Izglītības programma: **koka izstrādājumu dizains**

Mācību priekšmets**: profesionālā angļu valoda**

Tēma**: Bērza kokmateriāla īpašības, saplāksnis**

**Izziņas resursi:** <http://www.wood-database.com> <http://homeguides.sfgate.com/quality-birch-wood>

<http://www.thewoodbox.com/data/wood/birchinfo.htm>

http://northwesthardwoods.com

**BIRCH**

The bark of all birches is characteristically marked with long, horizontal [lenticels](http://en.wikipedia.org/wiki/Lenticel), and often separates into thin, papery plates, especially upon the [paper birch](http://en.wikipedia.org/wiki/Paper_Birch). It is resistant to decay, due to the resinous oil it contains. Its decided color gives the common names [gray](http://en.wikipedia.org/wiki/Gray_birch), [white](http://en.wikipedia.org/wiki/Paper_birch), [black](http://en.wikipedia.org/wiki/Black_birch), [silver](http://en.wikipedia.org/wiki/Silver_birch) and [yellow](http://en.wikipedia.org/wiki/Yellow_birch) birch to different species.

The buds form early and are full grown by midsummer, all are lateral, no terminal bud is formed; the branch is prolonged by the upper lateral bud. The wood of all the species is close-grained with satiny texture, and capable of taking a fine polish; its fuel value is fair.

Due to the hardness of Birch, it is better to shape it with power tools, as it is quite difficult to work it with hand tools

* Birch wood is fine-grained and pale in colour, often with an attractive [satin-like](http://en.wikipedia.org/wiki/Satin) sheen. Ripple figuring may occur, increasing the value of the timber for [veneer](http://en.wikipedia.org/wiki/Wood_veneer) and furniture-making. The highly decorative Masur (or [Karelian](http://en.wikipedia.org/wiki/Karelia)) birch, from *Betula verrucosa* var. *carelica*, has ripple textures combined with attractive dark streaks and lines. Birch wood is suitable for veneer, and birch plywood is among the strongest and most dimensionally stable [plywoods](http://en.wikipedia.org/wiki/Plywood), although it is unsuitable for exterior use.

Birch [plywood](http://en.wikipedia.org/wiki/Plywood) is made from laminations of birch veneer. It is light but strong, and has many other good properties. Birch plywood is used to make [longboards](http://en.wikipedia.org/wiki/Longboard_%28skateboard%29) ([skateboard](http://en.wikipedia.org/wiki/Skateboard)), giving it a strong yet flexible ride. It is also used (often in very thin grades with many laminations) for making [model aircraft](http://en.wikipedia.org/wiki/Model_aircraft).

* Extracts of birch are used for [flavoring](http://en.wikipedia.org/wiki/Flavoring) or [leather oil](http://en.wikipedia.org/wiki/Oiling_%28leather_processing%29), and in cosmetics such as [soap](http://en.wikipedia.org/wiki/Soap) or [shampoo](http://en.wikipedia.org/wiki/Shampoo). In the past, commercial oil of wintergreen ([methyl salicylate](http://en.wikipedia.org/wiki/Methyl_salicylate)) was made from the [sweet birch](http://en.wikipedia.org/wiki/Sweet_Birch) (*Betula lenta*).
* [Birch-tar](http://en.wikipedia.org/wiki/Birch-tar) or Russian oil extracted from birch bark is [thermoplastic](http://en.wikipedia.org/wiki/Thermoplastic) and waterproof; it was used as a [glue](http://en.wikipedia.org/wiki/Glue) on, for example, [arrows](http://en.wikipedia.org/wiki/Arrow), and also for medicinal purposes.[[5]](http://en.wikipedia.org/wiki/Birch#cite_note-5)
* Fragrant twigs of silver birch are used in [saunas](http://en.wikipedia.org/wiki/Sauna) to relax the muscles.
* Birch is also associated with the feast of [Pentecost](http://en.wikipedia.org/wiki/Pentecost) in Germany, Central and Eastern Europe, and Russia, where its branches are used as decoration for churches and homes on this day.
* Birch leaves are used to make a [diuretic](http://en.wikipedia.org/wiki/Diuretic) [tea](http://en.wikipedia.org/wiki/Tea) and extracts for [dyes](http://en.wikipedia.org/wiki/Dye) and cosmetics.
* Ground birch bark, [fermented](http://en.wikipedia.org/wiki/Fermentation_%28biochemistry%29) in [sea water](http://en.wikipedia.org/wiki/Sea_water), is used for seasoning the woolen, hemp or linen sails and hemp rope of [traditional Norwegian boats](http://en.wikipedia.org/wiki/Nordland_%28boat%29).
* Birch twigs bound in a bundle, also called birch, were used for [birching](http://en.wikipedia.org/wiki/Birching), a form of [corporal punishment](http://en.wikipedia.org/wiki/Physical_punishment).
* Many of the [First Nations](http://en.wikipedia.org/wiki/First_Nations) of [North America](http://en.wikipedia.org/wiki/North_America) prized the birch for its bark, which due to its light weight, flexibility, and the ease with which it could be stripped from fallen trees, was often used for the construction of strong, waterproof but lightweight [canoes](http://en.wikipedia.org/wiki/Canoe), bowls, and [wigwams](http://en.wikipedia.org/wiki/Wigwam).
* The [Hughes H-4 Hercules](http://en.wikipedia.org/wiki/Hughes_H-4_Hercules) was made mostly of birch wood, despite its better-known moniker, "The Spruce Goose".
* Birch is used as [firewood](http://en.wikipedia.org/wiki/Firewood) due to its high [calorific value](http://en.wikipedia.org/wiki/Calorific_value) per unit weight and unit volume. It burns well, without popping, even when frozen and freshly hewn. The bark will burn very well even when wet because of the oils it contains. With care, it can be split into very thin sheets that will ignite from even the smallest of sparks.

WOOD PULP

* [Wood pulp](http://en.wikipedia.org/wiki/Wood_pulp) made from birch gives relatively long and slender fibres for a [hardwood](http://en.wikipedia.org/wiki/Hardwood). The thin walls cause the fibre to collapse upon drying, giving a [paper](http://en.wikipedia.org/wiki/Paper) with low bulk and low opacity. The birch fibres are, however, easily fibrillated and give about 75% of the tensile strength of softwood.[[11]](http://en.wikipedia.org/wiki/Birch#cite_note-11) The low opacity makes it suitable for making [glassine](http://en.wikipedia.org/wiki/Glassine).
* In [India](http://en.wikipedia.org/wiki/India), the birch ([Sanskrit](http://en.wikipedia.org/wiki/Sanskrit): भुर्ज, *bhurj*) holds great historical significance in the culture of [North India](http://en.wikipedia.org/wiki/North_India), where the thin bark coming off in winter was extensively used as writing paper. Birch paper (Sanskrit: भुर्ज पत्र, *bhurj pətrə*) is exceptionally durable and was the material used for many ancient Indian texts.The [Roman](http://en.wikipedia.org/wiki/Ancient_Rome) period [Vindolanda tablets](http://en.wikipedia.org/wiki/Vindolanda_tablets) also use Birch as a material on which to write and Birch bark was used widely in ancient [Russia](http://en.wikipedia.org/wiki/Russia) as note paper (*beresta*) and for decorative purposes and even making [footwear](http://en.wikipedia.org/wiki/Footwear).
* **Tonewood**
* Baltic birch is among the most sought-after wood in the manufacture of [speaker cabinets](http://en.wikipedia.org/wiki/Speaker_cabinet). Birch has a natural [resonance](http://en.wikipedia.org/wiki/Resonance) that peaks in the high and low frequencies, which are also the hardest for speakers to reproduce.This resonance compensates for the roll-off of low and high frequencies in the speakers, and evens the tone. Birch is known for having "natural EQ".
* [Drums](http://en.wikipedia.org/wiki/Drum) are often made from birch. Prior to the 1970s, it was one of the most popular drum woods. Because of the need for greater volume and midrange clarity, drums were made almost entirely from [maple](http://en.wikipedia.org/wiki/Maple) until recently, when advances in live sound reinforcement and drum microphones have allowed the use of birch in high-volume situations. Birch drums have a natural boost in the high and low frequencies, which allows the drums to sound fuller.
* Birch wood is sometimes used as a [tonewood](http://en.wikipedia.org/wiki/Tonewood) for semiacoustic and [acoustic guitar](http://en.wikipedia.org/wiki/Acoustic_guitar) bodies, and occasionally for solid-body guitar bodies. It is also a common material used in [mallets](http://en.wikipedia.org/wiki/Percussion_mallet) for [keyboard percussion](http://en.wikipedia.org/wiki/Percussion_instrument).
* **Plywood** is a manufactured wood panel made from thin sheets of [wood veneer](http://en.wikipedia.org/wiki/Wood_veneer). Plywood layers (called veneers or plys) are glued together, with adjacent plies having their [wood grain](http://en.wikipedia.org/wiki/Wood_grain) rotated relative to adjacent layers up to 90 degrees.
* All plywoods bind resin and wood fiber sheets ([cellulose](http://en.wikipedia.org/wiki/Cellulose) cells are long, strong and thin) to form a [composite material](http://en.wikipedia.org/wiki/Composite_material). This alternation of the grain is called *cross-graining* and has several important benefits: it reduces the tendency of wood to split when nailed at the edges; it reduces expansion and shrinkage, providing improved dimensional stability; and it makes the strength of the panel consistent across all directions. There is usually an odd number of plies, so that the sheet is balanced—this reduces warping. Because plywood is bonded with grains running against one another and with an odd number of composite parts, it is very hard to bend it perpendicular to the grain direction of the surface ply.
* Smaller thinner plywoods and lower quality plywoods (see Average-quality plywood photo below and right) may only have their plys (layers) aranged at right angles to each other, though many better quality plywood products will by design have five plys in steps of 45 degrees (0, 45, 90, 135, and 180 degrees), giving strength in multiple axes. The highest quality specialty plywoods, often have plys at 30 degrees (0, 30, 60, 90, 120, 150, and 180 degrees) in seven layers, or have nine layers with two layers of 45 and 135 degrees in the sandwich. The smaller the step rotations, the harder it is to manufacture and the higher the cost to manufacture and its retail price.

## History

* Plywood was invented about 3400 B.C. by the [Ancient Mesopotamians](http://en.wikipedia.org/wiki/Ancient_Mesopotamians), who attached several thinner layers of wood together to make one thick layer. They originally did this during a shortage of quality wood, gluing very thin layers of quality wood over lesser-quality wood.
* Modern plywood was invented, in the 19th century, by [Immanuel Nobel](http://en.wikipedia.org/wiki/Immanuel_Nobel), father of [Alfred Nobel](http://en.wikipedia.org/wiki/Alfred_Nobel). Nobel realized that several thinner layers of wood bonded together would be stronger than one single thick layer of wood, and invented the rotary lathe used in plywood manufacturing.

## Structural characteristics

* A typical plywood panel has face veneers of a higher grade than the core veneers. The principal function of the core layers is to increase the separation between the outer layers where the bending stresses are highest, thus increasing the panel's resistance to [bending](http://en.wikipedia.org/wiki/Bending). As a result, thicker panels can span greater distances under the same loads. In bending, the maximum stress occurs in the outermost layers, one in [tension](http://en.wikipedia.org/wiki/Tension_%28physics%29), the other in [compression](http://en.wikipedia.org/wiki/Compression_%28physical%29). Bending stress decreases from the maximum at the face layers to nearly zero at the central layer. [Shear stress](http://en.wikipedia.org/wiki/Shear_stress), by contrast, is higher in the center of the panel, and zero at the outer fibers.

## Types

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* Average-quality plywood with 'show veneer'
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* High-quality concrete pouring plate in plywood
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* [Birch](http://en.wikipedia.org/wiki/Birch) plywood
* Different varieties of plywood exist for different applications:

### Softwood plywood

* [Softwood](http://en.wikipedia.org/wiki/Softwood) panel is usually made either of [cedar](http://en.wikipedia.org/wiki/Cedrus), [Douglas fir](http://en.wikipedia.org/wiki/Douglas_fir) or [spruce](http://en.wikipedia.org/wiki/Spruce), [pine](http://en.wikipedia.org/wiki/Pine), and [fir](http://en.wikipedia.org/wiki/Fir) (collectively known as [spruce-pine-fir](http://en.wikipedia.org/wiki/Spruce-pine-fir) or SPF) or [redwood](http://en.wikipedia.org/wiki/Redwood) and is typically used for construction and industrial purposes.[[1]](http://en.wikipedia.org/wiki/Plywood#cite_note-1)
* The most common dimension is 1.2m × 2.4m or the slightly larger imperial dimension of 4 feet × 8 feet. Plies vary in thickness from 1.4 mm to 4.3 mm. The amount of plies depends on the thickness and grade of the sheet but at least 3. [Roofing](http://en.wikipedia.org/wiki/Roofing) can use the thinner 5/8" (15 mm) plywood. Subfloors are at least 3/4" (18 mm) thick, the thickness depending on the distance between floor [joists](http://en.wikipedia.org/wiki/Joist). Plywood for flooring applications is often [tongue and groove](http://en.wikipedia.org/wiki/Tongue_and_groove); This prevents one board from moving up or down relative to its neighbor, so providing a solid feeling floor when the joints do not lie over joists. T&G plywood is usually found in the 1/2" to 1" (12–25 mm) range

### Hardwood plywood

* Used for demanding end uses. [Birch](http://en.wikipedia.org/wiki/Birch) plywood is characterized by its excellent strength, stiffness and resistance to creep. It has a high planar shear strength and impact resistance, which make it especially suitable for heavy-duty floor and wall structures. Oriented plywood construction has a high wheel-carrying capacity. Birch plywood has excellent surface hardness, and damage- and wear-resistance.

**KoskiTimber birch - Finest birch timber**

Good dimensional accuracy, an even saw cut, a degree of drying geared to the end use, and precise grading are characteristics of KoskiTimber birch. The grading of birch timber into different grades ensures the use of correct sawn goods quality for each application in the most economic way possible.

**Dense Finnish birch timber**

A good quality birch tree is tall, straight and stout. The colour of the birch is yellowish white or light brownish red. The colour varies depending on the place of growth, the time of cutting and drying. The density ranges from 590 to 740 kg/m3.

**Accurate measuring**

The sawing line is equipped with a scanner that measures the profile of the board with a laser and matrix camera, and the length of the board with a photo cell and encoder.