

# HOWT BAY HOUSE

**SHOW HOUSE & RESEARCH PROJECT**

H&V | NOVATOP | NOVASPRUCE | SECA | HWZ INTERNATIONAL SA

# HOUT BAY HOUSE SHOW HOUSE & RESEARCH PROJECT

The Hout Bay House is a showhouse and international research project built from CLT (cross laminated timber) located in Cape Town. The house is open to architects and public interested in green building and shows how a modern timber construction performs in the climatic conditions of Western Cape.

The main motivation to build this house (second Novatop CLT construction in Western Cape) was to inspire and encourage South African architects to design sustainably and show various solutions for sustainable hous-

ing. The house has been built in September 2015 and since that time hosts meetings, university excursions, workshops and other events to offer the visitors a chance to see all the materials "life", evaluate how they perform in the coastal climatic conditions and experience the indoor climate.

We trust a personal experience supported by research results is the best way how to encourage architects as well as their customers to see timber as a possible building material for their projects. In cooperation with experi-

enced static engineer, builders and local distribution partner, the HWZ International SA team shares experience with timber, recommends solutions and offers advice to those, who want to build sustainably and use advantages of modern ways of timber manufacturing.

Except of the Novatop CLT construction system, the house shows various kinds of glue laminated beams (horizontally and vertically laminated beams made from spruce or siberian larch), fermacell gypsup fibre boards for walls and flooring, wood fibre insulation and a choice of wooden profiles used for cladding and decking. There are also double glazed windows and doors presented. All products shown in the house are available on the South African market, either locally in the warehouses of our distribution partner or on order.



ARCHITECT WRITING COMMENTS IN HOUT BAY HOUSE GUEST BOOK



DRAWING BY ARCHITECT MICHAL DOSTAL



LOCAL HELPER DURING THE CONSTRUCTION



ONE OF THE CONSTRUCTION DETAILS SHOWN IN THE HOUT BAY HOUSE



# HOUSE BUILT IN 23 DAYS



The prefabricated Novatop CLT panels arrived at the building site in the moment the brick and mortar base were ready, and the construction team prepared the foundation as an equal level is needed for assembling of the panels. From this moment it took only 24 working days to assemble the walls and roof, install insulation and facade, do plumbing and electricity and finalize the interiors (bathrooms, flooring etc.). Of course, some final touches were still missing, but thanks to cooperation of all professions, prefabrication and precise planning, the time on the building site was very short. Watch the time laps (QR code below)!

## Advantages of prefabrication

The communication between architect, investor and static engineer is essential for every construction. Building with prefabricated CLT makes the planning phase even more important and



WATCH THE TIME LAPS OF THE CONSTRUCTION ON YOU TUBE



INSTALLATION OF THE NOVATOP ACOUSTIC CEILING BY MC FRAMES TEAM  
(COOPERATION OF EUROPEAN AND SOUTH AFRICAN BUILDES)

gives the architect a way how to keep the whole process under control. Everything is prepared and the construction team "only" assembles the building with high accuracy and respect to the material.

Shorter construction time is considerate to the surrounding (nature as well as neighbours), saves money and allows one to occupy the house faster, this doesn't matter if the investor wants to live there or to rent it.

The Novatop Solid Wood Construction system is the **first CLT certified in South Africa**. Download the Agreement certificate on HWZi homepage.





Since the construction started, the Hout Bay House is active on social media and there are articles published in printed as well as online magazines and the project was introduced on the Wood Conference in Cape Town.

First articles introducing the research project and its goals were published in the Timber IQ magazine, which later followed the research and informed the readers about the preliminary results.

Very interesting article by Anne Constable about the future of timber constructions was published in the Earth Works magazine. Constable mentioned the Hout Bay House as "a healthy sustainable alternative".

Also local newspapers, who are not focused on building materials or sustainability, informed about the showhouse and research.

Except workshops and events focused on professional audience, the Hout Bay House team

# AWAKING PUBLIC INTEREST IN SUSTAINABLE HOUSING



FAMILY DAY OFFERED WINE TASTING, NETWORKUNG AND MANY OTHER ACTIVITIES



OPEN DAY DURING THE CONSTRUCTION OF THE HOUT BAY HOUSE

organised also events for public and neighbourhood. The house was open during the whole construction period and everybody was welcome to visit the building site and see how fast the showhouse grows.

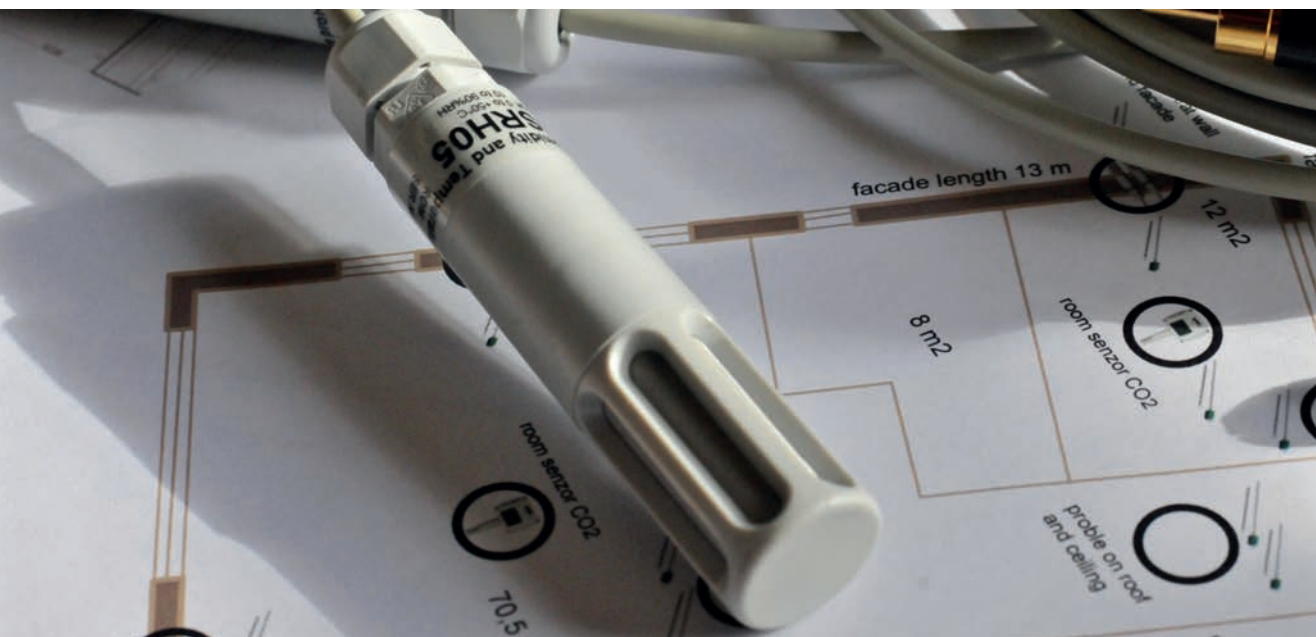
Shortly after finishing the house, neighbours as well as fans who followed the construction of social media, were invited to a family day, which offered wine tasting and delicious snacks for the adults and many activities for kids. The visitors were positively surprised by the nice welcoming atmosphere and modern design of the timber construction.



FACEPAINTING IN THE HOUT BAY HOUSE

SOCIAL MEDIA, ARTICLES IN PRINTED MAGAZINES AND ESPECIALLY PERSONAL EXPERIENCE CAN IMPROVE THE PERCEPCION OF TIMBER





# INTERNATIONAL RESEARCH PROJECT

## SURFACE DEGRADATION OF WOODEN CLADDING

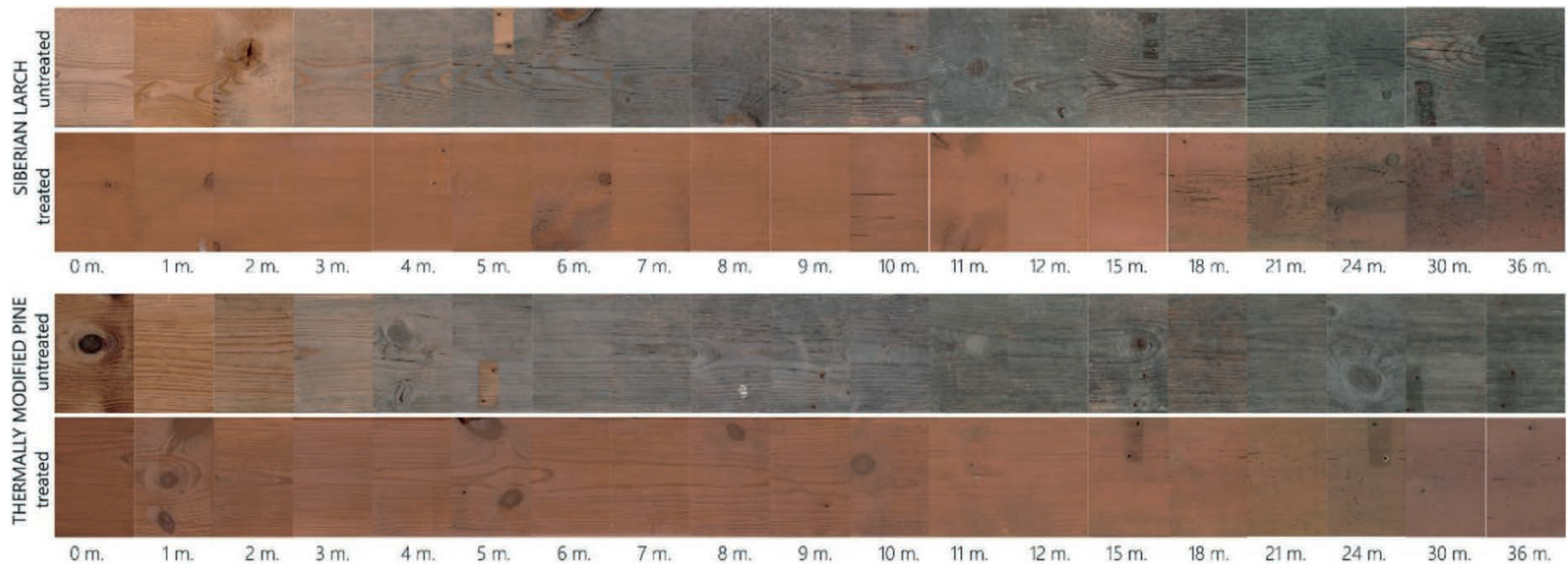
Hout Bay House research project is focused on exploring unique type of timber construction located in Western Cape. The main objective is to evaluate wood degradation after exposure to weathering process in specific climatic conditions of South Africa and compare the performance of treated and untreated wood.

Wood in outdoor constructions reacts to the weather and its changes. For its proper use, it is necessary to consider some basic rules (use of durable wood species, proper construction solution, use of surface protection). The Siberian larch wood and thermally modified pine, in European conditions considered as durable, were se-

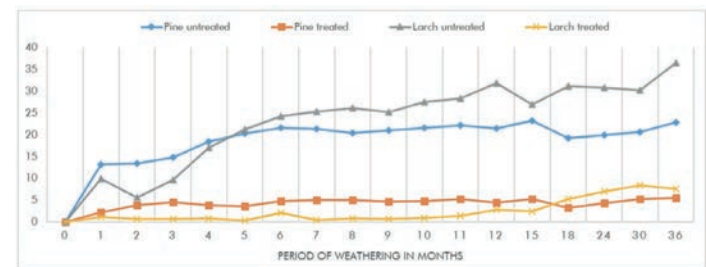
lected for the façade cladding and terrace decking at Hout Bay House. The test samples were prepared from these wood species, one part of them was left untreated, the other part was treated with two layers of natural oil wood stain UV OSMO. Prepared samples were exposed to natural weathering in special stands facing north in the inclination of 45° (faster degradation in comparison with vertical façade) according to European standards dealing with testing of coatings. The test samples were evaluated based on change of colour, gloss, roughness, wettability and other visual properties during three years of exposure.



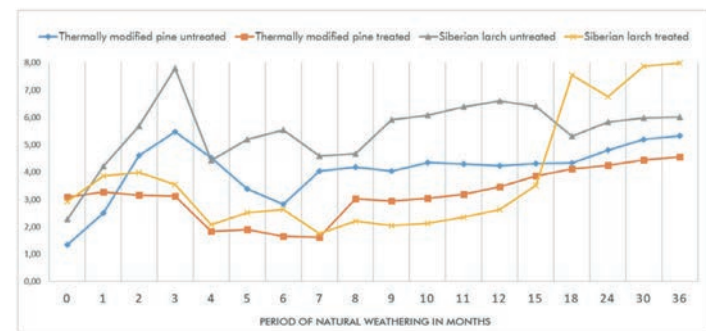




THE APPEARANCE OF TEST SAMPLES DURING 0 – 36 MONTHS OF NATURAL WEATHERING (FROM THE TOP LINE: SIBERIAN LARCH UNTREATED AND TREATED, THERMALLY MODIFIED PINE UNTREATED AND TREATED).



TOTAL COLOUR DIFFERENCE OF TESTED SAMPLES DURING WEATHERING



CHANGE ON ROUGHNESS DURING WEATHERING, AVERAGE ROUGHNESS VALUE Ra [µm]

To sum up the results from this 3-year experiment, the treated samples generally showed significantly more stable results than untreated ones in the first year of weathering. In that period of weathering, untreated samples distinguished by rapidly increasing colour, roughness and wettability changes. They turned grey already after 4 months of weathering. The formation of mould and cracks which basically ran in the direction of wood fibres was observed on untreated samples with increasing exposure period. The surface wettability (ability to absorb water) of untreated samples increased during exposure and reached the full wettability after 18 months of exposure.

The treated samples were characterized by relatively stable and low colour changes during exposure. The roughness increased at the later stage of weathering, especially in the case of Siberian larch. From the point of view of wettability, they maintained relatively good properties. Approximately after one year of natural weathering, the coating of treated samples started to

degrade and more damages in the surface treatment in form of flaking and peeling appeared. At the end of the experiment, after 3 years of weathering, the coating was almost completely damaged, especially in the case of Siberian larch.

## Conclusion of the cladding research

When using wood outdoors, we can consider two options - we can either accept the fact that untreated wood eventually turns grey (in the most cases unequally) and gets typical plastic structure, or we can apply suitable surface treatment which will prevent the wood from greying and roughening, but which has to be renewed after several years. The selection of wood and coating type is crucial. Based on the results of this research, visual evaluation confirmed the measured values - the better performance was observed for thermally modified pine, both in the case of treated and untreated samples. In the case of performance of untreated wood, there was no significant difference in comparison with performance of Siberian larch.

# HOUSE FULL OF SENSORS

Except the research focusing on surface degradation of wooden facade, there is also temperature and humidity measured in the walls of the timber construction. The sensors are located on the facade, between ventilated air gap and insulation, between insulation and Novatop CLT and in the interior. The measured data are evaluated and will be published on the homepage.



READ THE FULL RESEARCH REPORT AT [WWW.HWZ.CO.ZA](http://WWW.HWZ.CO.ZA)





# WORKSHOPS FOR ARCHITECTS & BUILDING PROFESSIONALS



Hout Bay House workshops aim to create a platform combining networking, friendly atmosphere, an inspirational environment and new knowledge. Speaking about sustainability and modern timber constructions in a building, presenting most of the topics and solutions, offers a unique added value. The capacity of the workshops is limited by 25 participants, who are divided into two groups to have more space for discussions.

## International cooperation

European speakers sharing their experience from production, research, business or building sites, work in co-

operation with South African Architects or builders who are adding the specific South African context and introducing their timber projects. The feedback and discussion with the participants make each workshop unique and are valued by the speakers.

## Topics and speakers

More details about each Workshop can be found in an invitation, which is usually published at least one month in advance on the homepage and social media and sent by e-mail. Presentations, photos and updated information of the speeches are available on

the HWZi homepage. Very interesting, for the example, was the summary on the cladding research by Eliska Oberhoferova in 2018 or examples of exposed wooden roof constructions build in South Africa introduced by Klaus Körber from Pitch 45 the same year. In 2019 Richard Stretton presented a concept of the first multi-storey CLT building in South Africa and shared reasons for his passion for timber. An inspirational presentation of wooden acoustic panels by Jiri Oslizlo, who explained how the panels improve the acoustic comfort and showed the various design options. Michal Popov explained why vertical claddings are not the best technical solutions and shared

with the participants some tips how to design them responsibly.

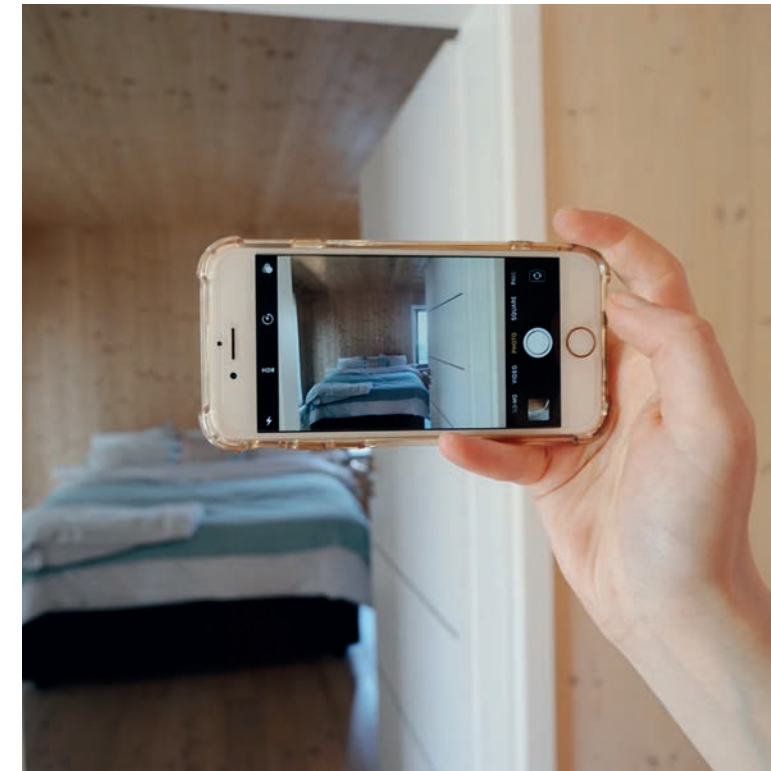
## Sustainability

Hout Bay House team is doing its best to keep the Workshops sustainable, reduce using of plastic and order catering from suppliers using local fresh ingredients. In case there are some snacks left, those are offered to our disadvantaged neighbours. Unfortunately, zero waste was not achieved yet, but we continue to strive towards this and to behave responsibly.





# INSPIRATION & SOLUTIONS



HOUT BAY HOUSE IS HERE TO OFFER INSPIRATION  
TO ARCHITECTS WHO WANT TO DESIGN SUSTAINABLY.

Hout Bay House has been designed and build as a showhouse introducing various options a modern timber construction can offer. Some of these options, such as cladding are investigated in the research, as well as various double-glazed windows, are incorporated to show the architects and clients options that the market offers.

## Modern timber construction

Timber is a very creative material combining sustainability and variability. Hout Bay House demonstrates how a building can easily grow and reflect the needs of its inhabitants. The showhouse has two bedrooms and one office, which can be changed into a third bedroom. In case a bigger family would like to live in

## MODERN TIMBER CONSTRUCTION INSPIRES ARCHITECTS AND SHOWS SOLUTIONS FOR SUSTAINABLE DESIGN & BUILDING

the Hout Bay House, there is a possibility to build an extension offering two more bedrooms and one bathroom. The walls can also become part of the furniture, as you can see on the wall dividing office and second bedroom.

## Surface finishes

Novatop CLT panels are on most of the walls in the visible quality and coated only with a light white wash to protect the colour (spruce gets yellow if exposed to the UV), on the ceiling in the

living room and kitchen, the spruce is coated with a thick white colour and on several walls there is an additional layer of fermacell gypsum fibre board which not only gives a nice contrast of timber and white colour, but also improves the acoustic and fire protection. Fermacell in either glued directly on the Novatop CLT panel or installed on battens.

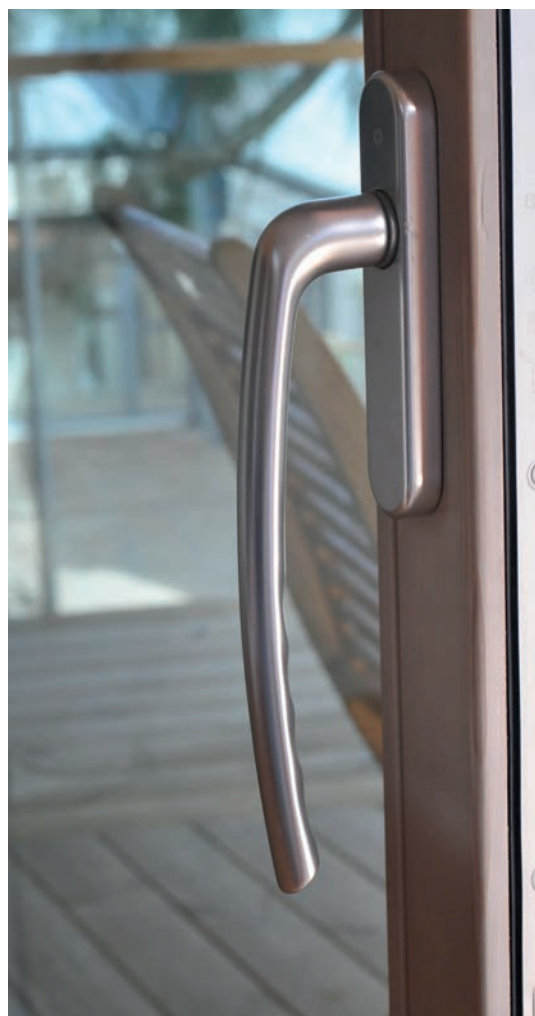
## Cladding and decking

Thermally treated pine and Siberian larch cladding and decking are used ei-

ther treated or untreated. The results of the research show how various options perform in the climatic conditions of Hout Bay, Western Cape.

The wooden cladding is installed on battens creating 60-100 mm of ventilated air gap, which helps to protect the house from overheating. The details like corners or connection of windows and wooden cladding, point out the importance of proper construction solutions, which play a significant role in prevention of structural degradation of wooden cladding.





## Windows & Doors

In the Hout Bay House all windows are double glazed, in the hot summer temperatures and during the cold and windy days, perfectly insulated window is essential for a comfortable indoor climate. In the entrance area you can find oak windows and entrance doors with an additional security features, in the garage and workshop are cheaper white PVC windows, in the rooms spruce window frames coated with a grey colour. There are also four options of balcony and sliding doors demonstrated, each with an approximate price information. Interesting is also the proper insulated garage door which helps to keep the indoor climate stable.

EXPERIENCE THE  
COMFORTABLE INDOOR  
CLIMATE OF A CLT  
CONSTRUCTION WITH  
DOUBLE GLAZED  
WINDOWS



HOUT BAY HOUSE: LIVING ROOM  
OFFERING CREATIVE ATMOSPHERE  
FOR MEETINGS





## MEETINGS WITH ARCHITECTS

The Hout Bay House is open to architects and people interested in green building. We trust a modern timber construction is the best place where to discuss CLT projects and to show various options and details.

Architects are welcome to invite their clients, introduce them the house and demonstrate which solutions will can be used in their projects. The house also perfectly demonstrates the aging of materials in South African climatic conditions.







RICHARD STRETTON DURING THE TIMBER COMPETITION WORKSHOP IN OCTOBER 2018

# TIMBER COMPETITION

The Timber Competition focused mainly on South African architects (under the age of 35 years) and students of architecture, who designed an ecologically friendly timber construction for a young family with three children – with all the necessities they might need. The objective is to widen the interest in modern sustainable construction and encourage young architects and also to obtain new experience. The contestants visited the opening workshop in the Hout Bay House and later presented their drafts to a professional jury at well as public at the 9th Wood Conference in Cape Town. The final designs were submitted in April 2019 and evaluated by an international jury. The second prize winner will enjoy a weekend in the Hout Bay House, which will give the talented architect a chance to experience the climate of a modern timber construction.





# VISIT THE HOUT BAY HOUSE!

Follow Hout Bay House on Facebook, visit regularly the homepage or register for our Newsletter and get the invitation for next event which will take place in the Hout Bay House. Regularly we organise Workshops and occasionally other events for professionals or public.

You are also welcome to make an appointment and visit Hout Bay House any time during the year.



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[www.houtbayhouse.info](http://www.houtbayhouse.info)

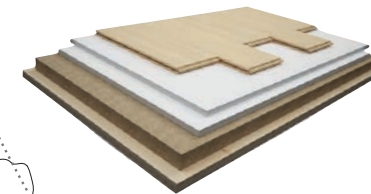
Wall composition:  
84 mm Novatop  
80/120 mm insulation  
100/60 mm ventilated air gap  
SECA cladding (part of eastern wall cement fibre board cladding)



A possible extension (two more bedrooms with one bathroom) can be added in case this will be necessary in the future.

There are 4 different solid wood floorings used in the house: Oak in the living room and kitchen, thermally treated Ash in the bathroom and Siberian Larch - with transparent oil in the western bedroom and with white oil in the eastern bedroom

The composition of the **flooring** is shown in the office:  
19 mm solid wood flooring  
40 mm wood fibre insulation  
25 mm fermacell flooring element  
15 mm solid wood flooring



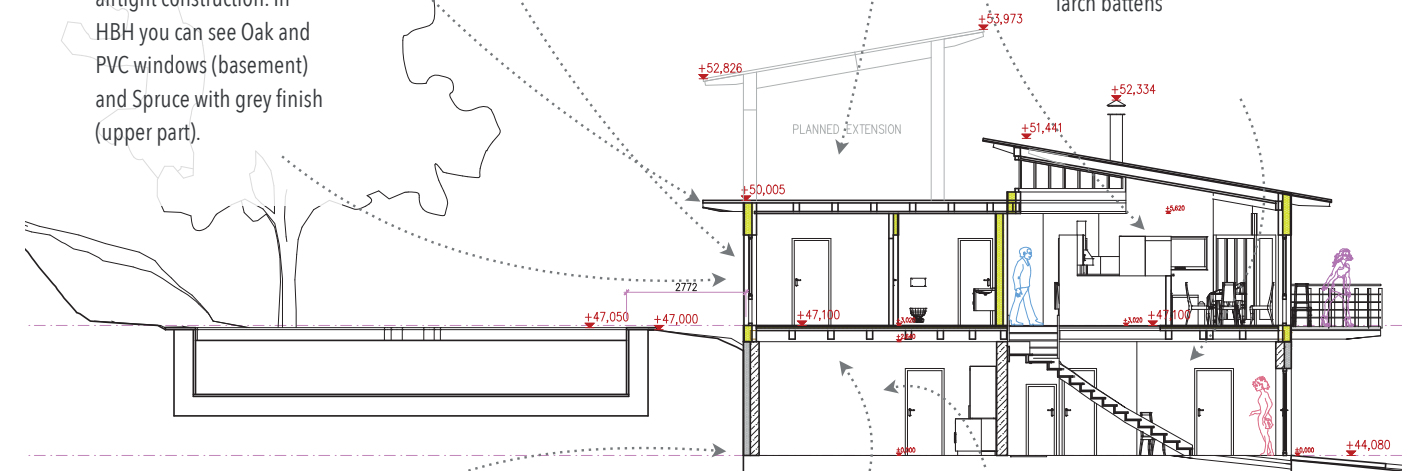
Roof overhangs prevent overheating of the walls and protect the cladding. In HBH we used Novatop Static for the roof overhangs - spruce is treated with OSMO.

Good quality double glazed windows are a necessary part of an well insulated airtight construction. In HBH you can see Oak and PVC windows (basement) and Spruce with grey finish (upper part).

Wooden walls can be also covered (depends on architect and investor), in case of HBH we used fermacell gypsum fibre boards, which also improve fire protection and sound insulation - for more information see fermacell page in the HWZi brochure.

The wooden walls are protected with light white wash treatment, untreated spruce will turn yellow (as visible on samples) and will probably get dirty. In the office you can see a connection of panels by screw (one is not covered), for more options of connections see the Novatop folder.

Combination of BSH (horizontally laminated gluelam beam) and CLT boards is used for the stairs, the rail is made from untreated SECA Siberian larch battens



Brick & mortar basement creates enough space for a big garage, entrance, second bathroom and technical room, at the same time shows how easily a CLT timber construction can be used as an extension of an existing building.

For the ceiling of the basement area we used DUO beams which are bearing the flooring composition of the timber construction - this solution is not the best for the acoustics of the building, a Novatop ceiling panel would be better. This solution has been chosen because the basement is not used as a living area.

In the technical room located in the basement, you can find the electrical and plumbing connection, which is easily accessible for any kind of repairing or upgrades. In the HBH construction the cables are hidden in the CLT wall or in the partitioning (i.e. plumbing) to go the shortest way under the flooring.



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COMPANY IMPORTING TIMPER TO  
SOUTH AFRICA



CONSTRUCTION SYSTEM  
OF SOLID WOOD



LAMINATED BEAMS & ROUGH  
SAWN TIMBER



WOODEN PROFILES

[www.houtbayhouse.info](http://www.houtbayhouse.info)