

# LOOK HOME

## *Design Annual*

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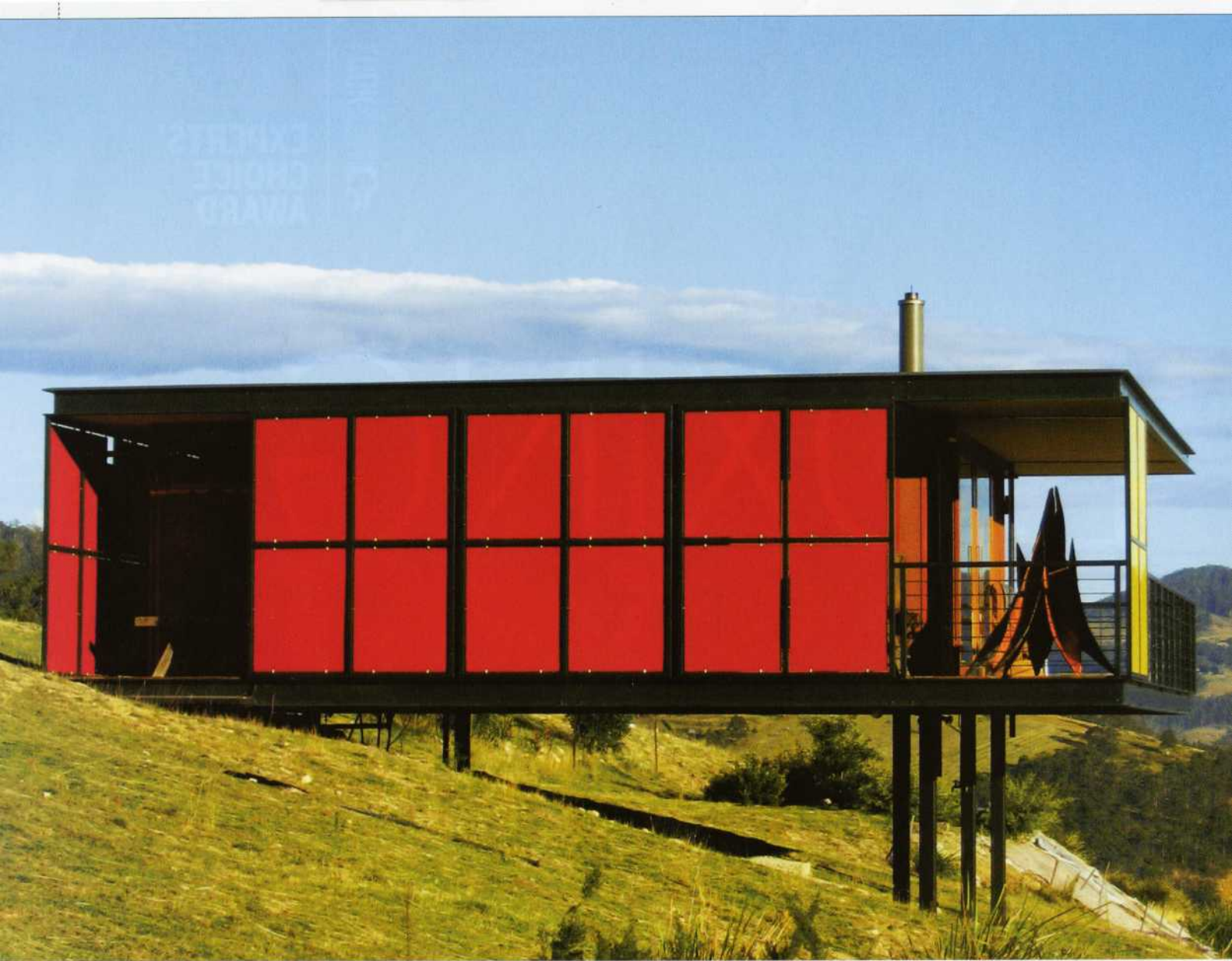


WORDS RACHEL SULLIVAN

A Tasmanian studio shows that bigger isn't better.

# BOXING CLEVER





AFTER YEARS OF DESIGNING LARGE LUXURY homes in Sydney, architect and interior designer Misho Vasiljevich decided he'd had enough of excess. So he planned to develop the smallest space possible that would allow two adults - and their dog - to live comfortably and self-sufficiently. That space was the Huon Box, a 38 square metre home, perched on the side of a hill overlooking Tasmania's Huon Valley.

"As suburban sprawl has increased, homes have grown larger and larger, and are often lived in by only two people," Vasiljevich says. "And only a generation or so ago, small inner-city terraces had five or more people living in them;

these days there's usually only one. It's just not sustainable, so I wanted to explore ways to live more rationally, and to see just how small a comfortable home could be."

Vasiljevich bought 24 hectares of degraded former farmland. It was the perfect place to add a small studio whose expansive views would more than compensate for its compact size. They could also move in right away, thanks to an existing 81 square metre garage on the site that could be converted to living quarters for the duration of the build, provide a rainwater catchment for drinking and washing, and then be turned into an office and design studio once the couple had moved in.

### GREEN LIVING

- Carefully positioned caves provide summer shade while allowing winter sun to penetrate into the home.
- Materials were chosen for their low embodied energy.
- Ceiling, walls and floor are all packed with R7 insulation to shield the home from sub-zero temperatures.
- Cross ventilation aids cooling and comfort control.
- Minimising the living area footprint of the building to 38 square metres and minimising the amount of materials used in construction.
- The home's small footprint and minimal ground disturbance reduced environmental impact.

### INSPIRED BY DISASTER

Seeking inspiration for his design, Vasiljevich turned to disaster housing, homes that can be erected rapidly and clad with whatever materials come to hand, such as bamboo or corrugated iron, creating "a platform that elevates the occupants above the ground, away from disease".

With this idea in mind, his brief was fairly straightforward: living in one room would be preferable to multiple rooms, and the building should be able to be completely recycled and



### MONEY MATTERS



**Budgeted cost:** \$100,000.

**Actual cost:** \$102,400  
(excluding GST).

The prefabrication and erection of the steel frame allowed the rest of the structure to be built without involving complicated scaffolding and rigging.

Costs were kept down because of the speed and simplicity with which the house could be erected: the cost of the internal portion was \$1,768 per square metre (totalling \$67,184) while the veranda/external skin/eaves cost \$568 per square metre (totalling \$35,216).

The home went slightly over budget because a number of things had to be redone, due to Vasiljevich's inexperience.

**Long-term running costs:**

Passive heat gain, from strategically placed windows combined with high levels of insulation, protects the home's interior from sub-zero temperatures, reducing heating bills. The 5kW grid-connected PV array also reduces power costs; an intended upgrade to 10kW will make the Huon Box a net energy provider.

Previous page and top left: An elevated platform minimises site impact. Above: Two-metre wide eaves stop summer sun overheating the interiors. Bottom: Legs at the front and back are the only points of attachment to the ground.

have no lasting impact on the site. Despite Tasmania's challenging climate, it should also be simple to heat and cool and have low maintenance and ongoing costs.

"Because the budget for the project was tight, it was important to think about how the buildability and constructability works with the design from the outset, rather than following the Sydney Opera House model of 'design first, think about how the building works later' which inevitably leads to big blowouts," Vasiljevich says.

### HANDS-ON CONSTRUCTION

"The site wasn't delicate pristine bush, and I wanted anything I did to either improve the site or have minimal impact in the way it touched the ground," he says. "I wanted to do as little cutting into the earth as possible, so using a lightweight structure that could be 'dropped in' to the site and was reinforced to withstand the valley's strong winds was the most logical choice."

Legs at the front and back of the finished Box form the only points of attachment to the ground, and from a distance it actually appears to hover above the sloping site.

The structural frame was fabricated off-site in a shed five kilometres away to simplify transport



and haulage costs, and is constructed from a simple six by six metre grid. Its four corner posts extend from the footings to the roof beams to create a flexible internal structure, and sit on a simple concrete ring beam footing.

"This also allowed the steel frame to be erected in one day using a 20 tonne excavator to lift it into place rather than an expensive crane that would be unable to work in a bush location." >



### WHAT THE JUDGES SAID:

This structure appears simple but incorporates a sophisticated design approach. A lot of thinking has gone into making a highly energy efficient shell, using two skins to maximise thermal efficiency with plenty of glazing to provide expansive views and natural light. While making a dramatic visual impact on the landscape, the structure has a minimal effect on the site itself - in time it could be dismantled, relocated and there would be no trace.



This page: The interior skin is clad in plywood with plasterboard as the finished surface. Top right: The entire building can be dismantled at the end of its life.

### DOUBLE-UP

Vasiljevich wanted the embodied energy of the building to be as low as possible, so opted for an air-dried Tasmanian plantation-grown hardwood timber frame, plywood cladding and timber sliding doors. Extra strength and thermal performance was gained by giving the house a double external skin.

"The two layers of facade are set two metres apart, with the external skin acting as a weather shield against strong winds and driving rain," he says. "This skin is fabricated from galvanised panels set in a steel frame, and also creates an outer walk that allows people to traverse all four sides under cover and semi-sheltered."

"The interior skin is a traditional timber framed stud wall made of Tasmanian-grown plantation hardwood. It is clad externally in eco plywood, while the internal cladding is plywood with plasterboard as the finished surface. The cavity wall is packed with insulation."

While there was no requirement by Huon Valley Council for an energy assessment when approval was granted in 2005, Vasiljevich decided to do one anyway. "As I was from Sydney originally, I used the Cox River in the Blue Mountains as an



*The two layers of facade are set two metres apart, with the external skin acting as a weather shield against strong winds and driving rain.*

equivalent environment and climatic condition, and established a baseline from there." He then used every conceivable means to increase the home's thermal performance.

The roof cavities are packed with four layers of 100mm bulk insulation, giving them an R7 rating, while the plantation roof beams were covered with plywood sheeting before the roofing foil and metal deck roofing was applied. The floor beams are also air-dried hardwood, with two layers of particleboard making up the flooring. Fibre cement sheeting was attached to the underside of the floor beams, sealing the sub-floor cavity and allowing another four layers of bulk insulation to be placed between the floor beams.

Windows are a single layer of 10mm laminated glass to allow sun penetration in winter, chosen because double glazing would not have allowed for the penetration of warming winter sunlight in to the interior. The laminated glass is shaded by two-metre wide eaves that stop summer sun from making contact with the glass and in turn heating the interiors. The eaves help shield the internal skin from the sun and reduce the heat load of the interiors.

#### USING FREE

"Solar energy, both passive and photovoltaic, is a key sustainable feature," says Vasiljevich, adding that he plans to upgrade the 5.0kW grid connected system to a 10.0kW system in time, which will make the house a net energy provider.

Meanwhile, underneath the house is a series of water storage tanks that harvest 30,000 litres of rainwater for re-use in and around the home, while greywater and blackwater recycling systems are located 40 metres away from the house.

Prior to the land being logged and then converted to farmland, it was home to a range of native animals. As part of his goal of improving the site, Vasiljevich is currently working to establish a pygmy possum habitat. "The 200-square metre area of native callistemons and plum pines will not only grow into perfect pygmy possum habitat, they will also absorb the phosphates from the greywater system, and stop them getting into the river," he says.

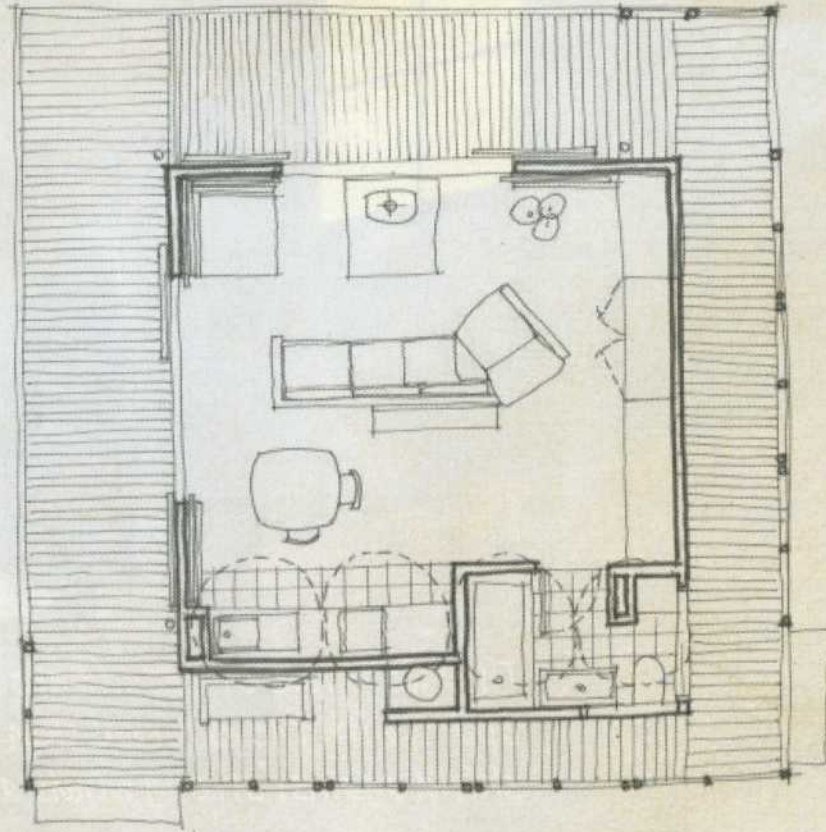
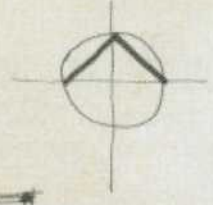
And in the future, "the entire building can be totally dismantled at the end of its life and re-used and recycled for its next life with very little energy cost, and leave almost no trace of where it once stood," except for a new colony of possums. **EN**

*Specifications overleaf >*

#### DESIGN INNOVATIONS

- Roof and floors are lined with plywood to stiffen the lightweight structure and help deal with high winds.
- Laying the PV panels flat on the roof increased the number that could fit on the available area.
- Prefabricating the steel frame meant it could be lifted into position using an excavator, rather than a crane.
- The steel frame also allowed plantation-grown hardwood framing to be used, reducing the load down on the structure.
- The home is perched on the slope on four steel legs, allowing natural water and air movement underneath.
- At the end of its useful life, the whole house can be recycled.

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The home has a double external skin.



Plywood sheeting inside for warmth.

## Specifications

### Designer and builder

Misho Vasiljevich, Misho and Associates  
[www.misho.com.au](http://www.misho.com.au)

### Roofing

Colorbond® roof sheeting.

### Insulation

Walls, sub-floor and ceiling R7 pink batts.

### External walls

Plywood.

### Windows

10mm standard laminated glass.

### Internal walls

10mm plasterboard over 6mm plywood.

### Flooring

Fibre cement sheeting sealing sub-floor space; two layers of 19mm HMR (high moisture resistant) board laid over floor joists and 18mm compressed fibre cement sheeting in wet areas.

### Water management

Envirocycle® system to treat greywater and blackwater on-site.

### Energy management

Sharp® 5kW PV cells with an off-peak electric hot water system.

### Heating

Rais wood heater from Denmark, using firewood harvested from the property.