

SUSTAINABLE CONSTRUCTION IN COMMUNITY

----- Hsieh Ying Chun

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Introduction

In 1999 the 921 earthquake and the subsequent flooding in Taiwan had caused severe damages to indigenous communities. Our organization was invited to reconstruct house and communities of the disaster-struck areas.

The challenges for us were both to build houses with extremely tight budget (25%-50% of the market price) and to base our practice on the notion of sustainable construction, such as green building, cultural preservation and creation of local employment opportunities. Such experience has given us confidence to start promoting ecological housing in China's rural areas in 2004. At the same time, we are engaged in the planning of housing reconstruction in tsunami-affected areas in Indonesia.

So far as these projects are concerned, light-weight steel construction plays a central role, in putting our ideas and theories to work and in making the technical breakthrough. The attached documents demonstrate our efforts in rationalizing the usage of light-weight steel, increasing its flexibility, and combining it with materials such as wood, straw, mud, brick, stone and cement, in order to achieve the goal of green and environmental-friendly construction. More importantly, we are making every effort to sustain the affordability and accessibility of this construction technology. We have simplified light-weight steel construction so that community people with no professional skills can participate in the building process. Being an open building system, it is adjustable to different needs, and is easy to maintain and replace. In this way, the expensive light-weight steel construction is turned into a construction system affordable and accessible to the general public. At the same time, it can be integrated with traditional cultures as well as the current social and economic conditions of a local area.

1. WHAT WE THINK

Background

The reconstruction of indigenous residences destroyed during the 921 earthquake in Taiwan became a major battle in the struggle for sustainable construction. The majority of tribes are located in ecological sensitive areas, or near reservoirs or wildlife-protected areas. Many of them are also facing the problems of preservation of cultural heritage under economic disadvantages.

Such a consideration differs from the prevailing approaches of the architectural technology . It requires a holistic approach capable of combining very diverse elements, such as community solidarity, environmental protection and the conservation of tribal cultural heritage. It also requires an innovative approach to tackling economic issues by offering an alternative in the form of semi-independent construction system , housing cooperatives and micro-finance supporting strategy.

Process

In the aftermath of the earthquakes, with the invitation from community organizations and anthropologists, Atelier-3 and Hsieh Architect And Associates, participated the settlement and rehabilitation of Thao Tribe, the smallest indigenous tribe in Taiwan. This responsibility means more than building a number of houses but also includes seeking for solutions, together with tribal residents, to preservation of the tribe and its culture, land disputes, livelihood-making, relationship between indigenous and non-indigenous communities, conflict of local interests etc.

The idea of promoting construction solidarity aims to initiate rehabilitation from strengthening psychological capacity and sense of community through mobilizing members of the tribe to build up their own tribe again with their own hands. This mobilization will also provide substantial foundation for future challenges.

During the community rebuilding process, we also introduce various environmental practices and make them a part of daily living than simply ideas.

We extend the experiences gained from the rehabilitation of the Thao tribe, with further design and planning, to assist other tribal communities.

Professional skills and management training have also been conducted in the process of promoting construction solidarity. Now a working group of 15 long-term members and 20 part-time members resulted from the training also join the reconstruction of tribal communities as well as other commercial construction projects.

Outcome.....

Over 300 units of residences, library and indigenous classroom in Thao Tribe, Kadu Tribe, Tan-nan Tribe, Yabish Tribe, Teinhw Tribe were built.

Technical adoptions (1) ——Simplified construction methods

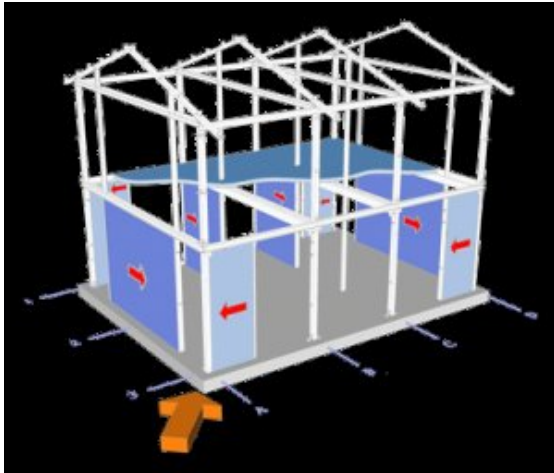
One of the keys to encourage construction solidarity is to simplified materials, tools and construction methods. Particularly, after the earthquakes, individuals with professional construction skills often maintain their job opportunities, and the labor force available is mostly unemployed individuals without trained construction skills. If construction solidarity groups would like to transform into cooperatives, almighty worker is necessary.

1. Steps of material producing and on-site assembling are as following:



2. Structure:

Light-weight steel is utilised as main structure with lateral support from bracing and shear wall. Comparing with the balloon system in US, it needs fewer connecting points. In addition, all connecting points can be installed with bolt easily.



Technical adoptions (II) ——Open building

We promote the capacity of connecting and interchanging different construction materials. Thus, it allows diverse possibilities under various needs of community, culture and living requirements. Other important factors to the establishment of self-sufficient construction system include the accessibility of materials and simplified processing.



Self- sufficient construction system

Small-ranged self-sufficient construction system promote the integration of local materials and labor force. In other words, it helps reduce transportation and over-consumption resulted from the convenience of information technology and modern transportation.

Current building industry is a highly professionally differentiated, capitalized and monopolized system, which provides little opportunity to economically disadvantaged people to fulfill their dreams. Many of them get small aids from the government, but can find no established architectural firms to take up their

projects. The key to solve the problem is to establish a construction system which is self-sufficient and independent from the market. In the future, this system may expand its capacity to cooperative-like organizations and micro-finance economy.

Residence reconstruction can be completed with simply 25% of market price through community labor exchange.

Only very simple production facilities are required.

Community labour exchange: All labour is treated and exchanged equally during the construction process. A labour system is built up segregated from the mainstream job market. Through this system, the basic rights of employment and survival may maintain.

Community--consciousness and cultural diversity

Construction solidarity aims to retrieve the house-building rights from construction company and emphasizes on the idea of solidarity rather than DIY. Through this movement, it also cultivates community--consciousness . The advantages and flexibility of open building encourage the participation of community members, as a result, develop diverse culture and architecture context.

Environment

This topic includes green building and environmental education.

Green building

Materials: Utilizing raw materials, such as bamboo, wood, stone, clay and reusable steel, aluminum

Save energy : Adopting adequate insulation, ventilation, lighting

Environmental Education

These ideas may become a participatory social movement only when they can be understood by general public and practiced in daily life. There are a total of 800 person-times participated in Thao project, 300 person-times in Song-he project, 2000 person-times in Tan-nan project (2003), 1900 person-times in community classrooms building projects and 3,500 person-times in residence rebuilding projects. Each participant gained personal experience in carrying out the ideas of green building.





2. WHAT WE DO

a. Story about Wulan building his own house

Villagers would come irregularly to help during the building process, especially Wu Lang's good friend Ah Liang. Last month, he came almost every day. He said,

"We have been very good friends since we were very young, we are closer than with our wives. After primary school, we worked together driving trucks carrying vegetables to the market. We all have to drive fast as the price would drop if we arrived late. It is dangerous and I have seen a friend who crashed his car in the highway. I was very much terrified and do not dare to speed-drive anymore. Later I return to the clan. It is unthinkable that we are building our own houses together. I try to work on the parts that I am able to do and so save money from hiring others."

After completing the framework of the house, before the ceremony of "fixing the top beam", Wu Lang went to invite friends for a meal, thanking them for their help. He said,

"After the earthquake, we let our neighbors use the yard of our temporary shelter to keep their building materials. I was full of mixed feelings to look at our temporary shelter and our piece of ancestral land which had no proper house yet. It was very hard for me to say in words that we had no proper house. My wife shared the same thought but we could only think about the house in our heart. To be frank, at the beginning, I was very uncertain if we could build our own house. Even now, it is still incredible that the house has actually been built. It looks like a dream. My elder sister will come over tonight and I will ask her to walk around our new house, for she did not believe that this house is actually built by me."

Mrs. Wu Lang said,

"After the roof was fixed, sometimes he would work alone at night, feeling delighted. He said that though he was not a skilled worker, but his work was fine. I have been married to him for more than ten years, only now do I know that he can do welding work."

At one time, the roof had just been fixed, the walls had not yet been put up, at night he started to stay there already, he even said,

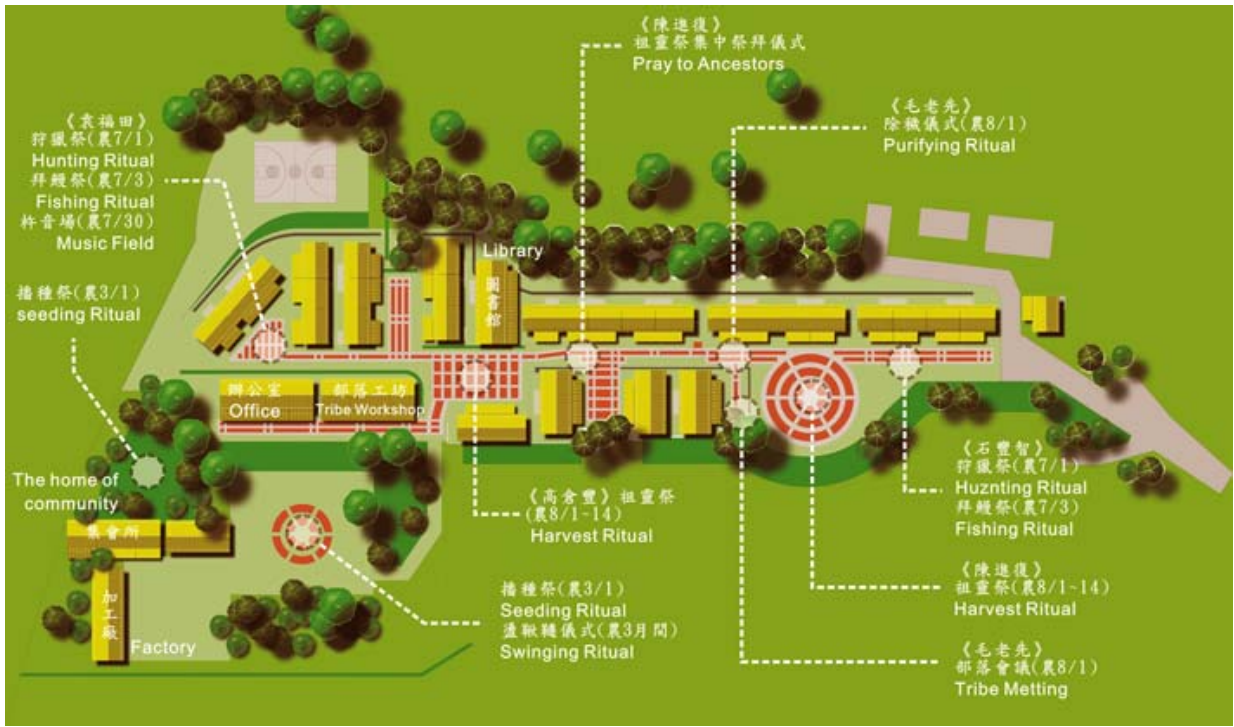
"This is my own house, of course I should stay there first."





b. Thao people rebuilding tribe by their own hands <http://thao.ngo.org.tw/>

Thao is one of the Taiwanese Indigenous groups, living around an area near the Sun Moon Lake. They have their unique culture, language, rituals and ancestral belief. Due to historical reasons, including land appropriation by the Han people, forced migration due to reservoir construction and plagues; only around two hundred and eighty people remains of this tribe. After the 921 earthquake, to prevent the remaining people from dispersing and outmigrating, causing cultural disintegration and extinction of this ethnic group; the kind support and assistance from individuals in the community has enabled the Thao, to rebuild their homes on their ancestral land, with confidence and their own efforts.





C. Low-cost house in disaster area





Teinhuw Tribe 36 unit house



Yabish Tribe 40 unit houses





d. Other works in Taiwan





Don-pwu tribe classroom



Wu-wei-kan community center





e. Experimental ecological building in rural China

Earthhouse 001



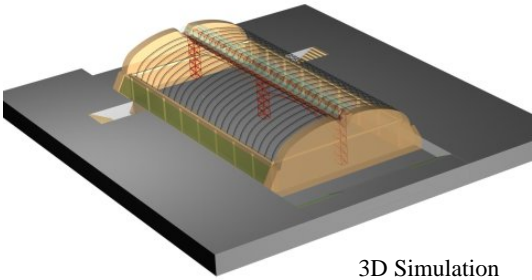
Urine feces separation eco-toilet



Earthhouse 002



Eco-assembly Hall



3D Simulation



Ache Rumoh House 001(Reconstruction Project for Aceh, Indonesia)



Reinforced and rust- proof by metal net and cement in houses of tsunami disaster area.

2. How we use light-weight steel

Screw bolt, you can build



Install on ground, then lift-up

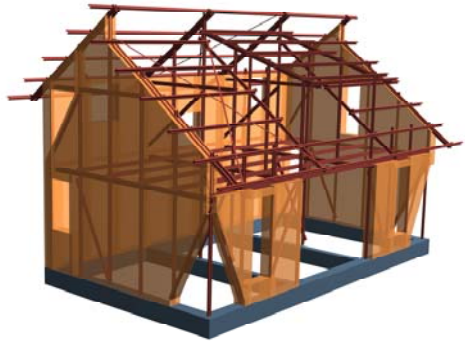


Steel, brick, concrete and wood

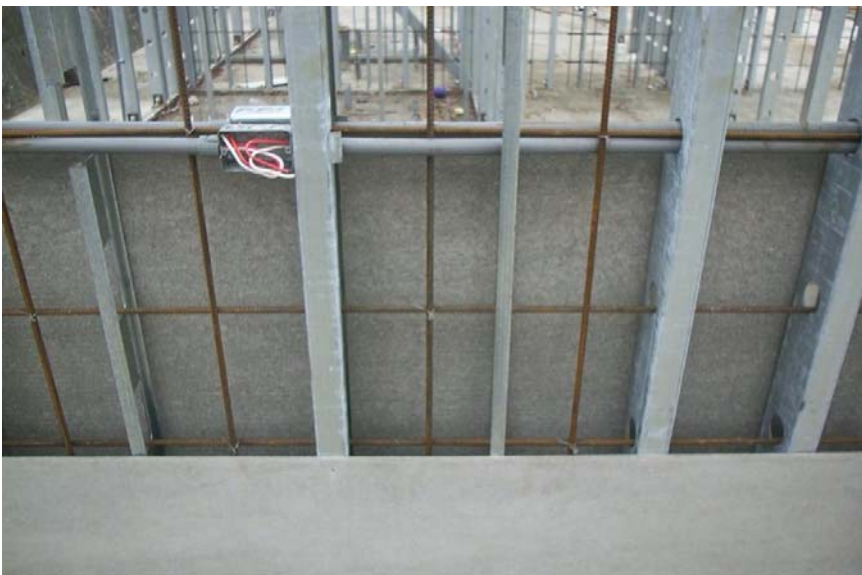


Light-weight steel combined with wood, mud, straw, stone, and bamboo





Retaining wall and fire-proofing for high density residence--- Teinhuw Tribe 36 unit houses



4. CONCLUSION

In these practical cases, we emphasize the opening construction system. It lies not only on the technical aspect, but also manifesting in the cultural and social dimensions. Only to release the construction processes from the increasingly closed system of the building industry, and so, people in the community can get hold of the processes, then we can actualize sustainable development from these diversify human habitats.