CONTEMPORARY TRANSLATIONS OF TRADITIONAL MATERIALS IN RURAL CONSTRUCTION

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In 2006, as part of the Chinese National Pavilion at the 10th International Architecture Exhibition at the Venice Biennale, Wang Shu designed a courtyard installation called "Tiled Garden." The architect collected tens of thousands of local Chinese tiles and used them to create a roof-like slope in an outdoor garden. He added a lightweight bamboo footbridge above the tiles, allowing visitors to experience walking on the roof of a traditional Chinese building. Wang's installation not only restored the shape and materials of a traditional Chinese roof, but also recreated a vivid spatial experience of traditional Chinese urban life. It is undoubtedly an excellent example of the contemporary translation of China's traditional architectural language.

Ten years later, at the 15th Venice Architecture Biennale in 2016, Wang's Amateur Architecture Studio returned to the language of materials, presenting a series of projects, including Ningbo Museum and the Wencun Village Renovation, while launching a comprehensive discussion on contemporary expressions of traditional materials. In these projects, seemingly ordinary rural building materials, such as bamboo formwork used for pouring concrete, recycled broken tiles, gray bricks assembled through different masonry techniques, and adobe walls, are presented in a new way. Wang's square-shaped material samples displayed at the Venice Biennale represented the challenge that many Chinese architects practicing in the countryside are concerned with: How can these materials be utilized to express the dialogue between the past and present?

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1. Tiled Garden © Chen Lichao
2. Ningbo Museum © Chen Lichao

Bamboo, wood, tiles, bricks, stone, and earth carry the label of being traditional and have frequently appeared in rural construction across China in recent years. In contemporary practice, a new generation of architects has been trying to breach traditional methods of construction through the extended study and application of traditional materials and techniques, thus conforming with the zeitgeist. However, the breakthroughs and innovation of materials and techniques will inevitably run into the expressionist mistake, which is contrary to the authentic nature of the materials. Presently, contemporary Chinese architects are still meandering and debating over the intersection between tradition and the contemporary.

Bamboo

Bamboo is an important carrier of Chinese culture. Along with the plum tree, orchid, and chrysanthemum, bamboo has been regarded as a plant that is representative of the ideal character traits of a gentleman scholar. Bamboo signifies perseverance, openheartedness, and uprightness. These connotations originate from the plant's unique biological properties, such as its nodes and hollow structure, which are also the same characters used in the Chinese word for "moral integrity" (竹) . The famous Song dynasty poet Su Shi once wrote of bamboo: "Having no meat to eat is better than not having bamboo in one's life. Not eating meat makes people thin, but not having bamboo makes people vulgar. Thin people can still become fat, but there's no cure for vulgarity."

Having become an important part of traditional Chinese landscapes, the fondness of bamboo continues to this day. For architects, in addition to the cultural implications, the physical characteristics of bamboo and its inherent mechanical resistance to torsion also provide broad opportunities for its usage. Beijing architect Xu Tiantian designed Bamboo Theatre with still-growing bamboo in Hengkeng Village, Songyang County, in Eastern China's Zhejiang Province. Local operas are performed on the stage during holidays, and villagers use the space to rest and chat after a day of working in the mountains on ordinary days.

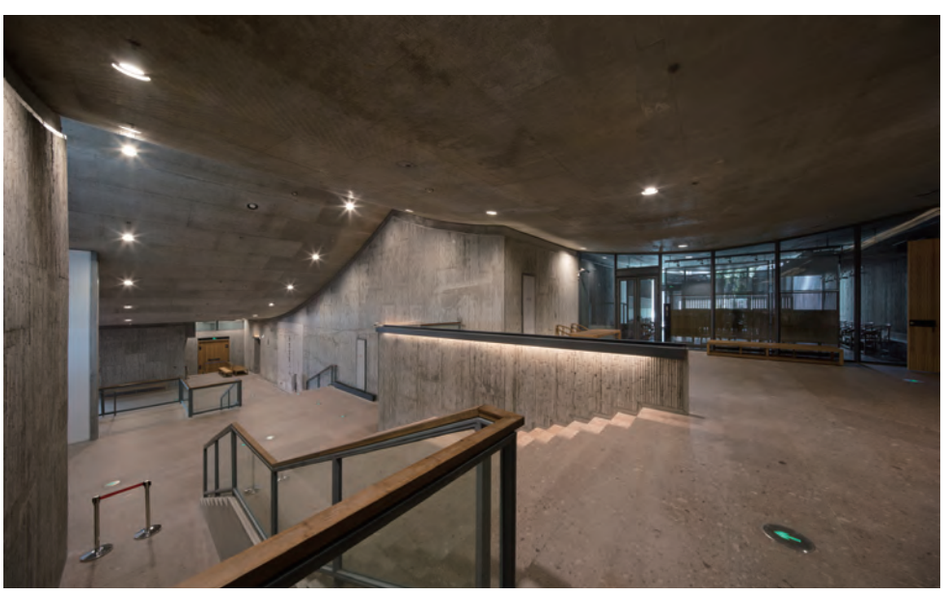
The architect wove bamboo stems into a dome as they were growing, making full use of the plant's rapid growth and flexibility. He thus combined a dome—a classical Western architectural element—with a traditional

Bamboo Theater © Wang Ziling

technique used in bamboo-lined walkways, while visually expressing a rural low-tech construction context and eco-friendly building concepts. Once the bamboo around the central stage of the theater was woven and fixed into place, the growing parts at the end of the branches required little maintenance, and new branches and leaves could fill in the existing grid. This organic architectural language has thus gained stability and immortality in its original natural environment.

The use of living plants as a building material is the most unique design idea found in this project. Seasonal restrictions and time constraints inspired the architect to weave the bamboo during the slow growth period of autumn and winter, and to take advantage of the rapid growth experienced during spring. In doing so, Xu created a public space that fully demonstrates the innovative strategies that result from the material limitations in rural construction.

In addition to the flexibility of bamboo, the dense vertical texture of bamboo forests has also influenced the practice of contemporary architects. Wang Shu used bamboo formwork to cast concrete walls with bamboo texture at Fuchun Cultural Complex in Hangzhou's Fuyang District. This strategy was inspired by the ocean-like bamboo forests near Fuyang. The technique creates a unique interplay between the building and the environment as the bamboo-textured interior walls present visitors with the illusion of passing through an outdoor bamboo forest. Although the use of bamboo to make concrete molds is relatively rare, it resembles a northern European regional practice, establishing a connection to the local context through raw molds. Compared to Xu Tiantian's Bamboo Theatre, it still has a certain degree of reproducibility. A similar use of bamboo can also be found at Sifang Art Museum, designed by American architect Steven Holl, in Nanjing.



Bamboo formwork gives texture to concrete at Fuchun Cultural Complex © Lv Hengzhong

Stone Nest Amphitheatre © Jin Weiqi

Stone

Hakka Indenture Museum—another project by Xu Tiantian, in Songyang County—clearly shows the charm of traditional stonework, with the building walls entirely made of rubble. Even though only one material is used, different masonry techniques are employed for a more sensible construction logic at the building's transitions and openings. The architect used large quoins for each outside corner to provide better static support and visually emphasize the rigidity and strength of the turns. Angled stones sit ceremoniously on top of the door jambs to hold up the lintel—another traditional masonry technique. Unified perpend stones are used in large quantities to hold together the stones of the nearly 1-meter-thick walls. A small artificial canal inside the building was originally used for drainage in the village. The canal was not only kept after the new building was completed, but the architect also constructed an overhead skylight that mimics its shape. The skylight is uncovered, so that rainwater drips through the opening and into the drainage canal. A water curtain will form during heavy rain, and a rainbow may emerge in the sunlight.

Hakka Indenture Museum © Wang Ziling

Architect He Wei used stone masonry for Stone Nest Amphitheatre in Weihai, Shandong Province, to form a dialogue between the amphitheater and the quarry behind it. The irregular, broken lines of the stone platforms, and the quarried backdrop, surround and create the central stage, entering into an intertextual relationship with the environment. A café is also incorporated beneath the elevated stage and seating. Most of the stones are from the site when it was leveled, with the variety of treatment methods of the same material depicting different human attitudes toward the rural landscape in different phases.

The Macha Village Center © Wu Zhi Qiao Charitable Foundation

Rammed earth

Rammed earth is the oldest and most widely used construction technique in China. A nationwide census organized by the Ministry of Housing and Urban-Rural Development between 2010 and 2011 revealed there are still at least 60 million people across China living in different types of buildings made of earth. These include the more widely known traditional cave dwellings of the Yellow River Loess Plateau and the *tulou* earthen buildings of southern China's Fujian Province, as well as *mogufang* (or mushroom houses), Tuzhangfang in Southwest China, the earthen towers on the Qinghai-Tibet Plateau, and the mud-brick houses of the ancient city of Kashgar in Xinjiang.

Architect Mu Jun, professor at Beijing University of Civil Engineering and Architecture, studied the design and construction of rammed earth architecture for more than 10 years. He described the modern improved rammed earth buildings as the most direct bridge connecting tradition and modernity. Buildings made of earth not only have a natural advantage in terms of thermal performance, but after the improvement on their weaknesses such as earthquake resistance and compactness through modern technology, their application in the countryside provides even more unique opportunities.

Architect Mu Jun combined improved rammed earth techniques with green building technology for Macha Village Center. A single-pitched roof on the three-sided building facilitates rainwater collection in the center of the courtyard, and small wind turbines provide half of the building's electricity. Its rammed earth walls were constructed traditionally without the help of professional builders. Characteristics such as minimal operating costs, ease of construction, and high fault tolerance allow for a wide applicability of this low-threshold rural approach.

Due to the natural simplicity of this material, rammed earth can also be misused in projects. Simulating rammed earth by simply coating the building with the material also points towards the phenomenon of "superficial contextualization" in Chinese rural construction.

Tiles

The façade wall of Ningbo Museum, designed by Wang Shu, provides a direct dialogue between the past and present, with a local architectural craft known as "*wapan* wall," which is made of stacked tiles. However, a *wapan* wall is not a simple pile of materials, but rather an exquisite craft of construction. First, it is necessary to use intact stones for the base of the wall. Then, all kinds of broken bricks and tiles are stacked to create the upper layers, with the fragments leveled out to ensure there are no excess gaps in the wall. A thin layer of lime is applied for reinforcement and to complete the *wapan* wall. The wall has been gradually forgotten with the advent of modern mass production as its construction process relies on refined manual operation.

To apply this technique on the outer wall of Ningbo Museum, the builders collected a large number of old bricks and tiles, including gray bricks, hollow bricks, tiles, and ceramic pot pieces, many of which stem from the Ming and Qing dynasties. This variety forms abstract patterns and textures across the wall, becoming

Recycled tiles on the exterior walls of Ningbo Museum © Chen Lichao

a classic example of the contemporary translation of traditional crafts. Wang Shu applied the same technique to the outer wall of Ningbo Tengtou Pavilion at the Expo 2010 Shanghai China world exposition. The outside wall is made with 600,000 old tiles and bricks collected from nearby towns, such as Fenghua and Yinzhou.

Compared to the manual arrangement of the *wapan* walls of Ningbo Museum and Ningbo Tengtou Pavilion, In Bamboo, designed by Philip F. Yuan and built in the outskirts of Chengdu in Sichuan Province, was completely digitized, optimizing the classic construction model of a wooden structure with tiled roof. Based on a prefabricated wood-and-steel structure, and with the help of a mechanical arm, the infinity-shaped design of the cultural center combines the temperament of traditional architecture with the finesse of contemporary industrial production. The partial separation between construction and site redefines the concept of localization, which is common in China's rural construction, and opens up the possibility of applying new technology in rural areas.

As an old Chinese proverb states: "Seeing an object, and being reminded." Chinese people's love of traditional materials is not a simple obsession, but a way of using bamboo, wood, tiles, bricks, stone, and earth to establish a connection to the past within the present time and space. A clear continuity is all the more important in rural China as it has not yet been hit by a large influx of capital. The efforts of architects to explore new ways of using traditional materials can be seen as a struggle against the irreversible trend of capital and the spread of technology into the countryside, while extending the lifespan of traditional workmanship in our time.