Izglītības programma: kokizstrādājumu dizains

Mācību priekšmets: profesionālā angļu valoda

Skolotāja: Dace Cine

Mācību materiāls – Sibīrijas lapegle, kokmateriāla īpašības, tā vērtība mēbeļu izgatavošanā.

**Siberian larch (Larix sibirica)**

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| Siberian larch is very resistant and durable wood. It is the only representative of conifers, which is added to the hardwood category and in hardness is comparable to oak.Larch is common in almost all over the territory of Russia, as well as in most of Europe, Japan, US and Canadian territory, but particularly valuable is only the larch grown in Siberia (lat. Larix sibirca). Since the climate in Europe, Japan and North America are much milder, the European, Japanese and North American larch wood is more loose and at best is comparable to a simple pine. Annuals rings for such larch is about 3-5 mm wide, while the Siberian larch, they may be even narrower than 0.5 mm.Siberian Larch is common mainly in taiga forests of the Krasnoyarsk and Irkutsk regions and also less in mountainous Altai region and the Far East. As these regions have very blunt and rather dry climate (average 65%) with extreme temperature changes (in summer up to + 40 ° C, and in winter down to - 60 ° C), larch grows very slowly and grows very dense. |
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| Larch species' dendrological particularities in combination with the harsh climate also creates this high-quality wood, which is comparable to the precious wood and hardwood. The most valuable types of Siberian larch wood is considered to be from Krasnoyarsk area of central and southern parts, or from Irkutsk area, because in theess areas has a long growing larch, little branchy, dense and relatively easy to be supplied from the felling areas to saw mills.Siberian larch's stems (logs) are quite smooth, and with a very low shrinkage factor, branch crown has a conical form. It's height reaches 45-60 meters and a stem's diameter may reach about 1.5 to 2.5 meters. It reaches its maturity when is about 300-400 years old. Larch average life expectancy is 500-700 years. But in some regions there are found even 1000 years old trees. Thanks to its majestic appearance, excellent properties and resistance to the harsh Siberian climate, in Siberia it is seen as a symbol of eternity and majesty. |   |

Siberian larch is famous worldwide for its unique biological and physico-mechanical properties. Therefore, it can be classified as one of the most valuable building materials. Larch wood up to 90% consists of heartwood, which is very hard, and sapwood is only 10-20 mm.

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| Since it has grown in unaffected Siberian taiga forests, it practically has not faced with manmade pollution. It is not only ecologically clean wood, but it even has medicinal properties. Larch wood has special substances - phytoncides. They are released from wood throughout the whole life cycle of larch wood, regardless of whether the tree is in taiga, or in your home.Phytoncides spreads in the air and purify it from harmful microbes. Thus, in the space around the larch wood there are very few viruses and microbes. Siberian larch has a high fire resistance and low thermal conductivity.According to the studies of Moscow State's Forest University (МГУЛ), larch resistance to fire is twice as high as pine or spruce. While, low thermal conductivity, for houses of larch wood, provides a slow heat drain in winter and inflow in summer. So in homes built of larch, winter is warm, but summer - pleasantly cool. |   |
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But larch's resistance to rot and pests should be specifically highlighted, it is thanks to its special resin, which has a variety of chemicals, which fulfills the functions of natural antisepsis. Hence, the larch is very resistant to rot and pests.

Larch will serve you 2-3 times longer than other species of conifers, besides without additional chemical treatment, while for other tree species such treatment would be extremely necessary. So larch material not necessarily has to be treated with impregnates, as well as the factor that because of larch's density, the wood absorbs impregnant very poorly, should be taken into account. Equally, the fact, that in the construction, no chemically saturated material is used, is a very important moment from the fire protection point of view. In the case of fire it reduces the risk that a person could get poisoned with chemical (antiseptic, impregnants) vapors or carbon monoxide and lose consciousness and actability.

Siberian larch is famous for its resistance to moisture, to mechanical loads, to pests and rot. Dried (about 20% humidity) Siberian larch sawn timber density is about 730 kg / m3, which is the same as oak and ash density. And almost twice denser than European spruce or pine wood (400 to 480 kg / m3). Even after many other factors, such as flexibility and mechanical strength, larch is equivalent to oak and ash properties.

Until the middle of XIX century in Russia selling of Siberian larch and use for civil purposes was prohibited by law. The pretext being that it is necessary for military buildings' construction, shipbuilding, railway construction and building of infrastructure. Exceptions, that were granted with larch material was the Winter Palace in Saint Petersburg, a few churches. Export was practically banned or very limited, so the Siberian larch wood was relatively unfamiliar to the outside world.

Historically, larch was used in structures and items, intended for long-term exploitation at significant loads. For many centuries larch was used for construction of bridges and port berths, telegraph poles, mine props, wooden structures in shipbuilding were made from it.

As a classic example construction of the city of Venice in the V-IX century should be mentioned, which was based on larch piles. Ten to fourteen centuries later (1827 year) part of the piles were surveyed - larch wood looked fossilized and with difficulties obeyed mechanical tooling.

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| Siberian larch, as particularly resistant material, has high potential in window and door frame, as well as stairs and furniture production. Because of high resistance to abrasion, this timber is widely used for the floor boards, but because of the persistence of external conditions, for garden furniture, cladding and patio plank production.In te range of colors larch can be attributed to at least 12-tone hues, and in this respect it is superior to the precious wood such as oak, beech, ash and maple. Colouring range is from almost white with a slight touch of yellow up to dark reddish - brown shades. But the basic tone is amber. The surface has a silky luster.Such tonal difference is explained by a particular tree growing location, soil chemical elements' composition and geology.  |   |

As an example, it is believed that red tint larch grows with iron rich soil, and serves as an indication of the geological clue for potential existence of minerals in the soil. It should be noted also that the red tint larch wood is also heavier than the lightest shades of larch woods.

Undoubtedly, Siberian larch has a beautiful texture and coloration of the wood does not require additional finishing or treatment. Untreated larch wood used  in outdoor works with time (sun, rain, snow and wind) remains silvery gray shaded that gives the building a romantic and antique appearance.

The complex processing cycle is considered to be the largest imperfection of this wood. Siberian larch drying, processing and treatment requires knowledge and experience. Because the timber is very capricious, resinous and dense. Consequently, it is different in all woodworking cycles compared to other conifers, as an example - drying and spraying, - necessary power and sharpness of equipment differs (saws, planes, etc.), and sharpening angles of saws and planers knives is different, and end processing - assembly, painting, lubrication and so on.

By contrast, the biggest benefit is that larch material is the optimal option from a cost point of view compared to other precious wood and hardwood, taking into account sustainability, quality, ecology and visual appearance.

Tulkojums:

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| **Sibīrijas lapeglei** ir ļoti izturīga un ilgmūžīga koksne. Tā ir vienīgā skujukoku pārstāve, kura tiek pieskaitīta pie cietkoku kategorijas un pēc cietības ir pielīdzināma ozolam.Lapegle ir izplatīta gandrīz visā Krievijas teritorijā, kā arī lielākajā daļā Eiropas , Japānas , ASV un Kanādas teritorijā, taču īpaši vērtīga ir vienīgi Sibīrijā augusī lapegle (lat. *larix sibirca*). Tā kā klimats Eiropā , Japānā un Ziemeļamerikā ir daudz maigāks, tad Eiropas , Japānas un Ziemeļamerikas lapegles koksne ir irdenāka un labākajā gadījumā salīdzināma ar vienkāršu priedi.  Gadskārtas šādai lapeglei ir ap 3-5 mm platas, savukārt  Sibīrijas lapeglei, tās  var būt pat šaurākas par 0,5 mm.Sibīrijas Lapegle ir izplatīta galvenokārt taigas mežos Krasnojarskas un Irkutskas apgabalos , kā arī mazāk Altaja kalnu reģionā un Tālajos austrumos. Tā kā šajos reģionos ir ļoti skarbs un diezgan sauss klimats (vidēji 65 %) ar krasām temperatūras maiņām (vasarā līdz pat + 40° C , bet ziemā līdz pat - 60° C), lapegle aug ļoti lēni un izaug ļoti blīva . |
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| Lapegles sugas dendroloģiskās īpatnības kombinācijā ar skarbo klimatu arī rada šo augstvērtīgo koksni , kura ir salīdzināma ar cēlkokiem un cietkoksni. Par visvērtīgāko Sibīrijas lapegles paveidu tiek uzskatīta koksne no Krasnojarsjas apgabala centrālās un dienvidu daļas vai arī no Irkutskas apgabala, jo šajā apgabalos augošā lapegle ir gara , mazzaraina , blīva , un salīdzinoši viegli piegādājama no cirsmām uz zāģētavām.Sibīrijas lapegles stumbrs ir diezgan gluds, un ar ļoti mazu rukuma koeficientu, zaru vainags ir konusveida formā. Tās  augstums sasniedz 45-60 metrus un stumbrs diametrā var sasniegt aptuveni 1,5-2,5 metri. Tā sasniedz savu briedumu aptuveni 300-400 gadu vecumā. Lapegles Vidējais dzīves ilgums ir 500-700 gadi. Bet atsevišķos reģionos ir atrodami pat 1000 gadus veci koki. Pateicoties savam verenajam izskatam, lieliskajām īpašībām un izturību pret skarbo Sibīrijas klimatu, Sibīrijā tā tiek uzskatīta par  varenības un mūžības simbolu. |   |

Sibīrijas lapegle ir slavena visā pasaulē ar savām unikālajām bioloģiskajām un fizikāli-mehāniskajām īpašībām. Tāpēc to var klasificēt kā vienu no vērtīgākajiem celtniecības materiāliem. Lapegles stumbrs līdz pat 90 % sastāv no kodolkoksnes , kura ir ļoti cieta un aplieva ir tikai 10-20 mm.

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| Tā kā tā ir augusi neskartajos Sibīrijas taigas mežos, tā praktiski nav saskārusies ar cilvēka izraisītajiem piesārņojumiem. Tā ir ne tikai ekoloģiski tīra koksne, bet tai ir pat ārstnieciskas īpašības. Lapegles koksnē ir īpašas vielas – fitoncīdi. Tie izdalās no koksnes visa lapegles koksnes dzīves cikla ilgumā, neatkarīgi no tā vai koks ir taigā, vai tas ir Jūsu mājoklī.Fitoncīdi izplatās gaisā un attīra to no kaitīgajiem mikrobiem. Tādējādi telpā ap lapegles koksni ir ļoti maz vīrusu un mikrobu. Sibīrijas lapeglei piemīt arī augsta uguns izturība un zema siltumvadīšana.Saskaņā ar Maskavas Valsts Meža Universitātes (МГУЛ) pētījumiem lapegles noturība pret uguni ir divreiz augstāka, kā priedei vai eglei. Savukārt zemā siltumvadītspēja , mājām no lapegles koksnes, nodrošina lēnu siltuma aizplūšanu ziemā un ieplūšanu vasarā. Tāpēc mājokļos, kuri būvēti no lapegles, ziemā ir silti, bet vasarā – patīkami vēsi. |   |

Bet īpaši jāizceļ lapegles noturība pret trupi un kaitēkļiem, tas ir pateicoties saviem īpašajiem sveķiem, kuros ir dažādas ķīmiskas vielas, kuras pilda dabiskā antiseptika funkcijas. Līdz ar to lapegle  ir ļoti noturīga pret trupi un kaitēkļiem.

Lapegle Jums kalpos 2-3 reizes ilgāk kā citas  skuju koka sugas, pie tam bez papildus ķīmiskās apstrādes, turpretī citām koku sugām šāda apstrāde būtu obligāta.Tātad lapegles materiāls nav obligāti jāanseptizē vai jāimprignē, kā arī jāņem vērā faktors, ka Lapegles blīvuma dēļ, tās koksne ļoti slikti uzsūc impregnantu.

Savukārt tas, ka celtniecībā , nav izmontots ķīmiski piesātināts materiāls , ir ļoti svarīgs moments no ugundrošības viedokļa. Ugunskrēka gadījumā samazinās risks , ka cilvēks saindējas ar ķīmisko vielu (antiseptiķis , imprignants) garaiņiem jeb tvanu un pazaudē samaņu un rīcībspēju.

Sibīrijas lapegle ir slavena ar savu izturību pret mitrumu, pret mehāniskām slodzēm, pret kaitēkļiem un trupi. Kaltēta  (ap 20% mitruma līmeni) Sibīrijas lapegles zāģmateriāla blīvums ir aptuveni 730 kg/m3, kas ir tikpat cik ozola un oša blīvums. Un gandrīz divreiz blīvāka nekā Eiropas egles vai priedes koksne (400 - 480 kg/m3 ). Arī pēc daudziem citiem faktoriem, kā piemēram, elastība un mehāniskā izturība, lapegle ir līdzvērtīga ozola un oša īpašībām.

Līdz XIX gs. Vidum Krievijā ar likumu bija aizliegta Sibīrijas lapegles tirdzniecība un izmantošana civilajiem mērķiem. Aizbildinoties ar to, ka tā ir nepieciešama militāro būvju celtniecībai , kuģu būvniecībai , dzelzceļu būvniecībai un infrastruktūras izbūvei. Izņēmumi, kuriem tika piešķirti lapegles materiāli bija Ziemas pils Sankt-Pēterburgā ,dažas baznīcas. Eksports bija praktiski aizliegts , vai ļoti ierobežots , līdz ar to Sibīrijas lapegles koksne bija samērā mazpazīstama ārpasaulei.

Vēsturiski lapegli izmantoja konstrukcijās un izstrādājumos, kas paredzēti ilgstošai ekspluatācijai pie nozīmīgām slodzēm. Daudzus gadsimtus lapegli izmantoja tiltu un ostas piestātņu būvniecībā, no tās izgatavoja telegrāfa stabus, raktuvju balstus, koka konstrukcijas kuģu būvē.

Kā klasisku piemēru jāpiemin Venēcijas pilsētas celtniecība V-IX gadsimtā, to balstot uz lapegles pāļiem. Desmit līdz četrpadsmit gadsimtus vēlāk (1827 gadā) daļa no pāļiem tika apsekota - lapegles koksne izskatījās pārakmeņojusies un ar grūtībām pakļāvās mehāniskai apstrādei.

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| Sibīrijas lapeglei, kā īpaši izturīgam materiālam, piemīt augsts potenciāls logu un durvju kārbu, kā arī trepju un mēbeļu izgatavošanā. Augstas  nodilumizturības dēļ, šī koksne plaši tiek izmantota grīdas dēļu, bet ārējo apstākļu noturības dēļ, dārza mēbeļu, apšuves un terases dēļu ražošanā.Krāsu gammā lapegli var attiecināt  vismaz 12 toņu nokrāsām un šai ziņā tā ir pārāka par tādiem cēlkokiem kā ozols, dižskabārdis, osis un kļava. Krāsojuma spektrs ir no gandrīz balta ar viegli dzeltenu pieskaņu līdz pat tumši sarkanīgi - brūnai nokrāsai. Bet pamata tonis ir dzintarkrāsa. Virsmai piemīt zīdains spīdums.Šādas toņu atšķīrības ir skaidrojamas ar konkrētā koka augšanas vietu, augsnes ķīmisko elementu sastāvu un ģeoloģiju.  |   |

Kā piemērs , tiek uzskatīts , ka sarkanā toņa lapegle aug ar dzelzsrūdu bagātīgā augsnē, un kalpo kā ģeoloģiska norāde uz iespējamo izrakteņu esamību augsnē. Jāmin arī, ka sarkanā toņa lapegles koksne ir arī smagāka par gaišako toņu lapegles koksnēm.

Nenoliedzami, Sibīrijas lapeglei ir skaista tekstūra un koksnes krāsojumam nav nepieciešama apdare vai papildus apstrāde. Ārdarbos izmantota neapstrādāta lapegles koksne ar laiku (saules, lietus, sniega un vēja ietekmē) paliek sudrabaini pelēkā tonī , kas piedod ēkai  romantisku un antīku veidolu.

Kā lielākais šīs koksnes trūkums tieks uzskatīts sarežģītais apstrādes cikls. Sibīrijas lapegles kaltēšanai , pārstrādei un apstrādei ir nepieciešamas zināšanas un pieredze. Jo šī koksne ir ļoti kaprīza , sveķaina un blīva. Līdz ar to, tai atšķiras visi kokapstrādes cikli , salīdzinoši ar citiem skuju kokiem , kā piemērs - kaltēšana un smidzināšna, atšķiras nepieciešamo iekārtu jaudas (zāģi , ēveles utt.) , atšķiras zāģu un ēveļnažu asināšanas leņķi , kā arī galējā apstrāde – montāža , krāsošana, eļļošana utt.

Savukārt lielākais ieguvums ir tas , ka Lapegles materiāls ir optimālais variants  no izmaksu viedokļa salīdzinot ar citiem cēlkokiem un cietkoksni , ņemot vērā  ilgtspējību, kvalitāti , ekoloģiju un vizuālo izskatu.

**Technical qualities:**

**European Larch (**resource: <http://www.wood-database.com/lumber-identification/softwoods/european-larch/> )

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| European Larch (Larix decidua)European Larch (Larix decidua) | [**Common Name(s):**](http://www.wood-database.com/wood-articles/common-name/) European Larch, Common Larch[**Scientific Name:**](http://www.wood-database.com/wood-articles/scientific-name/) Larix decidua[**Distribution:**](http://www.wood-database.com/wood-articles/distribution/) Central Europe[**Tree Size:**](http://www.wood-database.com/wood-articles/tree-size/) 85-150 ft (25-45 m) tall, 2-3 ft (.6-1 m) trunk diameter[**Average Dried Weight:**](http://www.wood-database.com/wood-articles/average-dried-weight/) 36 lbs/ft3 (575 kg/m3)[**Specific Gravity (Basic, 12% MC):**](http://www.wood-database.com/wood-articles/specific-gravity/) .45, .58[**Janka Hardness:**](http://www.wood-database.com/wood-articles/janka-hardness/) 740 lbf (3,290 N)[**Modulus of Rupture:**](http://www.wood-database.com/wood-articles/modulus-of-rupture/) 13,050 lbf/in2 (90.0 MPa)[**Elastic Modulus:**](http://www.wood-database.com/wood-articles/modulus-of-elasticity/) 1,711,000 lbf/in2 (11.80 GPa)[**Crushing Strength:**](http://www.wood-database.com/wood-articles/crushing-strength/) 7,540 lbf/in2 (52.0 MPa)[**Shrinkage:**](http://www.wood-database.com/wood-articles/dimensional-shrinkage/) Radial: 4.2%, Tangential: 8.2%, Volumetric: 12.5%, T/R Ratio: 2.0 |

[**Color/Appearance:**](http://www.wood-database.com/wood-articles/wood-color-appearance/) Heartwood ranges from yellow to a medium reddish brown. Narrow sapwood is nearly white and is clearly demarcated from the heartwood. Flatsawn sections can exhibit a lot of character and interesting patterns in the growth rings. Knots are common but are usually small.

[**Grain/Texture:**](http://www.wood-database.com/wood-articles/wood-grain-texture/) Grain is generally straight or spiraled. Texture is medium to fine with a greasy or oily feel.

[**Rot Resistance:**](http://www.wood-database.com/wood-articles/wood-durability/) Moderately durable regarding decay resistance.

[**Workability:**](http://www.wood-database.com/wood-articles/wood-workability/) Most hand and machine operations produce good results. However, natural resins in the wood have a tendency to gum up saw blades. Also, because of the disparity between the soft earlywood and the hard latewood, sanding can create dips and uneven surfaces.

[**Odor:**](http://www.wood-database.com/wood-articles/wood-odor/) European Larch can have a distinct resinous odor when being worked.

[**Allergies/Toxicity:**](http://www.wood-database.com/wood-articles/wood-allergies-and-toxicity/) Although severe reactions are quite uncommon, wood species in the [Larix genus](http://www.wood-database.com/wood-identification/by-scientific-name/#larix) have been reported to cause skin irritation, as well as hives and skin lesions. See the articles [Wood Allergies and Toxicity](http://www.wood-database.com/wood-articles/wood-allergies-and-toxicity/) and [Wood Dust Safety](http://www.wood-database.com/wood-articles/wood-dust-safety/) for more information.

[**Pricing/Availability:**](http://www.wood-database.com/wood-articles/wood-pricing-availability/) European Larch is harvested for construction lumber; prices should be moderate within its local range.

[**Sustainability:**](http://www.wood-database.com/wood-articles/restricted-and-endangered-wood-species/) This wood species is not listed in the CITES Appendices, and is reported by the IUCN as being a species of least concern.

[**Common Uses:**](http://www.wood-database.com/wood-articles/common-uses/) Veneer, utility poles, fence posts, flooring, boatbuilding, and construction lumber.

[**Comments:**](http://www.wood-database.com/wood-articles/comments/) Even though European Larch is a conifer, it’s deciduous—it looses its leaves (needles) in the fall—and can have a pleasing growth form that somewhat resembles a branching gymnosperm. The trees are commonly planted as ornamental trees in Europe.

Ammonia fuming larch produces a darker colored wood surface; “fumed larch” veneer is sometimes used as a decorative veneer.

[**Related Species:**](http://www.wood-database.com/wood-articles/related-species/)

[**Japanese Larch** (Larix kaempferi)](http://www.wood-database.com/lumber-identification/softwoods/japanese-larch/)