

The logo for ALPHAoak, featuring a green oak leaf icon above the word "ALPHA" in green and "oak" in brown.The logo for ALPHAoak, featuring a green oak leaf icon above the word "ALPHA" in green and "oak" in brown.The logo for ALPHAoak, featuring a green oak leaf icon above the word "ALPHA" in green and "oak" in brown.

- Handcrafted oak framed buildings and structures
- **Craftsmanship, sustainability and customer service**

UNDERSTANDING OAK FRAMED STRUCTURES

Timber framing (using oak, Douglas Fir, Larch etc) or post and beam, is the process of construction that has a wooden frame as the buildings structural support core. Oak framing is a centuries old method of constructing that frame, jointed together primarily with mortice and tenon joints, which are held together with oak pegs.



At Alpha Oak, we look to make the process as simple as possible for anyone considering an oak framed build project. To aid you with that, we have produced this guide to help you understand an oak framed building. It is our aim through this guide to explain and educate potential customers about oak as a construction material, and about the fundamental processes involved in creating an oak structure. It is our hope that you will then be as passionate about this ancient building technique with a beautiful natural material as we all are at Alpha Oak. Hopefully you will choose Alpha Oak to design and build your dream oak frame, and we will be looking forward to helping and advising you on your journey.

Why use oak?

As a material, the properties of oak make it an ideal building material. It has been used for centuries in making our homes, places of worship, bridges and piers.

Walk around most towns and cities in the UK and look up from the shop fronts!

It is not a forgotten construction material though, and in the last few decades, has become a fashionable modern material for buildings, due to its strength, adaptability and beauty. It can be seen in shopping centres, commercial buildings, and of course our homes.

It is a material for now and the future, and what was once becoming a dying craft, has seen a welcome revival.

It will stand the test of time, like so many structures before it, and in today's world, it is a sustainable material.

Why is it sustainable though?

In today's world, we want to feel we are doing our part for the earth, be more ethical in our choices.

Our homes can be very damaging to the environment, especially concrete and cement!

A Little History of Oak buildings in England

Oak (or '*genus quercus*' in Latin) is a hardwood with around 600 known species. The oak tree is native to the Northern Hemisphere and includes deciduous and evergreen species extending from cool temperate to tropical latitudes in the Americas, Asia, Europe, and North Africa. North America contains the largest number of oak species, with roughly 90 in the U.S, while Mexico has 160 species of which 109 are endemic. The second largest collection of oak varieties is China, which comprises approximately 100 species.

It has always been a popular wood in the UK, used to build navy ships in the 18th century, paneling in the Houses of Parliament, and the very heart of Westminster Hall. Within its roof you will find what is considered the most impressive hammerbeam trusses in any British building. These trusses are 20 metres plus in width, and run a length of over 70 metres, which makes this roof the largest medieval structure in Northern Europe.

Many cathedrals have significant oak structures within them, namely:

Exeter cathedral nave and the transept roof structure.

Ely Cathedral lantern and octagon.

Lincoln cathedral transept.

Other buildings of note are:

The Barley Barn at Cressing Temple.

Chester Rows have large oak frames adorned atop the stone lower story. The rise to five stories in places.

The Globe Theatre in Shakespeare theatrical land.

The Oak House in Greet's Green, West Bromwich. This is a Tudor house dated to at least 1634.

Oak history cont'd

It is the 'Tree of Britain'. Wander round many British towns and cities and look up above the shop fronts! Up until the 1700's, it was the core of our homes and the main form of construction. With its amazing architecture, it was used to build grand halls to basic homes.

The decline in oak framing came about due to several reasons:

There was a change in architectural design, with the stone builds going more towards a classical style.

The Great Fire of London (1666), and previous fires, meant that new rules were applied that banned the use of wood in populated town areas.

With oak being used in shipbuilding, the stocks were reduced to such an extent that British oak was rare. Structural wood was then having to be imported from the likes of Scandinavia and North America, which largely was Douglas Fir, Larch, Spruce and Pine.

Our countryside would not be British, if it did not have oak trees on its landscapes and horizons. In more recent times, the last 30 to 40 years, it has seen a resurgence, and has become more fashionable in construction again, and is rightly considered a real alternative to its steel and concrete cousins.



Just for fun, some little-known facts

- Oak bark is rich in tannin and is used by tanners for tanning leather.
- Tannin is a result of the intake of iron from the soil and rot, during the growth of the oak tree.
- Medicinally, tannins are used to draw irritants out of your skin such as the venom from bee stings or poison oak. Next time you get stung, pull some fresh bark off the twig of a nearby tree, chew it up and apply it to the sting. The irritation will go away within seconds. Tannins are also applied to burns to help the healing and to cuts to reduce bleeding.
- Acorns can be used for making flour or they can be roasted for making acorn coffee.
- Tannin dissolves and escapes from the wood. Wine barrels are made from oak and it is the tannin that helps to give the wine its' colour.

- Sessile oaks of Europe can reach heights of up to 40 metres.
- Oak trees regularly live to be 500 years old, although 1,000 years old oaks are also known.
- A mature oak tree can produce up to 50,000 acorns!
- Tannin is in tea (from the tea plant... not herb teas). The tradition of adding milk to tea causes the tannins to bind to the proteins in the milk rather than to the proteins in your liver and kidneys. When you drink tea without milk, you are literally tanning your insides.
- The flowers of many oak trees are known as *catkins* and they are produced by oaks when they reach their reproductive age, which is usually 20. They are generated by rising temperatures in spring. Ultimately it is the catkins of many oaks that turn into the acorns. Hence the old fashioned and popular phrase... 'from mighty oaks little acorns grow'.



Forests & woodlands.

Oak as a material is an infinite resource. The oak tree indeed takes up to 70 years to be a reasonable size, but with responsible management of sustainable woodlands, oak is a renewable source of material. All our oak is sourced from PEFC or FSC accredited suppliers. This promotes the continued management and survival of woodlands, along with their associated habitats and wildlife. As such, it can continue to provide for construction needs for decades and even centuries to come.

Sustainability of Oak

Carbon footprint.

Beyond its renewability, oak is a 'green' building material! Oak trees, like all other trees, take in carbon from the air, reducing the amount in the atmosphere. If wood in general is burnt, then it is carbon neutral, when you build with oak, over the lifetime of an oak frame, factoring in any carbon released during machining, it is better than carbon neutral, it becomes carbon negative.

Compared to more traditional methods of construction, using concrete and cement, it's environmental cost is low. As a construction method, oak framing using traditional methods, requires minimal processing past the felling stage, to make the actual frame.

Chemicals and pollutants.

Due to the natural strength and durability of oak, when used for framing, there is no need to use any finishing chemicals*, which could be harmful to our health and the environment.

*We do on occasions use an Oxalic acid to 'wash' the frame after assembly. This is to remove dirt build up during the machining and build phase. Please see our separate page for more information.

There's no waste.

Oak produces no waste, unlike most other methods of construction. Further, when it has outlived its usefulness (which could be hundreds of years!), the beams are more often than not reused for restoration work on other buildings. Even if left unused, they would just rot and return to the ground that which it took out. It will not takes decades or centuries to decay, causing any harmful effectives to the environment.

Oak framed structures last.

The longevity of an oak building adds to their green credentials. When we construct using oak, we are reducing the future need of construction for homes, as they will already exist. Your new oak framed home could be passed down the generations, reducing the need to build more homes.

On top of all that oak offers in sustainability, environmental impact and green credentials, it is such a beautiful material to work with and live in a home built from it.

Affordability and added value.

A regular question asked about an oak frame is, “is it expensive?” It’s a common misconception that an oak frame will be more expensive compared to more traditionally viewed forms of construction, such as brick and block, steel or a uPVC modular frame. The truth is an oak frame will generally cost less than you think.

A properly constructed oak frame will add value to your property, beyond monetary. It will add a better quality of life for you and your family, as an extension so often becomes the hub of the family gathering.

The monetary value added will vary depending on the size of the project, as well as the design and amount of oak used. We aim to maximise the space you have and your budget with the design we produce, to give you the best value for money, whilst providing your dream home or extension.

The design often includes large glazed areas, and vaulted ceilings with oak trusses, which will enhance not only the frame, but also the view you have from the building.

These add the ‘knockout’ factor to your project, which will help prospective buyers should you ever come to sell your home. It can often be the main factor in someone deciding to buy.

The image shows the interior of a room with a vaulted ceiling. The ceiling is constructed from a network of light-colored oak timber beams, creating a grid-like pattern. A large, diamond-shaped skylight is set into the ceiling, framed by oak wood. The skylight is covered with a decorative, patterned glass. In the lower right, a window with a wooden frame looks out onto a brick wall and a satellite dish. The walls are painted a light green color.

The benefits of oak as a material

Oak is a fabrication material like nothing else, which makes it perfect for construction, and uniquely better to other materials and woods. Lets explore its qualities.

Oak as a material: Hard-wearing & safe

Strength

In construction, oak has been used for centuries (and in boat building!). Older buildings are the living testament to its durability. A traditional oak frame is held together with often simple joints and oak pegs! These are so strong they can support large structures. The strength of the pegged joint is essential to how a post and beam frame is designed and made. How the frame settles over time, and the joints lock together, is the basis of a green oak frames' strength.

Fire performance

We can often be asked how an oak frame would stand up to fire. The answer is simple really. The general large section timbers used in oak framing perform exceptionally well in a fire. The timbers will char on the outside, which in turn forms a shell. This shell protects the rest of the beam from the flames, and in turn keeps the structural integrity of the frame.

Longevity

As long as the oak does not remain persistently wet, then it will last for centuries. The oak strengthens as it shrinks, and improves over time, increasing the esthetical look and feel over the years. The shrinkage is taken into consideration when designing and then making the frame. Oak only shrinks in its width, not length. This is what makes the structure stronger over time, locking the joints together tighter.

Cracks (or shakes as we call them)

These cracks appear as the oak dries out, but they do not affect the structural integrity of the frame. They add the unique character of oak that we all recognise, the warmth of the structure.

As the oak dries out, the colour will gently change, both inside and out. **Outside***, if left, the oak will turn a silvery grey colour. This is caused by the tannins in the wood reacting with the sun's UV and the weather elements. Inside, the oak will slightly darken in its natural honey colour.

Design adaptability and visually pleasing

The potentials in design with an oak frame are unrestricted, despite the common view that most frames need to be of a box 'barn' style. Whilst most frames will fall within a certain category of design**, these can be mixed up to give a unique style. Alpha Oak only design and construct bespoke frames, each unique to the individual client's wishes and needs. We do not supply kits for an off the shelf frame. We also craft all our frames by hand, with the years of knowledge going into each joint of each frame.

When the project is complete, an oak frame gives a look and feel that only oak can do. Oak is an affordable beauty, giving your home a warm, rich look to it. It works with modern materials, as well as it does with more traditional ones. Having an oak framed home or extension connects you to the outside like no other building material can.

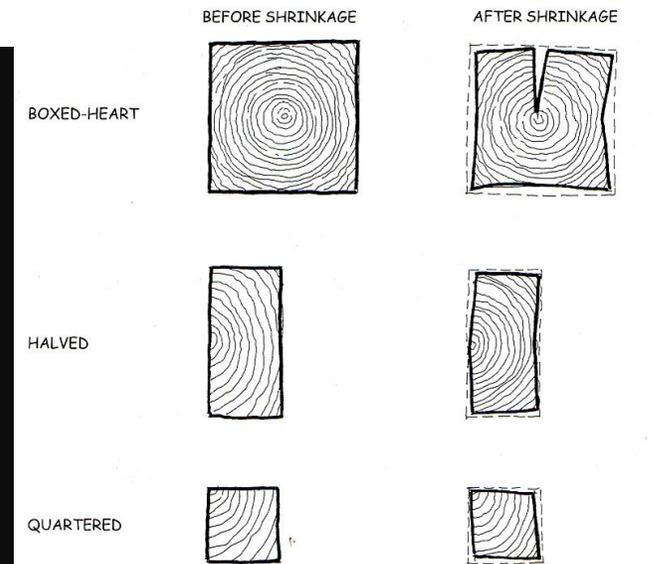
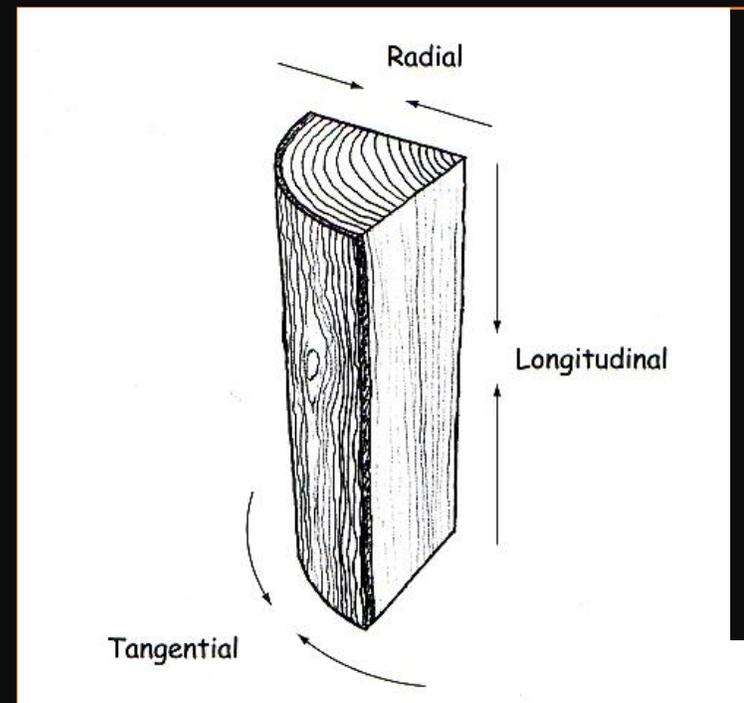
Alpha Oak can design and create your dream, a beautiful building or extension, that will bring years of pleasure.

*See our separate page on the treatment of doors, windows and if you want, the oak frame.

**See our separate page on the main categories of frame designs.

Shrinkage in green oak

Oak only shrinks in its width, never in its length. On average, under a controlled, centrally heated room, then oak beams will dry out an inch per year. Hence a 6-inch (150mm) beam will take 3 years to dry out to its maximum. As a percentage, this is between 4 and 8 percent, but to a maximum of 10%. Oak will dry out quicker through the end grain than the side grain.



Design and build



The basic design principles of an oak frame have changed little in centuries. They are skills that have passed down generations. Whatever the design, from traditional to a more contemporary look, the key elements are largely the same.

The main construction is post and beam. This involves large section green oak beams forming the primary structural frame, using traditional joints (mostly mortice and tenon joints) that are pegged with seasoned oak. It is around this frame that the shell of the house or extension then fits.

There aren't really any limitations to where an oak frame will work. The design can be adapted to suit any home or location. A design can be modified to meet any local planning authority, such is the diversity of oak. An oak frame can be built on any site, from the slopes of a hill, to a structure on silts!

Part L1A building regulations on green oak frames

- The regulations call for a reduction of CO2 emissions by 20% compared to the 2002 values.
- Practical provision must be made to limit the loss of heat through the material of the envelope.
- Glazing should be UV rated to avoid high internal summer temperatures.
- Air permeability needs to be kept within realistic limits.

Foundations

In general, the foundations for an oak framed building will be the same as a bricks and mortar structure. Usually, an oak frame will be lighter than its masonry equivalent, so less invasive foundations can often do the trick. The ground type, along with the building inspector, will often determine the type of footings required. Certain factors such as trees or on a slope can make a difference, but that would be the same whatever the super structure was. If there is ever any doubt, then Alpha Oak can look at the options, along with any ground survey if required.

Glazing

An oak frame is ideal for large areas of glazing, especially if you have a view to capture! An extension can be full of natural light. Please see our separate page for more extensive details.

Exterior envelope

There are several ways to finish the exterior of your building. These can be a wood cladding (Oak, Larch, Cedar), stone or brick, or even a rendered finish in a variety of colours. We will help you decide on what will fit in best with any existing buildings and the surroundings.



Glazing



Foundations



Exterior envelope

The process to your oak frame building

At Alpha Oak, we can offer you a turnkey project. This can take away much of the stress of the building project from you, as the client.

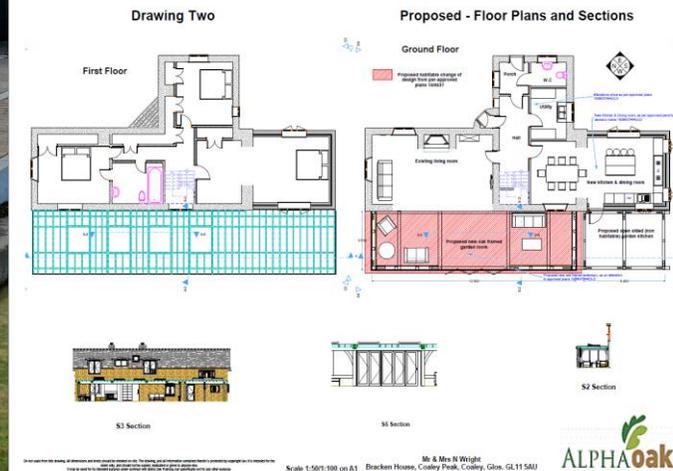
We give a free consultation meeting at the start, to guide you to the right decisions, making sure that you will get the right oak framed building you desire. We will listen to your initial ideas, and sculpture them, with our knowledge and experience into your vision. From there, we will give you an initial guide price of the project, to see if it works with your projected budget. We can then adapt where necessary.

Once you are happy, we progress to the design stage, and produce a set of drawings for you to look over. You may already have an architect or designer on board, and we can work with them to ensure that the design is right for an oak frame. You will be consulted closely throughout the design stage, presenting options and ideas as we go.

Once we have an agreed design, then we can move forward to planning, if required. Sometimes, with an extension, it can fall within 'permitted development'. Where required, we can submit the drawings for planning on your behalf.

From there, once planning approval is received, your project will be booked into the diary!

You will be kept apprised of the timescales as we work towards starting your project.



Making the frame

Most of the carpentry on the frame is carried out at our workshop, in the heart of The Forest of Dean. We have a very tranquil setting in which to work from (as you can see from the picture!). We use traditional oak framing techniques to lay out and scribe the frame, and each joint is marked with carpenters' marks, which help us put the frame together on site.

The tools are a mixture of framing hand tools, large chisels and slicks, alongside more modern electric machinery, such as a chain morticer, bandsaws and large rip saws.

All joints are tested as each section is made.

Some finer points of the frame carpentry are determined in response to the characteristics of the timbers used, in order to ensure the strength of each piece is utilized.

A high level of craftsmanship goes into each frame we make, ensuring each joint works with the timbers used.



Raising the frame

Once we have machined the frame in the workshop, then it is transported to site, to be raised. This is often a quick process, and you will see the frame up in a few days!

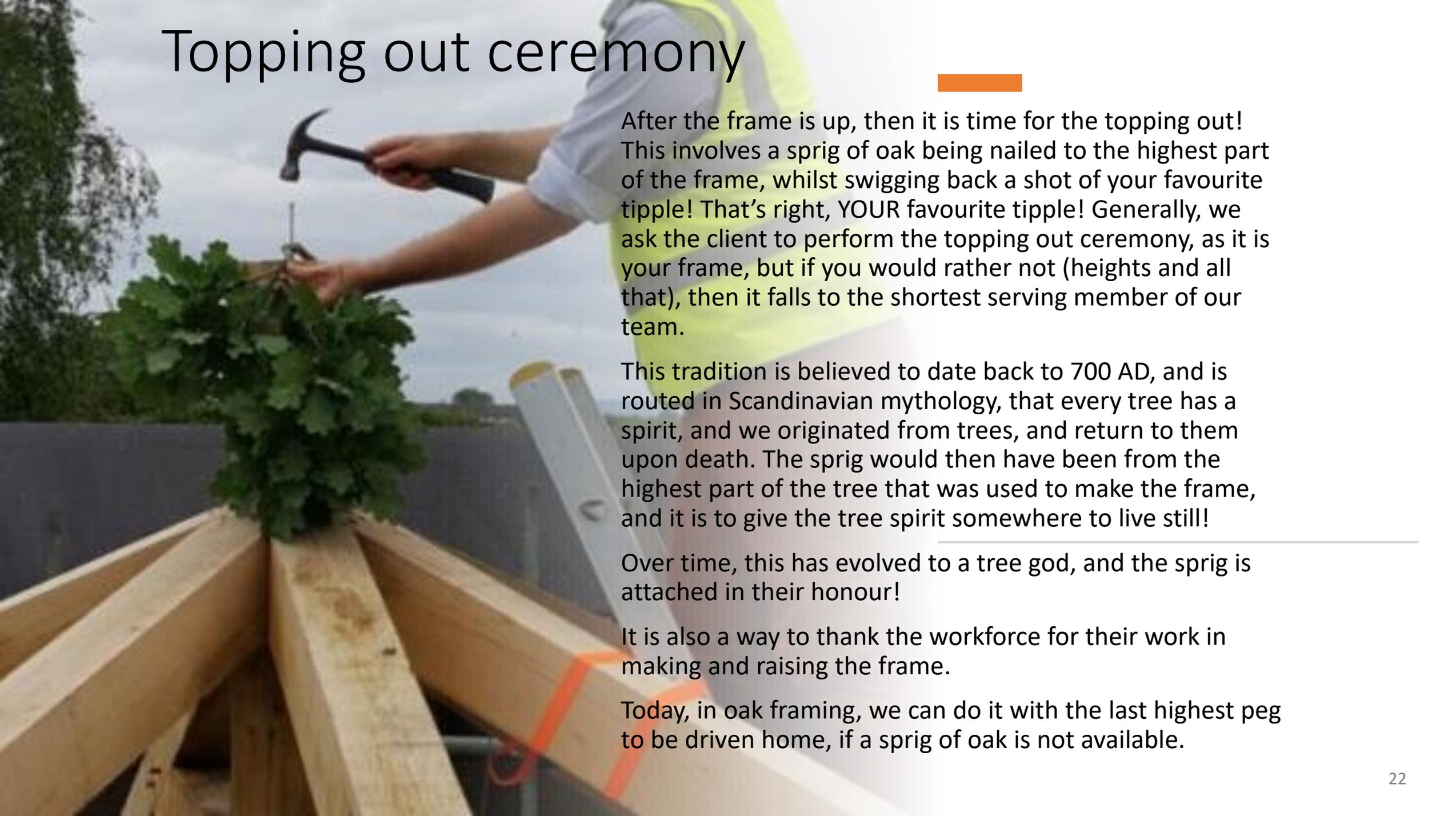
Once the entire frame is up, held in place with podgers (temporary steel T-pins), then we can align any posts or beams that need a gentle tap into the right position. After that, we go around and drive in all the oak pegs. At this point there is no going back!

For the client, watching this process is very exciting. Seeing our skilled craftsman raise the frame is a wonderful site!

This is when you really start to not only visualize, but realise, your new extension or home.



Topping out ceremony



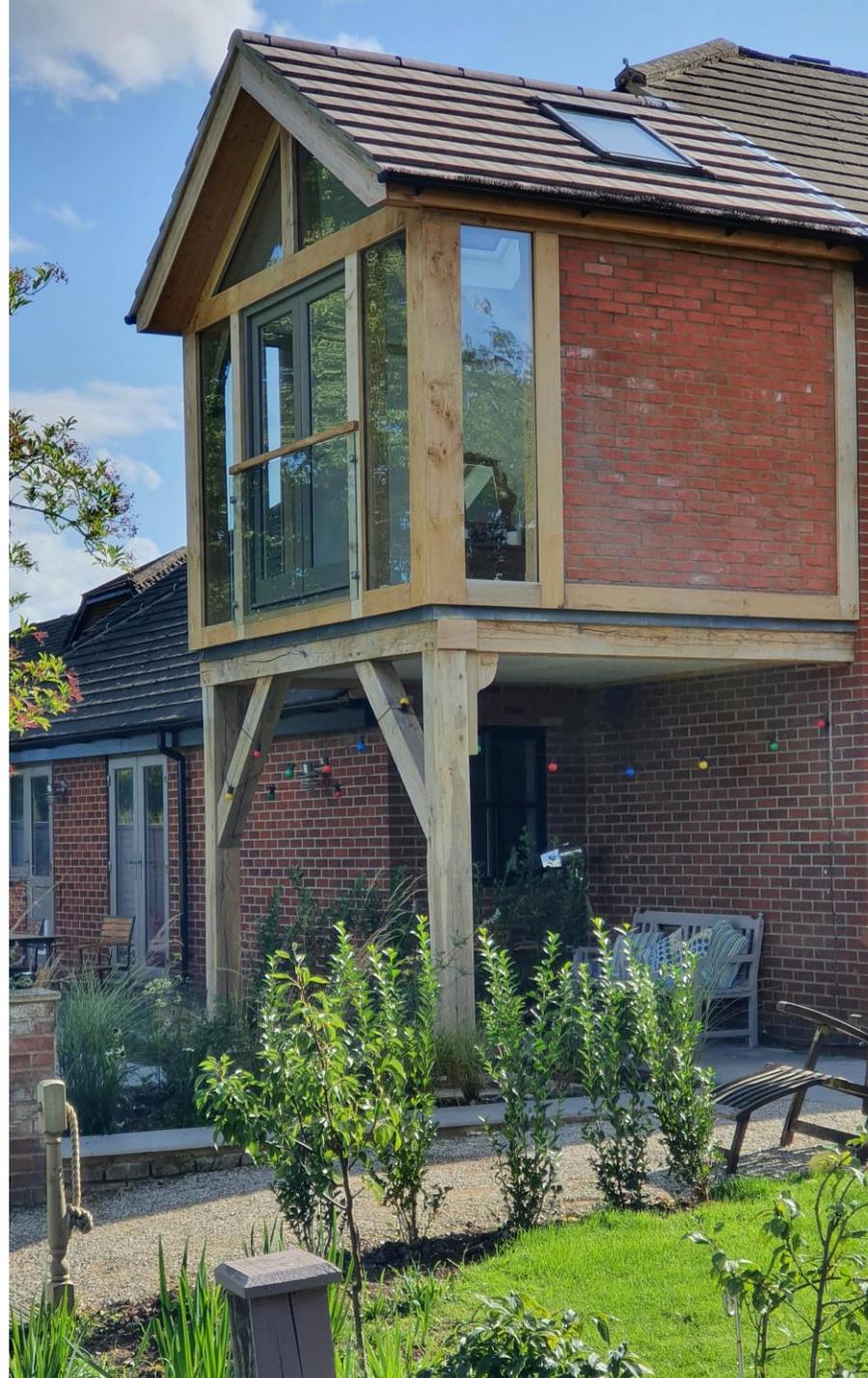
After the frame is up, then it is time for the topping out! This involves a sprig of oak being nailed to the highest part of the frame, whilst swigging back a shot of your favourite tippie! That's right, YOUR favourite tippie! Generally, we ask the client to perform the topping out ceremony, as it is your frame, but if you would rather not (heights and all that), then it falls to the shortest serving member of our team.

This tradition is believed to date back to 700 AD, and is rooted in Scandinavian mythology, that every tree has a spirit, and we originated from trees, and return to them upon death. The sprig would then have been from the highest part of the tree that was used to make the frame, and it is to give the tree spirit somewhere to live still!

Over time, this has evolved to a tree god, and the sprig is attached in their honour!

It is also a way to thank the workforce for their work in making and raising the frame.

Today, in oak framing, we can do it with the last highest peg to be driven home, if a sprig of oak is not available.



External envelope and glazing

The final part of the structure and shell, before internal works, is to clean the frame, and complete its shell. This may involve mainly glazing, or mostly an enclosed building, or it can often be a mixture of both.

At Alpha Oak, we will help you determine what will be best for your building, to enhance your home, its surroundings and to make the best use of the space created.

Talk to us about your ideas, and we will bring them to reality!!

Infill 'v' exterior envelope



Wrapping the frame in an exterior envelope

Pro's include improved insulation, air seal and the use of high insulation materials

Con's can include the loss of the traditional look

Infill using modern materials

Pro's include a more traditional facade and thinner exterior wall

Con's can be water ingress, air leakage and systematic maintenance. Care needs to be taken to ensure correct installation methods are followed to eliminate these factors.

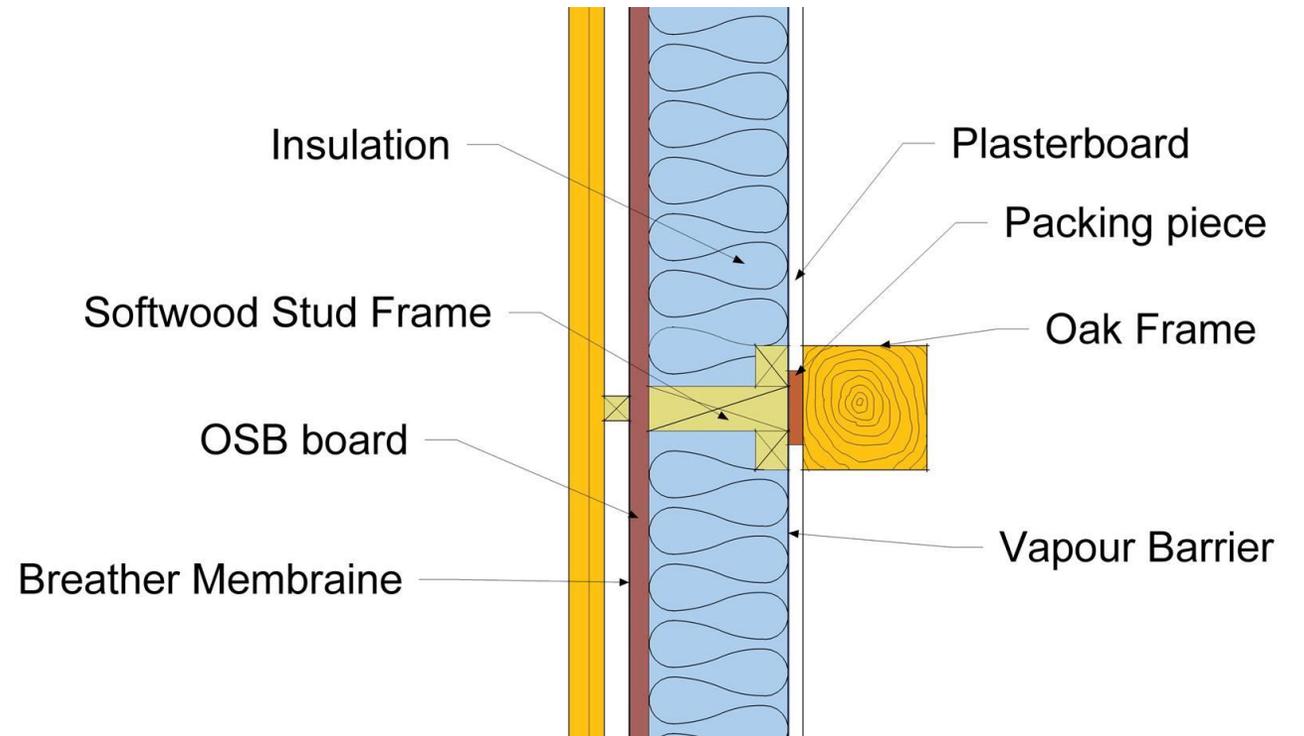


Exterior envelope wall details

With an exterior envelope, we can keep the entirety of the oak frame visible from inside the building, which, lets face it, is what you are wanting an oak frame for!

By constructing a softwood 'stud wall' around the frame, we can use this to insulate and then fix the chosen exterior material to. It also allows the placement of the plasterboard behind the oak frame. This is beneficial when the oak dries out. You won't get any cracks or unpainted lines as it shrinks!

Softwood Frame



SIPs Panel

Structural Insulated Panels (SIPs) are formed with an insulating foam core between two layers of board, which is typically an OSB (orientated strand board). They can be used for walls, floors and roofs. Their main advantages are the speed of installation and they create a better thermal barrier, with an improved air leakage performance, compared to a softwood stud frame, which is insulated between the studs.

When installed, careful consideration should be given to services (water, electricity etc.), as these can be accommodated between the plasterboard and the SIP panel.

These are a much more energy efficient and cost effective solution, decreasing your carbon footprint

