7 TRAINING MODULE 7
Wood: From Mill to Market

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Contents

Wood as a resource

In the previous module, we looked at where wood comes from, the types of forests and where they are found and some of the issues around getting the wood from the forest to the merchant. In this module we continue the story.

In Section 1 we look at the harvesting, importation and use of wood in the UK. In Section 2 we look at the kind of wood and wood products that will often pass through a community wood recycling enterprise and in Section 3 there are some questions for you to answer.

The learning outcomes of module 7

After successfully completing this module, you will be able to:

- Understand where most of our milled timber comes from
- Understand the main types of wood used commercially
- How timber is processed ready for use
- Know the most commonly encountered woods and sheet materials

Section 1—Wood production and use in the UK

Although we might not perceive the UK as a particularly wooded place, we do produce a substantial amount of wood from our own forests. In 2018 we harvested around 11.8 million tonnes (mt) of softwood and just over 0.6mt of hardwood.

Some gets exported (around £1.8 billion worth in 2018 - which is a 4% increase from the previous year), but most ends up at timber merchants and DIY stores. However around 1.2mt got made into chipboard and some (usually the lower quality wood) ended up as fuel chips, shavings for animal bedding or to be used for lower-grade fencing.

Unfortunately, our own production is not enough to satisfy the demand for timber—as per capita, we import more timber and wood products, such as panels and paper pulp, than any other country in the world.

In 2018 we spent more than **£8 billion** on:

- 6.9 million cubic metres (mcm) of sawn wood for construction/DIY (mostly softwood but some hardwood)
- 3.2 mcm of wood panels (such as plywood, chipboard and MDF)
- 6.2 million tonnes of wood pulp (for paper and card production)

Softwoods	Hardwoods	Plywood
Sweden 33%	Latvia 23%	Brazil 30%
Latvia 19%	USA/Canada 18%	Finland 15%
Finland 15%	Germany 7%	China 15%
Russia 12%	France 7%	Russia 5%
Other 21%	Other 45%	Other 35%

▲ The table above shows where we source this timber from

Europe accounts for 98% of all sawn softwood imports and 87% of all UK wood imports.

Perhaps the most potentially worrying part of the above is the amount of wood coming in from Brazil, where the forestry industries are much less regulated and illegal logging in the rainforests is a major international issue.

The world's four biggest exporters of softwoods are Canada, Finland, Sweden and Russia. The biggest exporters of hardwoods are Brazil and Indonesia.

What wood we use

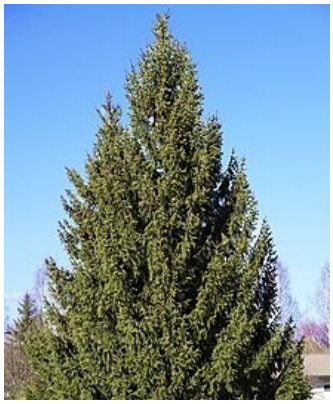
As we know, the vast majority of wood sold in the UK for construction is softwood and more than 80% comes from the great coniferous forests of northern Europe (see Module 6). The two most popular species arriving at timber merchants in the UK are Scots pine, which is known in the wood trade as 'redwood' and European spruce known as 'whitewood'.

Timber is sold in a great number of dimensions—from large sections for the frames of timber buildings down to the thinnest pieces of shaped mouldings. Scots pine is considered better quality, so is more likely to be used for windows and doors, skirting boards and other joinery work.

Usually spruce ends up as the stud walls, other first fix items and for packaging and, of course as Christmas trees. Most cutting to size is done by the mill in the country of origin.

◄ Scots pine is known in the timber trade as "redwood"

► European spruce, known as "whitewood"



Wood condition

Milled timber is sold in a particular “condition”.

Rough sawn is timber that is sold with a rough surface (with the marks produced by the circular saw when it was cut from the larger piece). This is suitable for first-fix work (floor joists, rafters, stud walls) where the timber will not be in view.

Planed all round (par) is timber with all sides and edges planed square and smooth. It is used for anything that will be seen. Because of the extra processing, it costs more; in Scotland it’s known as dressed all round (DAR). Some wood is sold planed on just both sides (PBS); planed square on just one edge (PSE).

Preservative treated wood

To make softwood last longer, especially when used outside, it can be treated with a range of preservatives. A popular old treatment that has now been phased out is creosote. Made from tar oil, it can be seriously damaging to health and the environment. It has a unique smell and dark brown colour and was commonly used to treat railway sleepers, telegraph poles and garden sheds.

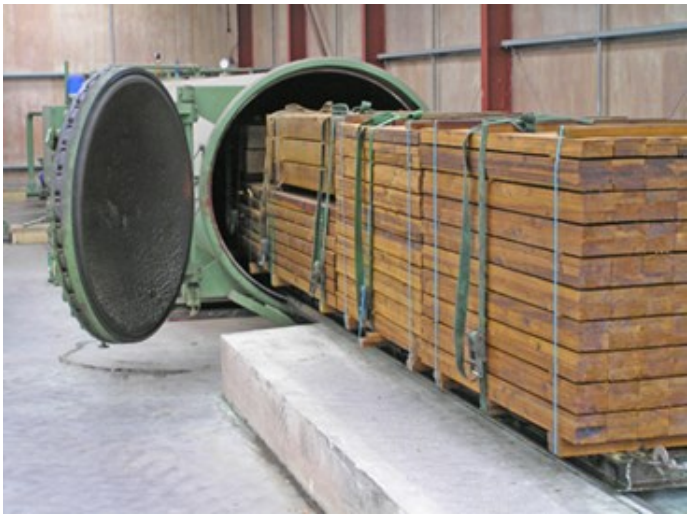
Although much less common now, we might occasionally come across it on collections from demolition or refurbishment work. It is classed as Hazardous waste and should not be handled and never accepted on a community wood recycling collection.

Nowadays however, most timber is being treated with preservatives. Such wood is commonly called ‘tanalized’ (the word comes from *Tanalith*—which is actually just a brand of chemical preservative). In this process, batches of wood are completely submerged in preservative in an air-tight tank. The air is then pumped out to create a vacuum and the liquid—which protects against fungal, insect and water damage—penetrates deep (about 3mm) into the wood.

By using this method, even lower grade wood can withstand outside use. The drawback is that treated wood is harder to recycle as, until a few years ago, the chemicals used in the preservative included derivatives of copper, chromium and arsenic (often referred to as CCA treated timber). These are toxic metals that can be very hazardous to health and can easily be released back into the environment if the preserved timber is burnt or composted.

Although new regulations prevent the use of chromium and arsenic compounds, as we outline in the next module, there are less recycling/reuse options for such wood. Treated timber is usually of green or yellow appearance—depending on the type/brand of preservative used.

► Pressure-treatment plant.



Section 2—Commonly-encountered wood

Although there are many thousands of species of wood, all with their own qualities, relatively few species are used by the construction industry in general building work. We mentioned above that the current most used softwood species are Scots pine and European spruce, but in addition to these we are likely to come across several other soft-woods along with sheet materials and hardwoods.

Softwoods

▲ Lengths of pitch pine

Pitch pine (*pinus rigida*) is the densest of all the commercial softwoods and so used for "heavier" construction jobs including beams, joists and floorboards. It was used extensively in old commercial and industrial buildings and so via the demolition and/or refurbishment of such buildings, is quite common at community wood recycling enterprises and architectural salvage yards.

Old pitch pine has a wonderful golden colour and wide flowing grain. It comes principally from the forests of north east USA. It is no longer widely used in construction. It has a high resin (pitch) content that has traditionally been extracted by charcoaling the timber. Traditionally, pitch was used for waterproofing buckets and boats. Pitch is black in colour—hence the term 'pitch black'.

▲ Parana pine

Parana pine (*araucaria angustifolia*) is Brazil's number one timber export and is also their most threatened pine. It is widespread in the montane forests (see module 6) in the huge Brazilian State of Parana, which borders both northern Argentina and Paraguay. It has a creamy appearance and closely layered grain with little in the way of growth rings. It is easy to work but it is not a very tough wood. Because the trees are large and the wood is relatively knot-free, it is commonly used in staircases and for internal joinery.

▲ Douglas fir

Douglas fir is also known as Columbian pine in the UK. Although native of Canada, it has been planted widely here in the UK. As well as being the world's most used wood in plywood, like pitch pine, it has been widely used for heavy construction work and regularly turns up in old joists, beams, roof trusses and railway sleepers. It is fairly easy to recognize, having straight, parallel and closely spaced grain.

Sheet Materials

When large flat panels of wood are needed (for example, for kitchen units, furniture, screens, hoardings, wall panels and shelving), joining planks of wood together to the required width would be time-consuming and expensive. Since the 1920s, there has been a growing range of man-made boards that have been used to replace solid timber in many applications. Sheet materials are most commonly sold in 8ft x 4ft (2,400mm x 1,200mm) sheets. Recent advances in sheet materials have seen the introduction of plastic laminated, veneered, and tongue and groove varieties, along with weather-proof, preserved and ultra-smooth finish boards.

The most common sheet materials include:

▲ Chipboard

Chipboard is made from woodchips that are mixed with formaldehyde glue and pressed together under heat and pressure. It consists of 3 layers; a course centre layer and top layers that are made of finer chips for a smooth surface.

Chipboard is a very cheap and versatile material that is used extremely widely in furniture, kitchen units and worktops, doors, flooring and many more products. It is easy to machine and can be laminated with plastic or wood veneers.

Although chipboard can be preservative-treated, it does not perform well in damp conditions, which can cause it to swell. It is available in many thicknesses, from 6mm to 50mm.

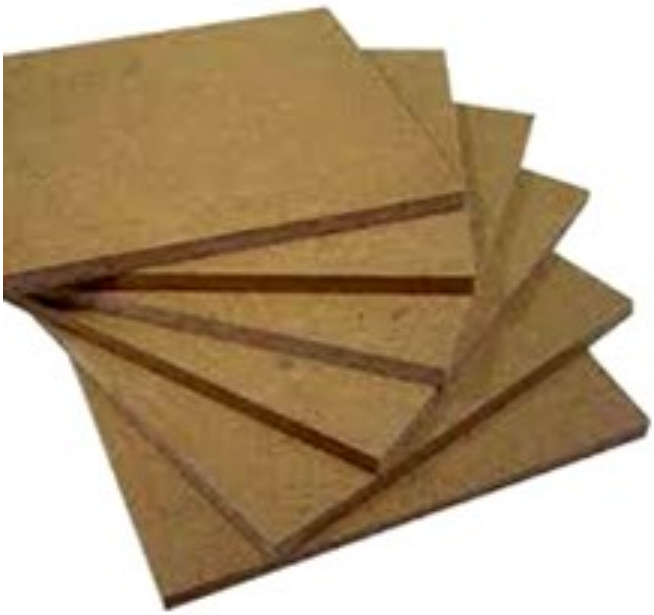
▲ Tongue and groove flooring

▲ Laminated Chipboard

MDF (Medium Density Fibreboard) has become very widely used, largely replacing chipboard in most applications. It is also made from chipped wood, but the particles are much, much tinier and are pressed and glued together under much greater heat and pressure. It has an extremely smooth surface and it can be machined without chipping or flaking. Like chipboard it performs badly in the wet, but unlike solid wood, it will not shrink or expand with changes in room temperature.

Nowadays it is used extensively in joinery - with skirting, architraves and other kinds of mouldings made from it. MDF dust is toxic and thought carcinogenic, so it must be cut or worked with great caution.

▼ Smooth MDF



Hardboard also known as High Density Fibreboard (HDF) was developed as far back as 1898. It is made of heated and compressed 'exploded' wood fibre. Unlike chipboard and MDF, no glues are used in its manufacture. It usually comes in thin sheets of 3mm or 6mm and is mainly used for the backs of cheap furniture and to line floors before carpet or vinyl is laid.

Oil-tempered hardboard is coated with linseed oil during production. This increases its strength and resistance to damp conditions. Pegboard (see centre board in picture on right) is hardboard with regularly spaced holes in.

▲ Hardboard

◄ Plywood

Plywood is the strongest, most versatile and most expensive of the sheets. It is made with 'real' wood that is 'peeled'—rather like sharpening a pencil. The layers of wood are then glued together with the grain running at right angles to the layer below. It is usually made with an odd number of layers and available in thicknesses—from 4mm (for model making) to 100mm. It is made from both hardwood and softwood and in various grades of quality. Marine grade ply is the highest quality board, with good resistance to wet conditions, whereas shuttering ply is low quality and usually just used for concrete formwork.

OSB (Oriented Strand Board or Stirling Board) is made by layering strands of wood about the size of a credit card in uniform directions (orientations) and gluing 3 layers together. It is a strong board and is used as a cheaper replacement for plywood in many applications. In the last few years its use has increased significantly with the growth in popularity of wooden-framed homes and off-site manufacture.

▲ OSB

Blockboard is made by gluing strips of softwood (or occasionally) hardwood side by side and sandwiching them between thin sheets of softwood or other veneer. It is extremely strong and was used extensively for furniture, countertops and other shop fittings. It has been largely superseded by chipboard and MDF.

▲ Blockboard

Hardwoods

As we know from the statistics above, the UK harvested around 0.6 million tonnes of hardwood in 2018. This was mainly, beech, ash, sycamore, birch, chestnut, hazel, willow and oak. But more than 1 million tonnes was imported, mainly from Eastern Europe, USA and Canada.

The hardwoods we are likely to encounter in community wood recycling are those that have been in circulation for a while, so might well include a higher proportion of English and French oak and unregulated tropical hardwoods.

A lot of this exotic wood was probably imported when much of the tropical and sub-tropical world was part of the British Empire.

With hundreds of species of trees in use, it is virtually impossible for non-specialists to accurately identify pieces of hardwood. Hopefully you will learn to recognise the most common species that we list below. Identifying wood takes years of practice, so don't worry if you are unsure. The information below relates to the most prevalent types and is really just a rough guide.

Oak is often called the 'king of wood' and it has a whole mythology and folklore around it. It is certainly a versatile timber and has been used for centuries in boat building, house construction, furniture and much more. Thankfully, it is still the most common tree species in UK woodlands.

▲ Oak barrels

▲ An example of oak grain and its creamy colour.

There are approximately 600 species of oak that grow right around the world. It seems to have always been prized and recycled; a lot of oak from redundant ships was re-used in house building in previous centuries. The majority of new oak used today comes from the temperate hardwood forests of Eastern Europe and the USA.

Beech is another common traditional English hardwood and one of the most easily recognized. It is called the 'mother of the forest' because its fallen leaves rot quickly and nourish the soil. It is exceptionally strong and although considered inferior to oak, it is probably the most popular wood for making furniture, especially chairs, school desks, upholstery frames and flooring.

▲ Beech

As it is easy to stain, it is often used to imitate more expensive woods such as walnut and mahogany. The short dark flecks that characterize its grain make it easy to spot. It is found in the mixed broadleaved/coniferous and the temperate hardwood forests.

▲ Ash

Ash is common throughout the UK and Europe and is widely used in chair making, furniture, interior joinery and in all sorts of sports equipment—such as snooker cues, hockey sticks and baseball bats. It has a wide grain that resembles softwood. Because it has relatively low moisture content it is considered to be the best firewood.

▲ Mahogany

Mahogany. Although there are a many different types of this timber, it is African mahogany that is probably the most common, coming from the old British colonies of east Africa. It has been very widely used for furniture, bank and shop fittings, carriage building, boat building, staircases and banisters and a whole range of other high quality work..

Mahogany furniture was very popular during Victorian and Edwardian times but its heavy, dark appearance went out of fashion after the war and much of it was exported to the USA during the 1970s and 1980s.

▲ Mahogany, common in old luxury furniture

Teak renowned for its strength and durability, it is widely used in boat building and for garden furniture, sea defences, bridges, high class joinery and furniture, laboratory benches and high quality plywood. It is found in tropical and sub-tropical forests and is an 'endangered species'.

▲ Teak

▲ Utile

Utile and **sapele** are found in the tropical forests of Africa. They are lower in quality but are often used in similar ways to mahogany and teak. Sapele has wide parallel grain.

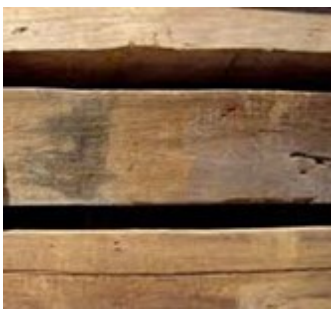
▲ Sapele

▼ Meranti—its grain looks a bit like cloud formations.

Meranti is found in the tropical forests of south-east Asia. It is a lower quality hardwood used mainly for cheaper furniture and interior joinery.

Greenheart is a fascinating wood that is extremely dense. It is a tropical hardwood found almost exclusively in Guyana in South America.

It is used extensively for marine engineering work, and becomes available to wood recyclers when the groynes, harbour walls, lock gates, bridges and jetties it is used for get replaced. It is extremely difficult to work—it seems more like iron than wood; it is difficult to drive a nail even into the end grain without it bending.
It is virtually immune to any wood pests and can be submerged in water for many years without showing any signs of rotting. It has to be handled with care because of its great weight and because its splinters are poisonous and will cause infection. It makes great 'sculptural' pieces for the garden.



▲ Greenheart

▲ Jarrah

Jarrah comes exclusively from south-western Australia and is exported around the world. It is most widely used for railway sleepers and, like greenheart, for marine engineering. It has a beautiful rich pink colour and is highly prized by community wood recyclers as it is one of the most interesting and attractive woods that we handle. It is another very dense, very heavy timber that is fairly difficult to work, but it is often used for internal joinery and floors in Australia and can be made into furniture.

Section 3—Trainee exercises and questions

When convenient (don't forget to ask your manager/supervisor), spend about an half an hour going round your enterprise looking for different softwoods, hardwoods and sheet materials. With permission, saw off small samples and label them. If there are any you can't recognize, ask your colleagues, research online or get a book from the local library. See how many you can find and make a list of them for future reference.

There are some questions for you to answer below and on the following page.

Remember: don't hesitate to ask for help from your Trainer.

Module 7: Exercise 1

1. Per person, which country imports the most wood?		
2. Approximately how much did the UK spend on imported timber 'products' in 2018?		
3. Which country supplies the UK with the most hardwood?		
4. From what two countries do the majority of our imported softwoods come?		
1.		
2.		
5. What are the two most popular species of imported softwood?		
a)	which is also known as:	
b)	which is also known as:	
6. What is rough sawn timber?		
7. Until recently, the derivatives what substances have been used to 'tanalize' timber?		
a)	b)	c)
8. What is the heaviest commercial softwood?		
9. What softwood is used most widely for plywood?		

10. What are these 3 types of sheet material commonly used for?		
a. Chipboard:	Used for:	
b. OSB:	Used for:	
c. Hardboard:	Used for:	

11. Name 2 types of plywood:	1. 2.
12. What sheet material is made without any glue?	
13. Sheet materials are usually sold in what size?	ft
14. From which country do we import the most plywood?	
15. What hardwood is known as the 'king of wood'?	
16. What hardwood is known as 'mother of the forest'?	
17. What are barrels often made from?	
18. What type of forest does teak come from?	
19. Where does greenheart come from?	
20. What is greenheart commonly used for?	
21. Why do you have to be careful handling green-heart?	

Office use only		**Number of correct answers required to pass Module 7: 16**			
Passed:		**Retake:**		**Date:**	
		Trainer's signature:			