



The benefits of using wood

Structural expression

Natural beauty

Easy to work with

Good insulation

Healthy

Safe, light, strong and durable

Wide range of engineered solutions

Building with wood

Today, when architects and engineers design landmark buildings like bridges or government offices, schools or factories, they look to timber to express a contemporary beauty which is nonetheless rooted in nature and a respect for the environment.

Wood is increasingly used in housing, nurseries and schools, religious, administrative, cultural and exhibition buildings, and halls and factories, as well as in transport-related construction like bridges, sound barriers, hydraulic engineering and avalanche control.

The flexibility of lightweight modular timber construction is particularly suited to multi-purpose halls because of its ready adaptability.

Wood is a high-performance material, low in weight, yet high in density, with excellent load-bearing and thermal properties, and the availability of a wide range of timbers, each with its own characteristics, means wood can be suitable for most special requirements.

Timber construction is typically characterized by a multi-layered combination of different materials which work together as a system to provide optimum stability, thermal, acoustic and moisture insulation, fire safety and constructional wood preservation.

“Timber building is part of future energy-efficient building. Wood is sustainable, CO₂ neutral and a highly effective insulator, creating excellent living conditions. One specific advantage of wood is its ability to reduce energy use. Timber construction has a higher heat insulation value than conventional construction methods, even with lower wall thicknesses. An external wall constructed using timber may have only half the thickness of a brick or concrete wall, yet provide double the thermal insulation value, while at the same time avoiding the thermal bridging common with other construction methods. Considering the growing importance of energy-efficient building methods, timber construction will play an increasingly important role in the future.”

Dipl.-Ing. Markus Julian Mayer (Architect BDA) and Dipl.-Ing. Cathrin Peters Rentschler, Munich, Germany.

Flexibility

The flexibility of timber construction methods makes it easier to vary a building's orientation on site, its floor plan, the number of rooms, the interior design and the overall appearance, while timber's thermal efficiency means walls can be slimmer, releasing up to 10% more space than other building methods.

External finishes depend on personal preference; walls can be clad in wood, tiles, brick, or plastered; roofs can be clad in tiles, slates, concrete or metal.

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Gallery staircase of Petajavesi Church, Finland

Photograph by Will Pryce from the book
‘Architecture in Wood’
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Opposite left and right

Timber building is part of future
energy efficient building



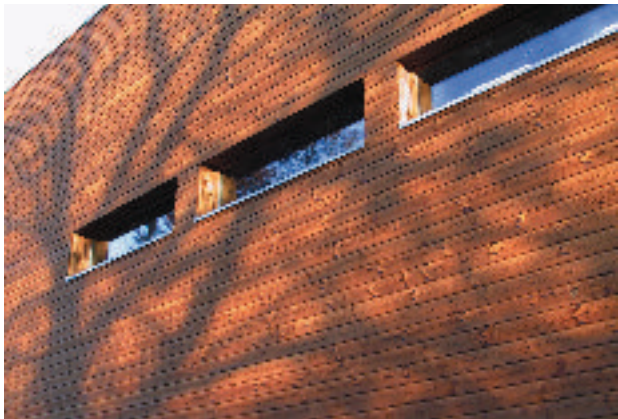
Fire prevention

Unlike many other materials, timber behaves predictably in fire, forming a charred surface which provides protection for the inner structure, so that timber elements can remain intact and fully load-bearing during a fire.

The fire-retardant detailing of modern timber construction prevents cavity fires and the spread of combustion gases.

“We believe in wood as a building material. It is a sound choice, so long as fire prevention and building regulation requirements are complied with. Timber construction makes our job easier because it remains stable longer, burning slowly, steadily and predictably. Its behaviour can be calculated, allowing us to estimate load-bearings and the critical points in the building. Its predictability puts us in control, so that we can enter the building to extinguish the fire. The failure of a wooden structure is foreseeable, whereas a steel structure will lose its stability suddenly and without warning. We therefore think modern timber houses are a good thing.”

Wilfried Haffa, commander of Rietheim-Weilheim's volunteer fire brigade in Germany, whose technical centre is built in timber.



Sound insulation

Modern timber buildings readily comply with sound insulation standards through using a layered structure of different materials. Even more demanding standards can be met using a number of different design solutions.

Durability

With good design and correct detailing, structural wood needs no chemical treatment to achieve a long life. Wood is resistant to heat, frost, corrosion and pollution; the only factor that needs to be controlled is moisture.

Timber construction materials are kiln-dried to specified moisture levels, removing the need for chemical wood treatment in interior use.

Externally, design elements, such as large roof overhangs and sufficient distance between timber and ground are important. Timber facades are non-load bearing and therefore do not require treatment. However, extended life spans can be achieved by using heat treated timber, special timber qualities, treatments or decorative finishes.



Timber cladding

Architects are increasingly turning to timber cladding for renovations as well as new buildings as a way of achieving a contemporary, yet natural look: a timeless elegance and simplicity.

Apart from its aesthetic advantages, timber cladding's light weight makes handling and transport simple. Used in combination with insulation materials, it keeps brick walls frost free, reduces heating costs and provides a more comfortable interior.

Timber cladding can be fitted to any exterior wall, timber, concrete, or brick, and is as popular for larger industrial and showcase public buildings as for housing.

Wooden windows

Nowadays wooden windows can be highly engineered components, built to the most demanding thermal and security specifications, with low maintenance intervals and a long service life.

Wooden windows have many distinct advantages: they look and feel right, they can be supplied in a number of colours or stains and to a wide range of designs, they are more thermally efficient, they resist 'cold-bridging', they can be rectified if damaged, and they are made from sustainable materials.

Above left

Cladding is becoming increasingly popular for residential and commercial buildings. This building is clad in Thermowood® heat treated timber

Above right

Wooden windows can meet the most demanding thermal and security specifications
Kindrochet Lodge, Perthshire © Wood Awards 2005

Opposite above left

Wooden houses can incorporate the latest energy saving technology

Opposite below right

Timber has high resistance to chemicals
Picture of Solemar salt-water baths in Bad Dürkheim, Germany



House technology

Timber houses are not only the most economical and environmentally-friendly, they also provide the best platform for integrating modern technology systems like controlled ventilation and air extraction, heat recovery and solar panels, many of which are now installed as standard practice.

Wood in the renovation of old buildings

Wood and wood-based materials have a number of advantages when used in the renovation of old buildings, quite apart from their aesthetic value, the most important of which is probably ease of use. Wood components do not generally require heavy lifting gear, and they are easy to fit and work with. Wood's thermal insulation and humidity control properties make it comfortable to live with, while its relatively low cost and long durability make it highly cost-effective.



Living with wood



A sound investment

Wooden houses are inexpensive to build and extend, and enjoy low running and maintenance costs over a long life. A study of whole life costs, carried out in 2002 by the chair of steel and timber building at the University of Leipzig in Germany, found that professionally designed and constructed timber houses are at least as sound a long term investment as any other.

Today the average service life of a wooden house is between 80 and 100 years, with some builders guaranteeing a lifetime of 125 years. In fact, timber houses can last many hundred years, as witness the many examples surviving from the Middle Ages.

Maintenance costs for timber buildings are no higher than for others. Wooden facades, with or without a surface coating, merely require ordinary maintenance.



Above
Timber is an ideal material for loft conversions
Below
Temperature profile in colours of a floor-wall detail

INFORMATIONSDIENST HOLZ hh 3 2 2
Holzbau und die Energieeinsparverordnung;
Univ.-Prof. Dr.-Ing. Gerd Hauser et al

Opposite
These fishermen's cottages in Bergen, Norway were built in the 19th century
Photograph by Will Pryce from the book 'Architecture in Wood'
© Thames and Hudson Ltd, London

Adapting to changing needs

Houses need to be able to adapt to changes in the life-stages of their occupants, as well as to wider changes in the way people live.

Thanks to the light weight and modular structure of timber houses, loft conversion, adding an extra storey or an extension, removing a wall, or just modernization, are simple and practical, while the dry lining used in timber construction means less waste and moisture.

In many cases a loft conversion is only possible in timber, where the low net weight and exceptional strength of wood elements ensure adequate load-bearing, even over considerable spans.

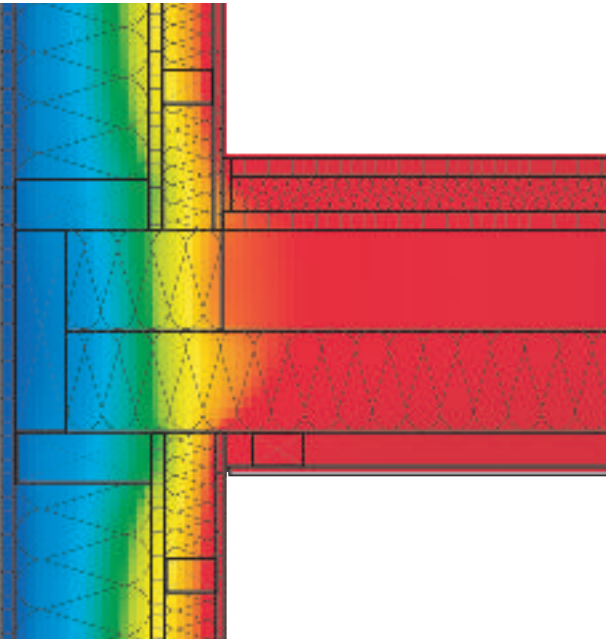
Timber construction reduces the build time for extensions, and the light weight of the components means they can be delivered even to sites with severely restricted access.

With the proper planning, not only windows and doors, but also many domestic installations can be integrated at the prefabrication stage.

Greater comfort, lower bills

Wooden houses set the standard for heat insulation, as timber's cellular structure gives it natural thermal insulation qualities that are superior to any other building material, keeping out the cold in winter and the heat in summer.

Wooden houses, built to standard construction methods, easily meet thermal insulation regulations. However, with additional insulation, it is quite practical to build ultra-low, or even zero energy houses using timber. Smaller capacity heating systems mean significantly reduced running costs.





Wood makes a natural case for itself inside the home from a practical as well as an aesthetic point of view. And nothing else has such timeless good looks or provides such a sense of well-being.

Panelling

Wood panelling, whether contemporary or traditional, painted, stained or natural, adds character to a room, while covering defects, improving insulation, balancing humidity, and providing a robust and maintenance-free surface. The older it gets, the more beauty and character it develops.

Ceilings

Wood panelling is particularly popular for ceiling, covering irregularities, minimizing maintenance, and simplifying the fitting of lighting and ventilation systems.

Floors

Wooden floors are beautiful, practical, healthy, durable and excellent value. They are hard wearing, yet warm to the touch, with enough 'give' to be comfortable. They protect against static electricity, offer no hiding place for dustmites and will provide natural humidity control.

Furniture

Wooden furniture combines timeless beauty with robust practicality, whether a modern style statement, or a rustic classic; whether hand-crafted objects made with exotic hardwoods, or mass-produced pieces made from plantation softwoods, which are increasingly being engineered to provide ultra high performance elements for the manufacturing industry.

Wood's strength, light weight and stability mean wooden furniture is exceptionally durable, ageing gracefully over the years.

Healthy living

Wood creates naturally healthy living conditions. It is easy to keep clean, helps maintain an optimum humidity balance, helps a room warm up more quickly, and keeps condensation to a minimum.

Wood in the garden

The tradition of fencing off gardens and external sites with wood is centuries old, and wood remains the material of choice for modern gardens.

It is inexpensive, simple to transport and handle and fits into the natural surroundings of landscape and garden. The possibilities are endless, from fencing to decking, pergolas to pagodas, planters to glasshouses.

Above

Wood blends into the natural surroundings of landscape and garden

Opposite above

Wood creates a warm, clean stylish attic bedroom
Picture © Åke Eson Lindman

Opposite left

Domestic fireplaces keep up with modern technology

Heating with wood

Over recent decades forest growth has considerably exceeded fellings. Not only is there an overwhelming environmental case for using more of this abundant renewable supply, but there is an increasingly compelling economic case, because of wood's relative price-stability. Modern wood heating plants, as well as domestic fireplaces, comply with the most up to date requirements of energy and heating technology.



Wood and chemicals

The processing and finishing technologies for wood often require the use of chemicals, in the form of adhesives, paints and coatings, as well as products to improve wood's biological durability and moisture resistance.

The application of wood preservatives happens under very strict control in closed systems and conforms to the relevant European and national regulations. Pressure treated timber for construction, agriculture, landscaping, garden products, marine, railway and many other applications, enjoys an extended service life and provides a good, environmentally conscious alternative to non-renewable materials.

Formaldehyde is a simple but essential organic chemical that occurs in most forms of life, including humans. It is naturally present in trace amounts and is also used in formaldehyde-based resins in the manufacture of commonly used wood products. The World Health Organisation provides an advisory limit of concentration of formaldehyde in indoor air of a maximum 0,1 mg/m³. Comprehensive indoor air studies confirm that the level of formaldehyde in European homes is on average only one third of the guideline. The limit value for the strictest formaldehyde class (E1) in the European standards for wood-based products is linked directly to this WHO guideline. Although those wood-based products still emit some formaldehyde, they remain at a level very substantially below WHO recommendations. The use of formaldehyde ensures good quality wood-based products can be produced affordably.

