

Timber-frame

Timber-frame houses account for a very small proportion of newly built houses in South Africa. Abraham Nel looks at the reasons for this lack in local interest and how the perception of timber-frame houses is slowly changing.



buildings come out the woods

The construction of timber-frame buildings, especially houses, is slowly gathering popularity and pace in South Africa. This method of construction has traditionally been overshadowed by brick and mortar construction. But the broad-based uptake of timber-frame construction by South Africans is still a long way off.

"Most people who want timber-frame houses built, see them as luxuries," says Werner Slabbert, an executive member of the timber-frame builders' umbrella organisation, the Institute of Timber Frame Builders. "But we do see more and more people building timber-frame houses to live in." Traditionally, timber-frame homes were confined to holiday homes along the coast lines. Environmentally sustainable vs. energy efficiency

As potential homeowners become more environmentally conscious, they switch to alternative construction materials like timber frames. "Over the last year or so, people have become more sensitive to environmentally sustainable options," said Jacques Cronje, a Cape Town-based registered professional senior architectural technologist. "There is a perception that timber-frame buildings are more sustainable." Cronje said a distinction must be drawn between environmentally sustainable houses on the one hand and energy-efficient houses on the other hand.

On the subject of energy efficiency in brick homes and timber homes Cronje says: "Energy efficiency relates to the energy use of the finished house's occupants. The energy efficiency of a house is influenced by many factors; choice of material is just one of them."

According to Cronje, these factors include design, orientation, and positioning and size of windows. This is collec-

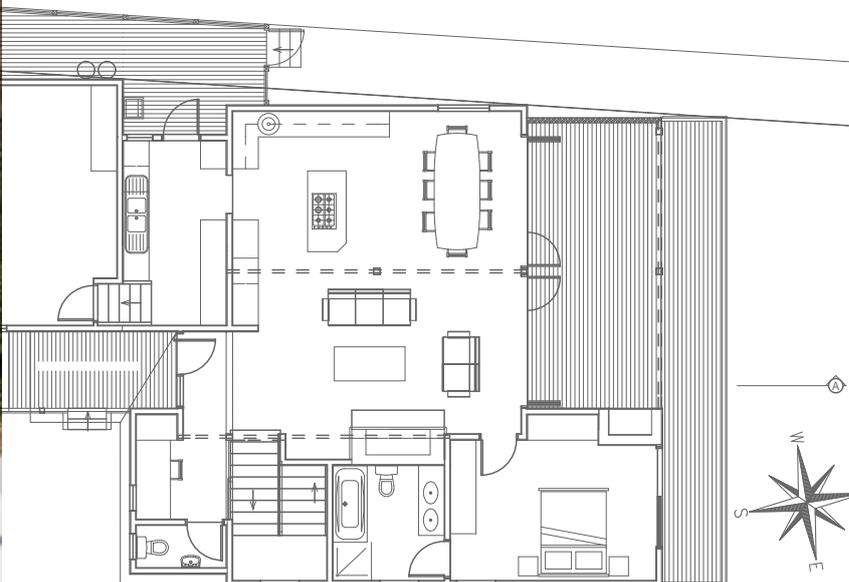
tively referred to as passive solar design. "It also includes active solar interventions such as solar water heating and using photovoltaics to produce electricity." He continues that the ultimate aim in terms of energy efficiency will be to produce what he calls 'net-zero buildings' or 'buildings that – once built – do not require any more energy than they produce'.

Hence, Cronje says it is a misnomer that timber-frame buildings are more energy efficient than brick buildings or vice versa, simply by the nature of the predominate building material used. The sustainability of materials used in the construction of a building, on the other hand, takes the so-called carbon-footprint of the building into account. Slabbert says timber-frame buildings have a negative carbon footprint. He explains that wood comes from trees, that grows from the soil, that acts as a storage point for carbon. Cronje agrees and explains that timber is a material grown and replanted and thus totally renewable. Adding to that, "It is carbon neutral as it absorbs carbon as it grows." Thus, he says, there is no contest with building materials which are quarried, heated in energy-intensive kilns or furnaces and, in the case of cement, gives off carbon as a by-product in production. According to information from the Institute of Timber Frame Builders, carbon emissions from processing and manufacturing other construction materials, such as bricks and steel, could be as much as 80 percent higher than from timber.

Timber versus brick

Apart from environmental considerations, potential timber-frame building owners will take a range of technicalities into consideration. The first is construction time. According to Slabbert, one of the biggest advantages of a timber-frame building is the time it takes to build. "It can take between eight and nine weeks to complete a timber-frame house. Then the house is finished and ready to be occupied. All finishes are completed." A brick house, on the other hand, can take three or four months to complete.

"The finishes of a timber house don't differ from that of a brick house," said Slabbert. "In some instances, such as with tiling and sealing showers, the finishes need to adhere to stricter guidelines and it can be more expensive." Secondly, homeowners need to consider the thermal properties of their construction material. With regards to this, timber frame and brick and mortar differ. Cronje says light-weight materials, such as timber-frame walls can provide highly effective insulation. Against this, "High-mass materials, such as brickwork and concrete, absorb, conduct and store heat." He uses the anomaly of a



Left and above: **Project:** House Marais **Design:** Jacques Cronje Timber Design **Contractor:** Cosy Homes, Sedgfield **Photos:** Carmen Lorraine Photography



Delivering on service that exceeds customers' expectations and competitively priced quality timber products has always been a strategic driving force for the Foresta Timber Group.

Exceeding customer expectations

A core focus of Foresta is their own branded products manufactured on site in their Machine Shop in Alrode Alberton. Products such their saligna pre-grooved decking, pine select ceiling, flooring and halflogs has set them apart from their competition.

The Foresta decking has become a popular choice for many contractors as it is manufactured in 110mm which is wider than the industry standard of 90mm and is aesthetically more appealing and easier to fit according to many in the industry. There is also the non-slip option which is a new innovation. With the closure of the SAPPI ceiling plant, Foresta took the initiative to close the gap in the market and began manufacturing first grade pine ceiling initially in the standard lengths of 2,4m and now from 900mm – 2,4m which has been in demand with many of the hardware groups. Their halflog distribution has grown as far as KwaZulu_Natal and Mozambique and their pine select decking which can be treated with copper chrome arsenate (CCA) is used extensively in log homes and even for shopfitting. The v-jointed flooring is also extensively used in mezzanine floors and since the launch of the Machine Shop in 2010, Foresta

won the contract to supply pine select flooring for the refurbishment of all the Gauteng Cape Union Marts.

Other very popular customised products are charging sticks for various mining companies, customised brushware and furniture components and Victorian Skirting in Meranti. In keeping with the global trend towards green and sustainable business practises the bulk of Foresta's timber is purchased from suppliers certified by the Forest Stewardship Council which means these companies strive to balance commercial forestry interests with forest ecology and the well being of local people.

Furthermore to optimise timber usage a specialised computerised machine was acquired for the machine shop which optimises cut-to-size lengths from the timber. Defects in the timber are marked by the operator and are cut out by the machine and the remaining quality timber yield is maximised according to a pre-set cutting list that eliminates wastage. As a result of this grading process, clear pine mouldings can be produced which as opposed to the industry standard of industrial or knotty pine mouldings.

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toasted sandwich to explain the heat-retaining property of high-mass materials: "You take it out of the snack-wich maker to cool off. Thinking it's sufficiently cooled down you take a bite only to get burnt by the hot tomato. The tomato, which has high water content, has a high thermal mass. The heat-retaining properties of high thermal-mass materials have caused the tomato to stay hot for longer than the rest of the sandwich." Thus, with regards to differences in thermal properties, the location of a proposed building will play a decisive role as to whether brickwork and concrete will be used in addition to the timber frame structure.

Here, the variance between the highest daytime temperature and the lowest night-time temperature needs to be taken into account. Cronje explains that where there is a big variance in the temperature such as inland parts of the country, there would ideally be some high-mass materials along with the timber frame walls. This could include a concrete floor which is able to capture the sun's heat during the winter day and slowly release it later in the same way as the tomato in the sandwich, during the night. The timber-frame walls act as insulators to keep the released heat inside the house.

Where the variance in temperature is not so pronounced – on coastal regions – the sea acts as a natural high-mass

material, slowly releasing captured heat during the night, says Cronje. Thirdly, the cost to construct a timber-frame house needs to be considered. According to Slabbert, there is no cost difference between timber-frame and brick buildings. "The industry norm is between R6 000/m² and R7 000/m². The house will be ready for occupation at these prices. All finishes will be included," he said. Slabbert added: "There is a general perception that timber-frame houses are cheaper than brick houses. But, the cost of labour for timber construction and the cost of timber itself are very high."

Cronje agrees that there is no difference in cost between building a timber-frame and brick house on a 'normal' site. But, when a potential homeowner wants to build on an abnormal site, for example on a sandy site or a site with a gradient, the cost advantage of a timber-frame building will become clearer.

Timber and labour pushing up costs

The shortage of skilled timber-frame builders is pushing up construction costs, according to Slabbert. The shortage led to an increase in the wage of timber frame constructors. "We pay timber-frame builders more than what we pay bricklayers," says Slabbert. "And when you move to the Western Cape, the labour cost increases even more." This is could be ascribed to the large demand for timber-frame houses along the Western Cape's coast.

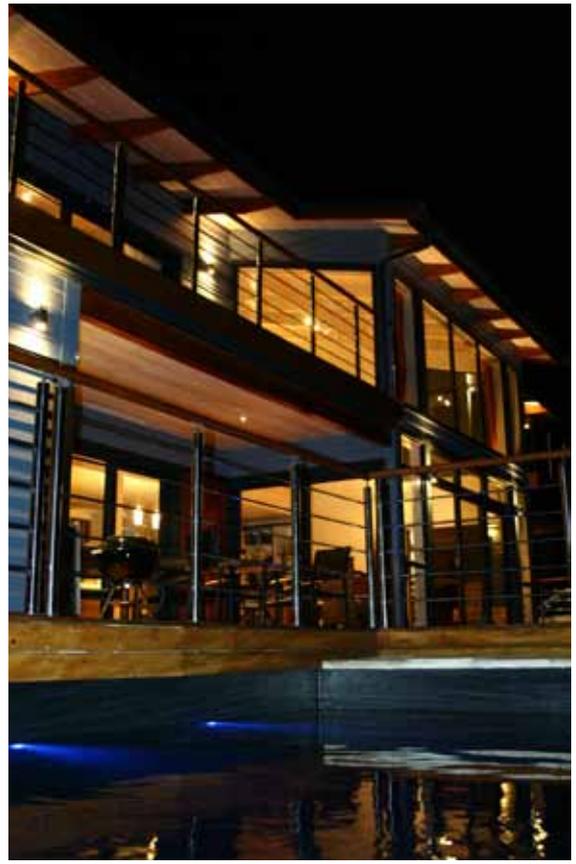


Project: House Dale
Design: Jacques Cronje Timber Design
Contractor: MG Projects, Knysna
Photos: Jacques Cronje





Project: House Swart
Design: Jacques Cronje
Timber Design
Contractor: Cosy
Homes, Sedgefield
Photos: Jacques Cronje
and Carmen Lorraine
Photography



The price of wood is another factor putting more pressure on timber-frame construction. According to Statistics SA, the average price of wood and wood products increased by 3,7 percent between February 2011 and February 2012. The previous year, Statistics SA recorded a similar price increase of 3,5 percent. "Wood is becoming more and more expensive and that is a huge problem," says Slabbert.

Wood and labour costs are not, however, the only challenges to the timber-frame construction industry.

Few designers

"There are very few designers working on timber-frame houses," says Cronje. He gives three reasons for this. Firstly, the demand for timber-frame houses is very small in South Africa. "Between one percent and two percent of houses being built are timber-frame houses. And most of these are being built by people in the higher income groups." The demand for timber-frame houses in South Africa pales into comparison with statistics from industrialised countries. At the Institute of Timber Frame Builders' 2010 annual general meeting, it was noted that 70 percent of the industrialised world's population lived in timber-frame homes. Around 90 percent of the USA's and Canada's populations live in timber-frame houses.

In South Africa, however, timber-frame buildings are generally limited to game lodges or nature reserves and coastal towns where they serve as holiday homes. "In many nature reserves we see building with timber is promoted," says Cronje.

Secondly, he explains, universities do not train potential architects in timber. "I, for example, wanted to do a thesis on tim-

ber for my built-environment degree, but I was dissuaded to do so by my supervisor," says Cronje, who has been working in the timber design and building industry since 1992. Among other projects, Cronje has been the contract manager for the construction of a timber hotel on Seychelles' Praslin Island. A third factor impacting the number of timber designers is the notion of potential homeowners approaching the timber constructors directly. Many constructors have their own in-house designers, says Cronje.

Standards for timber frame construction

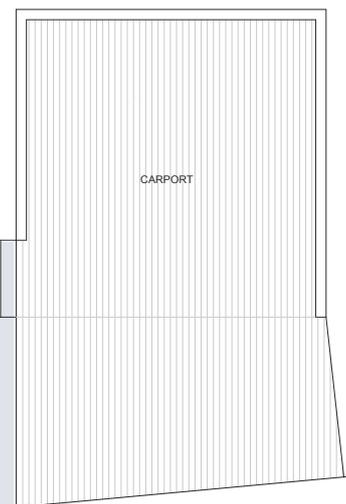
Slabbert says the Institute of Timber Frame Builders, through gazetted national standards on timber-frame construction by the South African Bureau of Standards, ensure the quality of timber-frame construction. The national standard SANS 10082:2007, published in 2008 in the Government Gazette, sets out the quality guidelines for timber-frame construction. There are, however, timber-frame constructors who do not adhere to this construction standard, said Slabbert. "There are constructors who take shortcuts," he says. "They tend to build timber-frame houses cheaply, but these are nothing more than glorified Wendy houses." One of the shortfalls of this type of substandard construction will be a lack of proper insulation of the building. He urges potential timber-frame homeowners to take note of the SABS standards.

Slabbert advises potential homeowners to ask whether a timber-frame builder is registered with the Institute of Timber Frame Builders. Banks issuing mortgages for the construction of timber-frame houses will not approve credit if the timber-frame builder is not a member of the institute.

"Admittedly, there are timber-frame builders outside the institute who build good houses," Slabbert says.



Project: House Nezar
Design: Jacques Cronje Timber
Design Contractor: Noggin Homes,
 George **Photos:** Jacques Cronje



Timber sourced from SA

Wood for South Africa's timber-frame construction industry is sourced from local sawmills.

"I source my wood directly from the saw mills," says Werner Slabbert, owner of Eco Log Homes. "I have to buy a truck link full of timber at a time at a cost of R600 000."

According to him, Radiata Pine, *Pinus radiata*, is a more stable softwood used in timber-frame construction and he sources it from the Southern Cape. He also sources wood from sawmills in Mpumalanga.

Wood used in timber-frame construction needs to adhere to certain wood preservation standards as set by the SABS and the South African Wood Preservation Association. The treatment of wood, generally through high-pressure immersion with preservatives, is indicated through the association's hazard class-levels, based on similar international levels.

The preservatives used in treating the wood differ according to the use of wood. The exterior walls of timber-frame buildings will be constructed of level-H3 wood, whereas the base of the building's structure, which is in contact with the soil, will be constructed of level H4, a more intensely treated wood.