



## Anti-seismic Earth House Won International Architectural House Award

The Rebuilding Assistance Programme in Guangming Village in Yunnan launched by the One University One Village (1U1V) team has recently stood out from 250 entries from around the world and won the Architectural Review (AR) House Awards 2017. It has also been shortlisted for the World Architecture Festival 2017 Awards, known as 'the Oscars of architecture'. These two awards will be presented in Berlin in November.

In August 2014, a magnitude 6.1 earthquake shook the Ludian County in Yunnan Province, destroying nearly 81,000 homes and killing 617 people. All local rammed-earth structures—accounting for 80% of the old buildings in Guangming Village—collapsed. In October 2014, the 1U1V team launched a post-earthquake reconstruction demonstration project to develop anti-seismic, low-cost, comfortable and sustainable dwellings for the villagers. The researchers studied the shortfalls of traditional rammed-earth buildings and formulated a new rammed-earth system. Two two-storey rammed-earth houses were then built. Their seismic performance meet the local seismic codes of fortification of intensity 8. Not only do the buildings, constructed with local materials, cost 40% less than brick-concrete houses, but they have also rebuilt the villagers' confidence in traditional rammed-earth buildings and improved their quality of life.

One of the houses accommodates an elderly couple, and special considerations in thermal and daylighting performances at the living and semi-outdoor spaces have been made to further improve their living environment. Windows were double-glazed and the roof was insulated to create a more thermally comfortable environment and reduce energy consumption. In the garden, grass and trees were planted and the area where they work and chat with other villagers was shaded.

The judging panel of AR House Awards appreciated the team's deep understanding of the local community and their work in providing a cost-effective architectural solution using local materials. The project has made the house owner proud and even re-instilled a sense of admiration for traditional buildings among the villagers. The team's next target is to apply this anti-seismic earth building system to more rural projects in southwest China. It is hoped that the new system will provide guidance to reconstruction policies and rammed-earth building standards in the mainland.



## Our Projects



**Site Location:** **Qiunatong Village, Gongshan County, Nujiang Prefecture, Yunnan**

**Project Nature:** Rural Sustainable Development Assistance Programme

**Teams:** CUHK, Peking University & Kunming University of Science and Technology

**Project Duration:** Dec 2013 – Nov 2018



### Early Childhood Education Service

The 1U1V team carried out an early childhood education service in Qiunatong Village in collaboration with the Service-Learning Centre of Chung Chi College at CUHK from 20 June to 14 July. It is the second time such service was held. Adhering to the “play-based learning” and “firm but friendly” principles, the program leaders and volunteers played games with children aging from three to eight in the village to help them build a sense of discipline, develop healthy habits and become team players. General knowledge and information about the outside world were also introduced.



### Eco-farm land use planning and building Design

The team completed an eco-farm design for a household in May this year. With the core concept of respecting the land, the farm was designed to: 1) reduce human activities on the land, highlighting the importance of protection and respect for nature and farming; 2) understand the sustainability of traditional buildings and use of space, demand for eco-farming, and social relations between the local villagers and tourists with respect to the development of market economy and rural tourism. Currently, the household is gathering funds, manpower and other resources. Construction is expected to begin next year.





**Site Location:** Dabaiyi Village, Xiyang Township, Jinning County, Kunming City, Yunnan

**Project Nature:** Earth Building

**Teams:** CUHK & Kunming University of Science and Technology

**Project Duration:** Feb 2017 – Dec 2017 (1<sup>st</sup> phase project)



Dabaiyi Village, 2.5 hours on car from the city center of Kunming, accommodates 462 people in 141 households. Ninety percent are ethnically Han, while the rest are Dai and Yi. Most houses are made with palm, while a few brick buildings can be found at the village edge. Architecture remains traditional at the village, but many houses are in a poor condition, with about half requiring rebuilding or restoration. In February 2017, 1U1V team conducted an investigation trip to the village. They provided guidance to the villagers in the renewal work at a planning level and helped rebuild, repair and transform houses of a few different types. Work was also performed to improve the infrastructure, public space and community facilities according to the villagers' need. The project will not only enhance the living quality, safety and livelihoods of the villagers, but also demonstrate the opportunities for innovative and sustainable development in traditional agricultural villages.



In April, the team launched the first phase of a housing renovation project for three households. Work includes the demolition of the original building, site formation and the building reconstruction. The first floor was completed in a month and a half, but construction was forced to come to a halt from mid-July as the rainy season began in late June. The remaining work is planned to be completed in two months after the end of the rainy season.



The team adhered to the "local technology, local materials, local labor" strategy in the project. Stones, wood, bricks and soil materials were collected in demolition and recycled. However, because of the recycled soil's poor performance in water storage and bonding, 200 cubic meters of stickier natural soil was imported from the neighboring village and added to the mixture to improve the anti-seismic performance and adhesion between different materials in the wall.



Many residents in Dabaiyi and nearby villages hope the team would launch the second and third phases of construction upon completion of the current work. Specifics of the implementation and scale will be discussed with the local village committee and township government after the rainy season.





**Site Location:** Dujia Village, Xinglong Town, Yubei District, Chongqing

**Project Nature:** Bridge Building Programme

**Teams:** CUHK, Chongqing Jiaotong University & Tsinghua University

**Project Duration:** Jan 2017 – Aug 2017



Located in a hilly area at Xinglong Town in Chongqing, Dujia Village suffers economically as people move out. A river cuts through an important pathway 50 meters from the Dujia primary school, and villagers can only wade across it. As water rises to up to two meters deep every year from May to September, crossing becomes highly dangerous.

The 1U1V team conceived the idea of constructing a new bridge in January 2017, and confirmed the details with local officials and the township government after a few rounds of discussions. In March, the team started site investigation and survey work in the village, while conducting multiple experiments and research work. In the end, the team came up with a bamboo arch design for the 20-meter bridge.

The team conducted node tests and processed the bamboo specifically for the bridge. An experimental structure of a 1:1 scale was produced and a series of structural problems were identified and analyzed. The original design scheme was then improved. The studies laid the technical foundation for the construction. Prefabricated components will be delivered to the site for the final construction work in near future. The project is expected to be completed by the end of October this year.

The bridge design won the first prize of the 2017 College Student Bridge Design Competition organized by the China Highway and Transportation Society in June 2017. The jury panel of seven experts unanimously praised the design for its environmental friendliness, sustainability, rich cultural connotation and humanistic care.





**Site Location:** Kunming City, Yunnan

**Project Nature:** Earth Building Research & Development Centre

**Teams:** CUHK & Kunming University of Science and Technology

**Project Duration:** Nov 2016 – May 2018

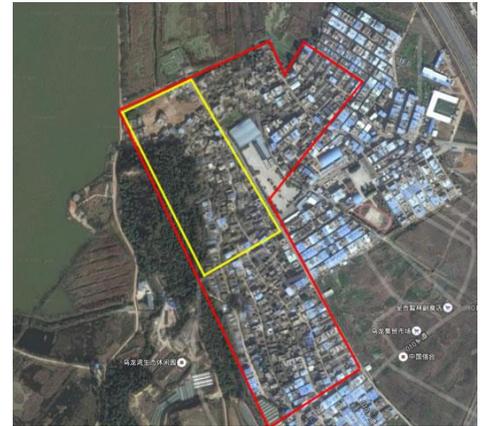


The 1U1V team believes that the use of anti-seismic village houses made of rammed earth can extend beyond post-destruction rebuilding to accommodating villagers in the remote areas in the southwest, and promoting their understanding of the feasibility and importance of anti-seismic construction. They could also help maintain the tradition of rammed earth architecture of the region. Therefore, the team is carrying out a series of new earth building studies, training and practices there.

In November 2016, the team conducted a site visit in Wulongpu Village in Yunnan, where most of the houses were made of earth. To regenerate the village and at the same time preserve the traditional culture and architecture there, the villagers spontaneously organized cooperatives to work together. After discussing with the village committee and local government, the team decided to launch an earth building recovery program and build an earth building research and development center there. However, as the government of the Chonggong district changed term in March this year, the construction of the center was forced to be shelved due to the inclusion of the village in the Yunnan Huandian Wetland Protection Plan”.

However, as the construction of the Centre is essential for the work of the team, they decided to apply to build the center at the Kunming University of Science and Technology campus. The research activities in the university and its convenient location make it an ideal place for domestic and international academic exchanges. The center will be a place for conducting experiments, training for workers and exhibitions of earth construction techniques. In June this year, the university has officially approved the application, and the team is now working on its design. The center is expected to be completed and open in April or May next year.

Another goal of the team is to provide long-term training to local villagers on new anti-seismic earth construction technology. A stable team of workmen will be formed as a result and the best ones will join the 1U1V team officially as core technical workers. In the beginning of the year, a three-day course was held at the university, where 18 villagers from Ludian County, Chenggong District and Yuxi Township learned about the theory and practice of earth construction. Six of them already had some experience in the Guangming Village rebuilding project. Their knowledge about construction techniques was improved after the course.



Wulongpu Village - red area is the traditional building protection region; yellow area is the core neighborhood



## Planning Ahead – Project Status

**Earth building project** – The terrain of Jinhe Village in Lijiang, Yunan, is mainly mountainous. Landslides are frequent and the safety and property of the villagers have been greatly threatened. In July this year, after a field investigation and communicating with the village representatives and villagers, the 1U1V team devised a relocation plan for 98 households. Latest seismic rammed-earth technology will be employed and the first demonstration phase will serve 10 to 15 households. During the construction, two to three training sessions will be organized for villagers to learn about anti-seismic earth construction techniques. It is hoped that the project will not only improve their living environment, but also provide them with skills for future employment. The feasibility analysis and design planning of the project will be completed in the next few months.



Two French architects specializing in earth construction will be invited to Kunming for academic guidance and technical exchange in October this year. They are very experienced in both research and teaching. Together with the construction of the earth building research and development center at Kunming University of Science and Technology, the team hopes to develop a systematic and scientific process for a variety of aspects in earth construction, such as the identification of soil, the ratio of different materials, operation of machinery and testing of the final product. This will lay the theoretical foundation for future anti-seismic earth projects.

**Bridge project** – July this year marks the first anniversary of the completion of “Yi Xin Qiao” in Xiaowu Villager of Chongqing. The team conducted a loading test for the bridge, and the result showed its condition was good with reliable loading capacity. The team also inspected the bridge and carried out maintenance work, through which they studied the best way to maintain a bamboo bridge. In addition, the team is planning to carry out a large number of bamboo tests to analyze the material and mechanical properties of different types of bamboos from different regions and of different ages.



**Village assistance programme** – A university student from Qiunatong Village wishes to share his own unused houses and land with other villages by transforming an old house into a library and the courtyard into public space. The team is very supportive of his idea of serving the village and will assist in the design and construction of the library and courtyard.



## Promotion & Publicity

In June this year, 1U1V team received an invitation from CLAB of Chengdu, Sichuan, to provide training and construction guidance for the rammed-earth construction of the "Innovation Lab of Architecture and Arts" in Qiongyao Relics Park. The building contains a cafe for public events, two working studios for an architect and an artist. The foundation work for the project is almost completed and it is the wall ramming construction work will begin soon.



Since the establishment of “1U1V”, the team aims to gather professional knowledge from higher institution to help improve the environment and livelihood of remote villages. Following the success of the rebuilding assistance programme in Guangming Village in Yunnan and the bamboo bridge project in Xiaowu Village of Chongqing, we have not only received praises from the beneficiaries, but also a lot of recognition and encouragement in both local and international competitions. The team has also given a number of media interviews to promote and further develop the work of 1U1V in the future.



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