

2.3 The present day

The development of the formaldehyde group of adhesives in the mid-twentieth century resulted in the increasing use of glued laminated construction (glulam). Individually seasoned laminations, usually of softwood, are glued together to give a beam of virtually any size, but made of dry timber. Glulam provides an economic design solution for medium-to large-span roof structures set within the weatherproof envelope of the building. As a consequence, very few structures were built in oak in the mid twentieth century, when its use was largely confined to high-quality joinery alongside other temperate and tropical hardwoods.

However, from the 1970s onwards, there has been a gradual revival of interest in green oak structures, made by specialist carpentry companies using traditional methods of construction and fabrication, (*Figure 2.10*). These clearly show their method of construction and principles of stability; what might in building terms, be called structural honesty. See Chapters 5, 6 and 7. However, there can be a certain 'shock of the old', when clients more used to looking at kiln dried softwoods and manufactured veneered boards have to accept that drying movements, and in particular surface fissures, are not 'defects' but system characteristics. This revival of interest has also initiated some research, looking for instance in more detail at the strength of pegged joint assemblies (see Appendix III).

Figure 2.10 (and next page) Modern green oak structures
Framing and photos: The Green Oak Carpentry Company
below: Completed frame before enclosure





top: One and a half storeys using a modern two-tier cruck frame
centre: One and a half storeys with gallery; principal frames use raking struts from the tie beam
bottom: a simple crown post roof

top: Chithurst Monastery, Hampshire. A modern hall, resembling a traditional Sussex barn (Photo: Wood Awards)
centre: Tithe Barn at Great Fosters Hotel, Surrey. Reconstruction of a traditional roof
bottom: A garden room extension using joinery infill panels



Later Chapters and the Case Studies illustrate the great range of projects which are currently being carried out in green oak. At one end of the range are the historical reconstructions, such as Pilton Barn (*Figure 2.11*) or the Globe Theatre (Case Study 9.1). Here the primary aim has been to achieve an authenticity of form and detail, based on extensive historical research.

Other projects have re-visited past styles, but interpreted them more freely, in the manner of the Victorians; perhaps the best known being the new roof to St George's Hall, Windsor, reconstructed following the fire in 1992. The surviving walls determined the basic frame layout, while the trusses themselves were re-invented in 'Downsian Gothic' after the roof's designer Giles Downes (*Figure 2.12*).

Much recent work is based on historic models, such as those shown in Chapter 5, which are then fitted out and clad, often in a contemporary style (see, for example, Case study 9.3). However, in some ways the more interesting projects are those where the principles of design in green oak have been applied to engineered structures, generally using metal connections. These include the York Minster roof, Bedales School Theatre and Darwin College Study Centre (Case Studies, 9.5, 9.6 and 9.7), all of which were the subject of conventional structural analysis.

Late in the twentieth century, huge advances in computer technology enabled designers to draw, analyse, and in some cases to fabricate projects of extreme geometrical and analytical complexity. The Weald and Downland Gridshell (Case study 9.8) marks a step change in our ability to create exciting, and at the same time reliable structures, while allowing the efficient design and fabrication of more modest projects.

The advantages of green oak framing as a method of construction still hold good today. Although oak is more expensive than softwood, it has an attractive figure, and the natural durability of the heartwood allows exterior use, where it weathers over time to a silver grey. Even with the benefit of modern power tools, green oak is still much easier to cut and shape than seasoned oak.

The gradual rise in concern for environmental issues has also favoured green oak, which locks up carbon, has a low embodied energy, requires no preservative treatment and can be sourced from sustainably-grown forests. Today the oak frame is an accepted building form, capable of being weather-proofed and insulated in accordance with present-day regulations, while at the same time providing a link to the buildings of the past.



Figure 2.11 (above and left) Pilton Barn, Glastonbury. Reconstruction of roof destroyed by lightning
Framing: McCurdy & Co
Architect: Caroe and Partners
Photos: Wood Awards / McCurdy & Co



Figure 2.12 'Downsian gothic' trusses at St George's Hall, Windsor
Photo: Giles Downes, Siddell Gibson
Architects