



The private house occupies a unique position in both the history of architecture and human imagination. Beyond its core function of shelter, it is an object of fantasy, a testing ground for the ferment and crystallisation of new ideas, and an important rite of passage for young architects. For the eighth year, AR House recognises innovation and excellence in the design of dwellings.

This year's judging panel comprised leading British architects Jamie Fobert and Tony Fretton, as well as Christine Murray, editor-in-chief of *The Architectural Review*. More than 250 entries were received from around the globe and considered by the judges, who were looking for ingenious and future-leading houses that seek to push the type forward. When Fobert quoted Duchamp's famous 'architecture is sculpture with plumbing', the jury was prompted to discuss the criteria that were to influence their decision. Should a house be an inhabitable artwork? A piece of art comes with a 'degree of dysfunctionality', remarks Fretton, while a house is 'psychologically more complicated' and ought to be 'pragmatically workable' – a balance, subtle at times, that lies in the hands of the architect. To what extent does the house anticipate occupation? Does it allow flexibility for different forms of inhabitation in the future? The relationship between interior, exterior and wider surroundings was also identified as a critical component for a successful project. 'Different contexts call for different responsibilities', says Fobert. But a project ought to be stylistically eloquent.

The nine houses on the left were shortlisted by the judges, but it is the six projects featured in the following pages that made it to the final round – they were all visited by independent critics before the judges decided on a winner.

THE JUDGES

Jamie Fobert

Principal, Jamie Fobert Architects

From the generous rooms to the considered details, the winning anti-seismic house offers not only a local and cost-effective construction template but also a home of charm, in which the owners have real pride. Readdressing the fundamental role of the house as shelter, *Inverted House* considers a radical realignment of interior and exterior space and the ability of architecture to contain and embrace a landscape. The reduction of function is counterpointed by the complex beauty of its built form. Perched gently on the coastal rocks, *Lille Arøya* is a house whose modest and relaxed form belies the clarity of each considered move.

Tony Fretton

Principal, Tony Fretton Architects

The importance of research behind the anti-seismic house is undeniable but what is equally striking is the spatial quality and materiality of the house. It is a complete piece of architecture reflecting a deep understanding of local society. The relation of *Inverted House* to its setting is distilled back to fundamentals so that both indoor and outdoor spaces can be fully appreciated by the mind and senses. In *Lille Arøya*, it is the style, habitability and above all interpretation of the Norwegian setting that stand out, balanced in a piece of architecture that provides shelter from the elements while also communing with them.

Shortlist for the AR House awards

The 15 shortlisted projects include houses in the USA, Venezuela, China, Canada, the UK, the Netherlands, Japan, Norway, Spain, Peru, Australia and Chile



- Guangming Village Post-Earthquake Reconstruction and Demonstration House, China, Edward Ng+Li Wan+Xinan Chi
- Calders House, Spain, NARCH
- Ancon House, Peru, Barclay & Crousse Architecture
- Parallelogram House, Canada, 5468796 Architecture
- Renovation of the Captain's House, China, Vector Architects
- Inverted House, Japan, Oslo School of Architecture and Kengo Kuma & Associates
- Netherhall Gardens, UK, Brinkworth
- Gyroscopic House, Venezuela, Lab.Pro.Fab
- Coogee House, Australia, Chenchow Little Architects
- House in Morrillos, Chile, Cristián Izquierdo
- Redshank, UK, Lisa Shell Architects
- Lille Arøya, Norway, Lund Hagem
- County Seat Valkenberg, Netherlands, Ard de Vries Architecten
- He, She & It, USA, Davidson Rafailidis
- Moving House, Australia, Architects EAT

WINNER

BACK TO EARTH

In the wake of a devastating earthquake in Ludian County, concrete and brick are sidelined in favour of traditional rammed-earth construction, writes *Austin Williams*

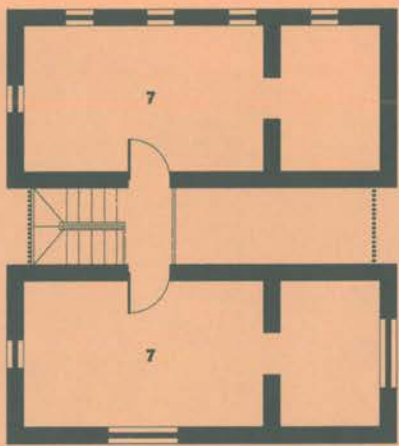
On 3 August 2014, a magnitude 6.1 earthquake with a depth of 12km hit the mountainous area of Ludian County in Yunnan Province. In total nearly 81,000 homes collapsed, 617 people died and 112 remain unaccounted for. More than 1,800 were injured and 57,000 were relocated, not least because rock falls had dammed the Niulan River threatening villages downstream. It is only because of the low residential density of these rural areas that the death toll wasn't greater. The relatively busy town of Longtoushanzhen, for example, suffered 80 per cent of the fatalities.

Three years later and two hours' drive out

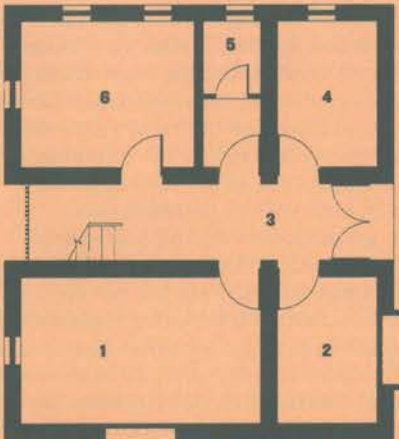
of Zhaotong City, the vertiginous vegetation along the sheer mountain slopes still reveals geological scars in the bright red earth, dramatic reminders of the landslides in which entire communities were wiped away. In Guangming Village, with a population of just 61 families, around 10 people died and most of the village's physical infrastructure was destroyed. At that time, 80 per cent of these old buildings were local rammed-earth constructions, all of which collapsed. The remainder – 10 or so – that had been built in brick and concrete survived relatively unscathed. When President Xi Jinping visited Guangming Village soon after the devastation to inspect

the situation, the mud remnants of the old village houses had been dumped over the side of the mountain and many people had quickly rebuilt in brick and concrete to show the speed and effectiveness of the reconstruction programme. The lesson seemed to be that concrete, the ubiquitous symbol of China's progress, had proved its worth and shown earth construction to be backward and clearly dangerous. Enter a team of researchers, led by Professor Edward Ng, Dr Wan Li and Xinan Chi of the School of Architecture at the Chinese University of Hong Kong. Together with experts at Kunming University they developed a Rural Sustainable Development

- 1 living room
- 2 shop
- 3 atrium
- 4 kitchen
- 5 toilet
- 6 master bedroom
- 7 multi-functional space

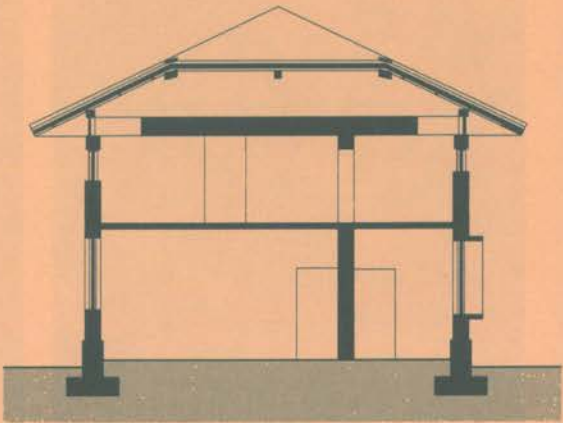
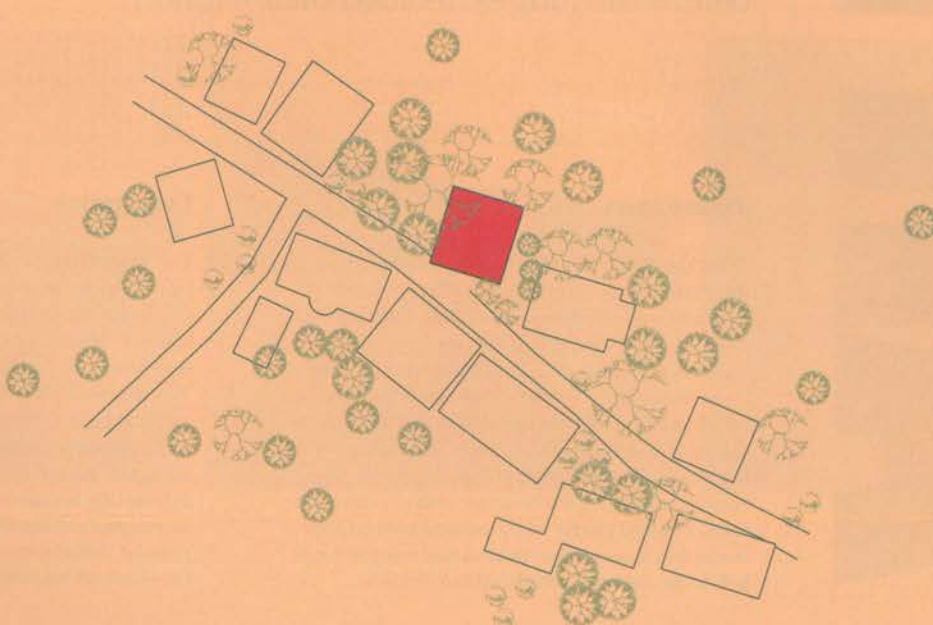


first floor



ground floor plan

techniques and the particularities of the climate, as well as an aspiration for bigger, better, more stable modern housing. One of the obvious solutions to Guangming's isolation might be to advocate that families leave this remote region and relocate to safer areas with more convenient amenities. But as a response to the government's countryside regeneration movement, there is now a conscious imperative to reinvigorate local communities such as these – improving their quality of life and work opportunities – to discourage local youth from moving to China's rapidly expanding neighbouring cities. For as China urbanises, so places like Guangming are



section AA



Concrete retaining structures on mountainous areas of Ludian County in Yunnan Province bear witness to the destruction wrought by the 2014 earthquake

rendered devoid of working-age youth: these are the so-called left-behind villages populated by the elderly and their grandchildren.

So on the one hand, employment opportunities are needed. On the other hand, China has been keen to promote local intangible (and tangible) cultural heritage. Writing of rural life, one author recently acknowledged that local village housing doesn't often fit the common definition of global heritage, but 'plain dwellings are the foundation of the living circumstances over generations'.

Ludian County's red clay soil is an archetypal material in its vernacular

architectural heritage: it is cheap and plentiful and provides a number of other, less tangible gains that the researchers were keen to exploit. The idea was to reconstruct using local labour and to return some lost rural construction skills. The important starting point was to get the village to accept a non-concrete construction.

The government's one-off payment of 50,000RMB (around £5000) for the loss of a family house is significant but not enough for locals to construct a full-sized replacement, especially in expensive concrete frame and brick. Seizing this opportunity to promote low-cost dwellings, the CUHK team has formed a notional aid agency to provide

appropriate technological assistance to several inaccessible villages, with strict budget constraints. After that, 'volunteers' were found and local labourers recruited.

The original rammed-earth buildings had a high proportion of stone. This may have contributed to their structural collapse so the research team has tested a range of mixes, additives and structural insertions to aid stability. Initial findings showed that the benefits of the new rammed-earth formulation are twofold. First, it is a thermally sensitive material in this particular climate that experiences only minor fluctuations over the year. Here in Yunnan Province, the use of rammed-earth

The School of Architecture at the Chinese University of Hong Kong carried out extensive on- and offsite investigations before using local labour and time-honoured rural construction skills to replace the wrecked infrastructure with traditional rammed-earth structures



housing creates homes that are warmer than similar concrete buildings in winter and cooler in summer. Second, the first couple of houses used earth that had been salvaged from the earthquake-damaged buildings. The rubble was watered down and reconstituted as a workable material.

This reclaimed earth had to be sieved and soaked for a month before it was of the right consistency and this preparatory work took place while the rubble concrete foundations were being laid. Next, steel shuttering was formed into approximately 1m by 600mm high by 350mm wide blocks and filled with the reclaimed soil mixed with sand, cement, grass and natural fibres (proportions 100,

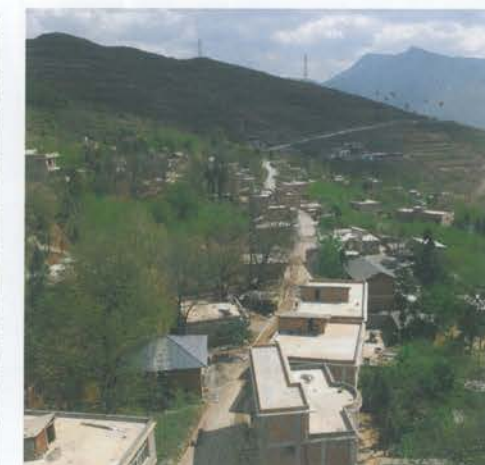
100, 5, 0.2, 0.2), lightly tamped and allowed to set. The next 'block' was laid in the same manner and so on with steel reinforcement bars at vertical intervals. Subsequent shaking table tests reveal that the reinforcing steel adds little stability and now the team is experimenting with horizontal bamboo reinforcement. At the top of the roof is a concrete ring beam.

The initial projects have been as much about skilling the labourers as about testing the technology. The main contractor, Yang Qingguang, is the son of the elderly couple who now occupy the house featured in this article. Yang's own wife was a tragic victim of the earthquake and his parents, aged 79

and 81 years old, had also been living in a tent for 12 months – because of the collapse of their home – before the opportunity arose for a new start.

The house is a simple rectangle on plan and angled to the road, creating a triangular garden where the Yangs have built a small table and chair in ubiquitous concrete and have planted a productive vegetable garden. The house is split in two with a staircase in the middle: a double-height space that is open to the air at both sides and providing a cool shaded area to work and chat. On either side of the corridor are simple square rooms, sparsely furnished in a simple homely fashion. In one corner of the living room,

Brick and concrete buildings proved more resilient than mud structures in the earthquake so many houses were quickly rebuilt in the materials





Architects
Edward Ng, Li Wan,
Xinan Chi of the School
of Architecture at the
Chinese University of
Hong Kong;
Kunming University
Engineer
Wenfeng Bai
Photographs
Courtesy of the
architects, cover image,
pp51, 52, top right and
bottom right 53
Austin Williams, pp50,
top left, top middle and
bottom left 53



alongside the television and an embroidered Chinese good luck motto, is a photo of Yang's own father taken in 1900.

There is no heating provided – something that the research team and local builders may address in future projects – but even so, this house exceeds the standard performance of a similar house built in brick and concrete, and regular monitoring of a control building is providing data to prove it. Given that concrete housing is seldom insulated, rammed earth provides excellent thermal performance by comparison (aided and abetted by double glazing in this project) and it also helps regulate humidity, is a low-energy intensive system of building

(notwithstanding it is labour intensive), produces little noise or air pollution, and is easy to learn.

Construction of this 72m² two-storey house started in December 2015 and was completed in April the following year. The Yangs are clearly delighted with it and the success of the project has given the locals a sense that, not only might employment opportunities now be made possible in a newly energised local construction industry, but by architect-designing these buildings to include social spaces, passive ventilation, private gardens and an aesthetically pleasing finish, other villagers are now interested in switching back from their

concrete and brick houses. As a result, the research team is now working in a few other villages, importing the initial labourers as site foremen to oversee the next generation of trainees. It is also building a rammed-earth training centre at Kunming University for academic and practical research.

But the research team has been eager to point out that this is not some alternative technology miracle solution to the world's problems. 'It isn't even appropriate for most of China', says Dr Li Wan. It is a geologically and climate-defined solution for this particular area. More importantly, it is a simple stepping stone to put real people's lives back together.



Perhaps not the ideal solution for all regions, rammed earth works here, as epitomised in the Yangs' house. It represents superior thermal performance to brick and concrete construction and regulates humidity by passive ventilation

What are the AR Awards?

The AR Awards are an online awards programme dedicated to commending and celebrating design excellence and innovation across a range of building types.

The AR is at the heart of global architecture and this exciting new awards programme will seek out transformative, leading edge projects from around the world. Challenging and inspiring architects to reflect more deeply on the purpose of architecture and its relationship with the wider world, the AR offers critical thinking for critical times. The AR Awards will reflect these values, examining how different building types are evolving to meet the changing demands of the 21st century.

Categories for 2017 will be House and Culture. Winners will be extensively featured in the AR across both print and digital platforms through specially commissioned critiques and films that will explore the ideas behind the architecture and bring winning projects vividly to life. Providing a respected and critically authoritative global platform for the best new buildings, AR Awards represent the ultimate mark of distinction.