of rapid social changes, however, we should hold a balanced view toward the measures of preserving our cultural heritage.

Second: to make a brief analysis of the historical background of the owners, so that we may gain a better knowledge of the development of the dwelling. To offer a basis for a comparative study of the Homestead.

Third: to introduces in detail the arrangement, special structure,

decoration, engraving, etc., and summarizes our views about these features.

Fourth: to treat the operation of dismantling and removing.

Fifth: to describe the project for reconstructing the old Homestead.

2 GENERAL DESCRIPTION OF THE STRUCTURES

A. The wooden framework is fitted together with hidden tenons and mortises, and nails. The nail heads are completely covered; apparently most of the nails are made of bamboo. The round gilded pillars are drum-shaped. The square eaves pillars are united smoothly with the stone pillars. The cross beams and purlins are all built with superb craftsmanship. The wooden wedges and the nail heads are all well covered. The locks of the main door are elaborately made double, with one explicit and the other impplicit (Fig.3).

B. The stone carving part: The stone materials are all connected by using hidden dovetail keys, and the stone materials and the wood materials are also connected by the use of tenons and mortises. The same is true of the doorposts, wainscots, stone thresholds, and pillar bases. With ordinary houses, the stone hinges and the doorpost pedestals are two separate parts, but in the Homestead they are carved as an integrate piece. The same skill is applied to the stone hinges at the bottom. The stone steps, stone wall bases and the friezes are all well proportioned in their dimensions. The igneous stone used in paving the inner court, the open drain, and the front court, though not carved very exquisitely, are well selected, and their sizes are all very accurated. Owing to their old age, the stone slates are no longer very even; but the crevices were adjusted by using copper coins as tools, and ground leveling was secured by melting lead underneath. These all show the great care taken in its construction (Fig.4).

C. The bricks and tiles: The ridges of the old Homestead are in one single ridge style. The ventilating bricks in the middle of the ridge are double-sliced chute, in the wicker ventilating window style. The tiles on the roof are in the southern Fukien style with a pitch of three to ten. Beneath the tiles are wooden rafters for nailing. The ventilating holes at the midtop of the gables are tracery made of unglazed bricks. The stone place on top of the doorways in the side buildings also have latticed ornamental bricks to give vent to the air within. This not only is logical but also forms different vertical surfaces that add to the beauty of the

2. Tsai V., End of courtyard compound? Sinorama Vol.17 No.11 Nov. 1992.
3. Li, X.F., Urban Planning and Protection of Ancient Architecture, Taipeistan Publications, June, 1991 (in chinese).

Fig. 1 Old homestead (Fu Kien style)

Fig. 2 Bamboo house of an aboriginal

Fig. 3 The wooden Framework

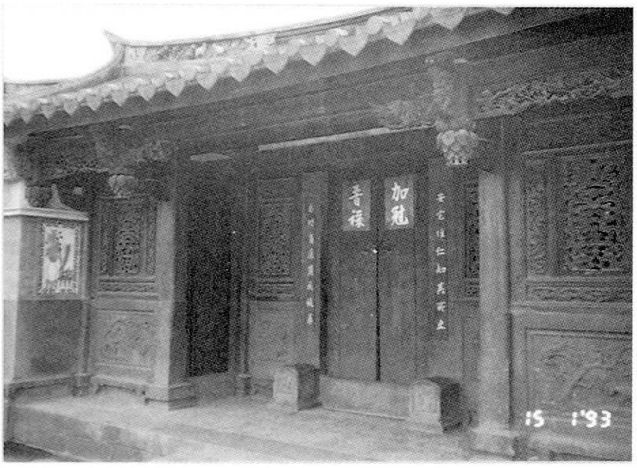

Fig. 4 The stone carving part

Homestead.

Three types of bricks laid horizontally in the facade of the lower building are in the southern Fukien style. Those on the rear part of the building are clay bricks. The face brick walls of the side buildings are engraved with tortoiseshell patterns. These probably resulted from a later addition or repair work. The stone slates below the stone waist piece are rather elaborately engraved in the pattern of tables. The entire facade of the dwelling looks neat and handsome. Although its altitude is relatively low, there is a sense of equilibrium (Fig.5).

D. The fine wood carving and the windows and doors: The main gate and the slide windows of the main hall are carved hollow. The ornamented waist panels design and engraving techniques are different from one another. The wainscots and waist panels of the doors and bar windows are all carved in one whole piece. The bar windows are of various designs, and since most of them are composed of many single pieces, they are fragile and not easy to preserve. Most of them have decayed and became loose which makes them rather difficult to repair after they are dismantled (Fig.6).

3 SOME REMARKS ON DISMANTLING AND REBUILDING THE STRUCTURES

As there is a relative lack of experience in preserving cultural property in our country, we maintained a very careful, faithful attitude when we actually engaged ourselves in dismantling project. We recorded down every bit of working experience as we went along, so that the record may be referred to constantly in our future preservation of the property. Before we removed it from the Old Homestead, we had measured, recorded, and numbered every piece of brick, stone, and wood; and then we drew the details to make blueprints for reconstruction of the Homestead at a later time. We also took a large amount of pictures to add to supplement the blueprints. After a minute investigation of the structure of the old Homestead, we reached the conclusion that, like other old buildings in general, it was constructed in the routine order of framework first, then the partitions, doors and windows, and finally the decorations. In dismantling, therefore, the reverse order had to be followed; that is, we had to remove the embellishments and accessories first, the partitions or screen-walls next, and then the dismantling was to continue from the roofs down to the foundations.

The most difficult part of the job in dismantling and reconstruction the house was locating the tenon and mortise joints. Here are some remarks on the dismantling and rebuilding of the structure:

1. The trussed girders must be taken off only after the hidden tenons and mortises have been disconnected, and the hidden nails removed. If force must be applied, it must be done lightly and under protection of padding boards. They must not be forcefully thrown down or hit by other objects.
2. The components that are to be taken off later and the parts too fragile to be taken off first are to be protected by coverings. Those objects that may fall apart are to be bound together beforehand.
3. In dismantling the wooden plugs and partitions, they must first be bound up, then a crane or windlass must be applied to remove the burden, and finally the hanging bar has to be put in horizontal position. Only after these precautions are taken, the actual dismantling can begin.
4. Before engraved portions of the doors and windows are taken off, they must be fixed with boards and other wooden materials to ensure that they will not be distorted or disorganized.
5. Before the clay, stone pieces, bricks, and tiles are taken off, they should be watered continuously for four hours to give them moisture, and then they are to be taken off piece by piece with a pitching chisel. They should never be pushed down to be chiseled off. After being taken off, they must be protected by being wrapped with cotton cloth and straw sacks.
6. Engraved stone piece should be protected by being wrapped with straw ropes and sacks and cotton cloth before they are taken off.
7. In order to make the reconstructed old Homestead endure, we have already mapped out plans for reinforcing its structure. Instead of spoiling the original style of the residence, they will preserve the original to a long future to come.
8. The original method and procedure of construction are to be followed so that the unique style of the original Homestead may be preserved. The procedures are rather complicated, but they are still worth trying in order to preserve the antique flavor. Besides, although residence was built nearly two hundred years ago, a careful examination reveals that these walls do not have the slightest signs of decay. This testifies to the high value of the engineering methods used in building this residence.

4 CONCLUSION

Architectural works of historical value are handiworks with stylistic characteristics. The art craftsmanship itself may be irrevocably lost if the architectural remains were wilfully destroyed. Special care must be taken in

the process of reconstruction or repair.

The most difficult part is the roof trusses, the beams and columns. Most of the roof trusses and beams in the gables have decayed; they have to be replaced by those made from wood material of the same (or quite close) quality. As for the acquisition and replacement of other building materials there do not seem to have much difficulty.

In carrying out its reconstruction, we have to take care that the specifications and appearance of the materials are the same as the originals and that preventive measures be taken against humidity and termites. As the older generations of building technicians gradually retire from the scene, how do we bring new generations to succeed them--to continue and glorify their traditional building techniques?

Home is where the heart is. In this close-it-off add-it-on culture where there's always one room too few, all the semi-open spaces where one can see the sun of feel the rain - pations, rooftops, courtyards - are all being made into interior living space.

Is it that people have changed, or that architecture has? Has modern architecture really made people cold and mercenary? Or have people made buildings into places that cut off and isolate us from sentiment and reason? Whether or not the spirit of the traditional ho-yuan family compound can invigorate modern architecture is not just a problem of building materials and architects. We must survive it before they are vanished.

5 REMARK

Due to the misunderstanding of the materials used before and bad repairing the rebuilded homestead are being damped and even forming the crack on the corner of the door and window. Even the connection of the main and winged house are also cracked. The door are thus deformed. The rebuilding work are merely less than five years. The reason of those damage are mainly coursed by misuse of cement in stead of clay and gypsem. The foundation are used by concrete instead of original stone layer. These are the first presvation works in Taiwan. Experience gain from them will be good for future works (Fig.7-8).

6 REFERENCE

1. Li, C.Y., The removal and reconstruction project of the Lin An-T'ai old homestead. Jane's Book Co. Taipei 1985.

Fig. 5 The bricks and tiles

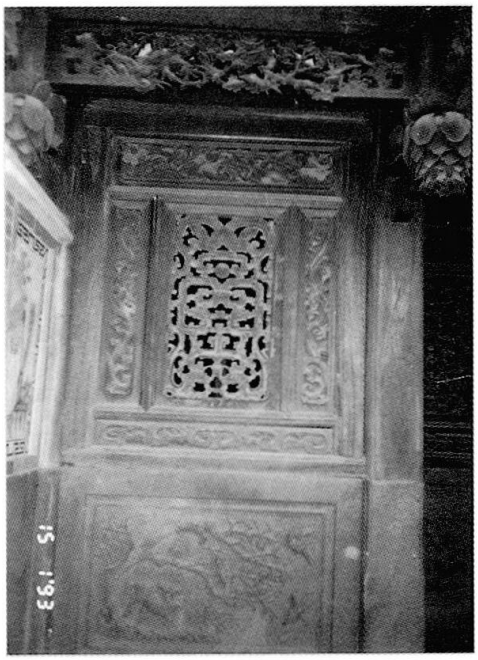

Fig. 6 The fine wood carving on window and door

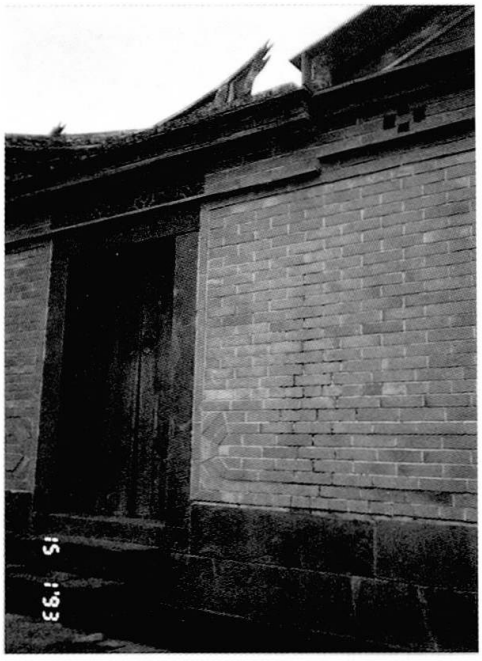

Fig. 7 Unequal settlement between main hall and wing house

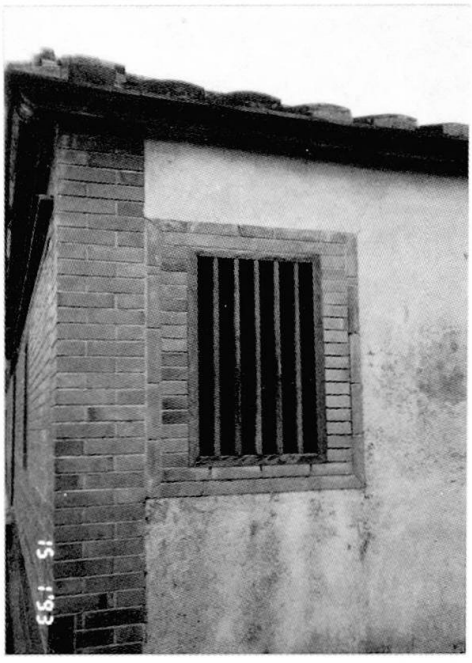

Fig. 8 The damped wall