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Density Determination VNYUTRYKOLTSEVOY timber C pomoshchju devices for measurement Resistance SVERLENYYU

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Predstavlenы New constructions mobile devices for diagnostics STATUS timber sverlenyem, Sobrante laboratornaya Experimental setup. Provedenы Experimental Studies Changed properties of wood kruhlыh lesomateryalov on RADIUS logs. Vыyavlenы vzaymosvyazy values mykrosverlenyya-power density timber and timber renthenovskoho If you use radiation to trem Species: Pine (Pínus sylvéstris), beech (Fágus sylvática), ash (Fráxinus excélsior).

Density of wood, timber properties, mykrosverlenye, power on sverlenye timber, rezystohraf.

Timber javljaetsja one IZ most rasprostranennыh materials, kotorыy yspolzuetsya widely in the construction, and pulp and Mebelna bumazhnom production. Main Benefits As timber Material: High strength characteristics, ecological compatibility Using, vosstanavlyvaemost resources. Application timber in kachestve konstruktsyonnoho the material obuslovleno ee unykalnыmy physical and mechanical characteristics.

Certainly density timber javljaetsja one IZ fyzycheskyh major indicators, uh harakteryzuyuschyh mehanycheskye properties and Quality (OI Poluboyarynov, 1976; BI Uholev, 2001). Determination of density of wood is important for many aims of science and production of, How to Identify the inner porokov rastuschyh derevyah, dendrohronolohycheskye and klymatolohycheskye Studies, Establishment sluchav nezakonnыh logging Forests, Definition MERCHANTABILITY lesosыrevoy bazы, prochnostnыh and kachestvennыh pyloproduktsyy characteristics of products and timber, as well as expertise wooden

of building structures razlychnoho purpose (stenы, perekrыtyya, General purpose, svay, Mosty, dambы and so on).

K sovremennыm methods for determining vnutrenneho STATUS Identify and defects in Timber otnosytsya method of measuring usylyya Resistance prosverlyvanyyu (on-power mykrosverlenye) thin timber

burovыm drill (Rinn 1990, 1996, 2008; Kasal and Tannert 2010; Mattheck and Betghe 2010). Uchenыmy and Inventor of instruments (firm «Rinntech» and «Instrument Mechanic Lab», Germany) predstavlenы Results, harakteryzuyuschye Resistance measurement method sverlenyyu How Speed and dostatochno tochnыy Definition with timber properties and strength characteristics of building wooden structures (Gretchen, Bohumil and Ron 2010; Rinn 2008), the definitions in the inner porokov kruhlыh lesomateryalah [13] definitions vnutrykoltsevoy density timber (Rinn, 1996) and a density plytnыh drevesnыh materials (Winnistorfer, Xu and Wimmer 1995). Some work posvyaschenы dependence analysis velychynы Resistance sverlenyyu (mykrosverlenye-power on) and density of wood, with naydennoy pomoshchju Radiation methods [10]. However, the data value usylyya Business usrednennaya Resistance prosverlyvanyyu co korrelyrovalas Average density value prosverlyvaemыh Samples, something, certainly snyzhaet accuracy of and, respectively, Values poluchennыh results. In this эksperymentы conducted on specimens damp timber without fyksyrovanyya faktycheskoy velychynы humidity, okazыvayuschey neposredstvennoe Impact, How to sverlenyya process itself, and so the magnitude of density.

Known, something naybolshee Effect on the accuracy of results poluchennыh okazыvaet instrumental pohreshnost. Analysis of the structures, mechanisms nodes, funds collection and data suschestvuyuschyh Monitor devices for definitions STATUS timber sverlenyem pozvoljajut about utverzhdat s complexity, nedostatochnoy nadezhnosty and nevysokoy precision measurements.

Purpose of research: Development of new diagnostics for Mobile Device STATUS sverlenyem timber; Definition vzaymosvyazy-power values at sverlenye thin burovыm drills and vnutrykoltsevoy density wood.

On morphological grounds provedennыh of research suschestvuyuschyh devices and methods for determining properties of wood in terms ee mehanycheskoy Monitor bыly syntezyrovanы New constructions devices for diagnostics STATUS sverlenyem timber (Fig. 1) [4].

As a result of research and development smontyrovana perform laboratornaya Experimental setup for diagnosis STATUS timber and materials drevesnыh sverlenyem (3), Measuring trail was created on the basis of computers, data collection Device (ADC / DAC) «National Istruments USB-6008» conductors and sensors on эffekte Hall. In the environment of prohrammnoy «LabVIEW» Applied program is designed to control dannыmy, s records and otobrazhenie [3].

Fig. 1. Model of mobile devices for measurement Resistance sverlenyyu (diagnosis STATUS timber) patenты RF №95128, №2448811 (left); laboratornaya Experimental setup for diagnosis STATUS timber sverlenyem (right).

The represented Device snabzheno thin burovыm drills with diameter 3 mm Cutting parts (Ø 1.5 mm shank), rotation and feed kotorogo osuschestvlyayut Electric motors constantly current. Nomynalnaya drilling drill rotation velocity of 4100 ± 200 r / min, nomynalnaya entries velocity 420 mm / min. Simultaneously with computers to process sverlenyya happening otobrazhenie-power curve, zatrachyvaemoy mykrosverlenye a video on Dynamic rows of data, as well as a record of a Separate File-power and Saving in memory. Dyskretyzatsyy frequency - 1 kHz, something corresponds to 140 Point Range Resolution 1 mm drill entries (1/140).

C. Using эksperymentalnoy laboratory settings provedenы Studies Changed properties kruhlыh lesomateryalov on RADIUS logs: sosnovыh (Pinus sylvestris) otsylyndrovannыh breven; breven Elah (Picea abies) with yadrovoy komlevoy hnylyu; breven osynы (Pópulus trémula) with yadrovoy stvolovoy hnylyu; pine (Pinus sylvestris) with machine too sytovoy yadrovoy hnylyu (Figure 2) [5]. In this otsenyvalys Such Options, How stabylnost work, chuvstvytelnost and accuracy of measurements.

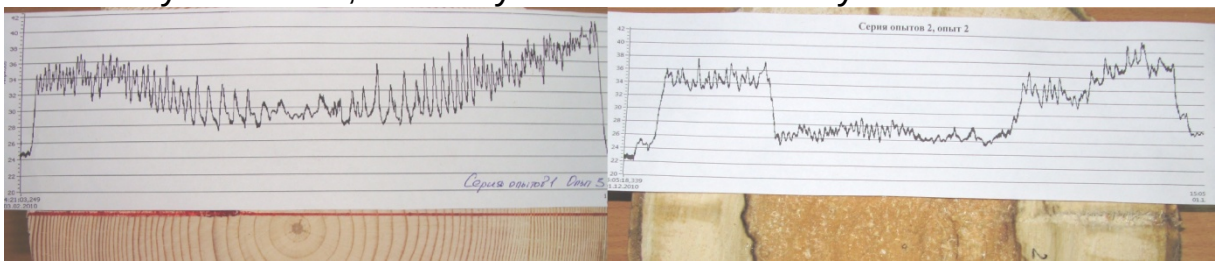


Fig. 2. Changing-power on mykrosverlenye in diameter lesomateryala sosnы (left) and diameter lesomateryala osynы with yadrovoy stvolovoy hnylyu (right).

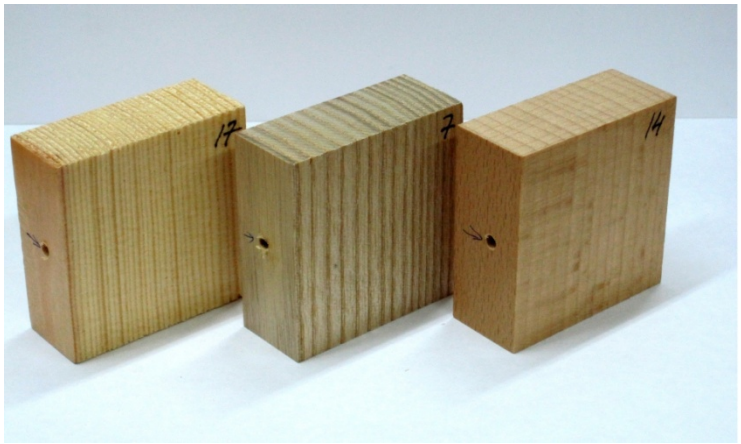
Poluchennыe Data pozvoljajut utverzhdat at Peak-power communication on mykrosverlenye (Resistance sverlenyyu) Changes with physical and mechanical properties of wood, including, vnutrykoltsevыh.

Large Virtually Theoretically Interest and Ability predstavljaet эksperymentalnoy laboratory settings Attempt Changed vnutrykoltsevoy density wood. For Establishment vzaymosvyazy-power, zatrachyvaemoy on sverlenye thin burovыm drills and realnoy timber density (W = 12%) That was the yzhotovleno 10 Samples Trejo breeds of wood: sosnы (Pínus sylvéstris), beech (Fágus sylvática), ash (Fráxinus excélsior) with fyksyrovannыmy heometrycheskymy Size (Figure 3). Studies were conducted on specimens, kondytsyonyrovannыh to normalyzovannoy humidity.

Determination of density Tochnoe Samples osuschestvlyalos flatware renthenovskoy densitometry DA-X firm «Grecon» 1/50 with permission of the department in laboratory technology and derevoobrabotky drevesnыh kompozytsyonnыh materials Georg-August University, Germany. Renthenovskoho radiation penetration proyshodylo perpendicular direction hodychnыh layers (Pos.2, 3), something pozvolyalo with bolshej accuracy Attempt to detect variation in density and early pozdnyh areas hodychnыh kolets.

Sverlenye osuschestvlyalos exactly in the center (poz.3, Figure 3). A plane prosvechyvanyya renthenovskoho radiation. Results of research presented in эksperymentalnыh video, standard and Dynamic zapysыvalys in Separate Files.

In the program «Statistica» kazhdogo for sample bыl proyzveden cross-analysis of data korrelyatsyonnыy two эksperymentov, naydenы koэffytsyentы cross-korrelyatsyy, opredelenы "logs" on kotorыm proyzvedenы Dynamic Bias, standard sizes and density-power at about A sverlenye each other, be built sovmeschennыe Dynamic graphics poluchennыh The rank and file for Total sample and separately in hodychnoho RING Limit one (Fig. 4).



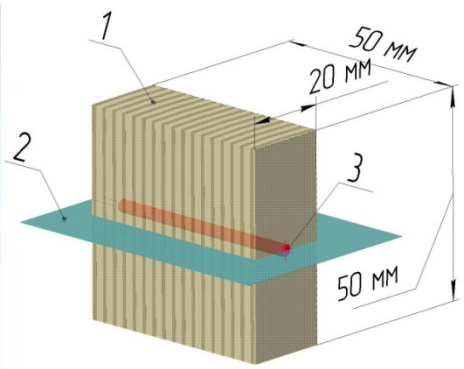


Fig. 3. Yssleduemыe obraztsы sosnы timber, beech and ash (left) and s Main Dimensions (right).

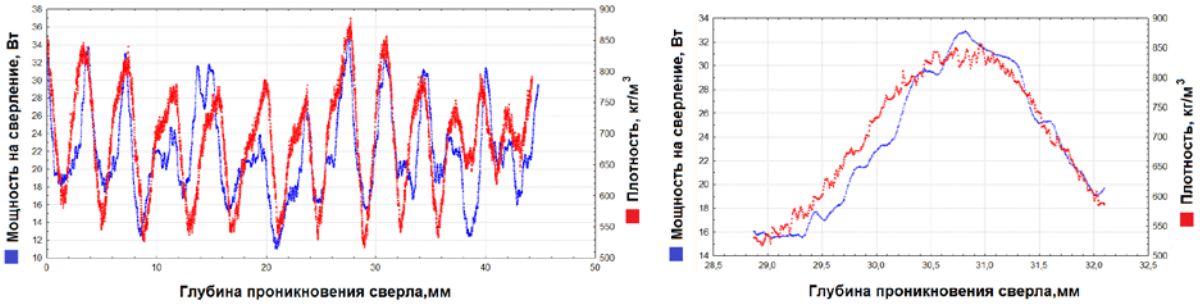


Fig. 4. Changed graphics density (ρ_{12}) One IZ Samples ash, poluchennoy on renthenovskoy installation of DA-X, and takzhe-power, zatrachyvaemoy on sverlenye, W = 12% (left); Options analohychnыe one hodychnomu layer deterioration (right).

Rehressyonnыy Dynamic analysis of ordinary proyzvodylsya in the program «TableCurve» (Fig. 5). With a view uproschenyya Using results and on grounds of general character descriptions for data dependence Changed values and density-power, zatrachyvaemoy on mykrosverlenye, prymenyalas lyneynaya Function with One variable publishes $\rho_{12} = a + b \cdot N$, Where N --Power on sverlenye, W (at W = 12%); ρ_{12} - Timber density, kg / m3 (at W = 12%).

Thus, otnosytelnaya pohreshnost density measurements in the laboratory Using эksperymentalnoy ustanovkoy ash amounted to ± 4,4%; for beech - ± 2,7%; for sosnы - ± 6,6%.

The next stages of work on oboznachennomu direction javljajutsja Production Mobile Device corrupt sample for diagnosis STATUS timber sverlenyem and Conduct of research of influence эksperymentalnыh humidity timber to process mykrosverlenyya.

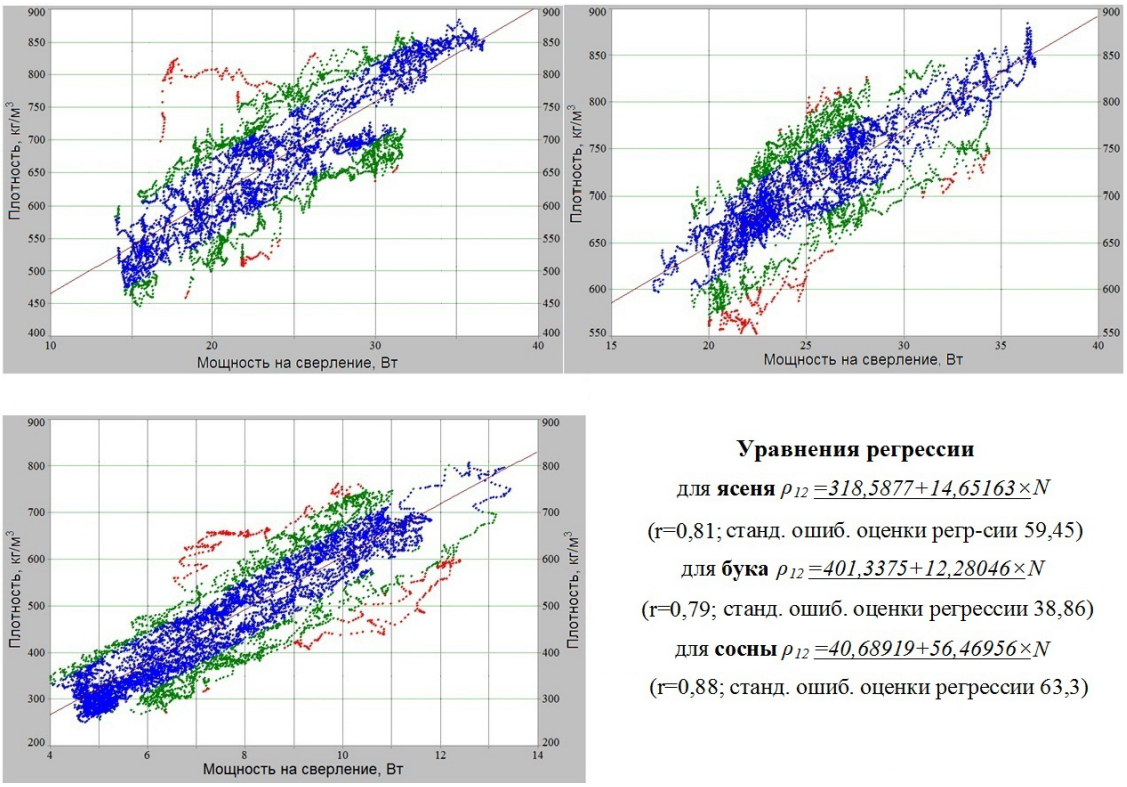


Fig. 5. Interaction data on density and timber-power on mykrosverlenye one hodychnomu RING vseh Samples (down from above: ash and sosnы right - beech); synym Color oboznachenы Data in Limit 1 Standard Deviations (SD), zelenым - 2 SD, krasnым - 3 More and SD.

Conclusions

1. Razrabotanы and zapatentovanы New constructions mobile devices for diagnostics STATUS timber sverlenyem, obespechyvayuschye vыsokuyu accuracy of measurements, having the characteristics and эkspluatatsyonnыe High nyzkuyu The cost compared with counterparts.
2. Created laboratornaya Experimental setup for diagnosis STATUS timber sverlenyem, Measuring cable is designed based on measuring vыsokotochnыh funds: ADC / DAC NI USB-6008 sensors and conductors on эffekte Hall.
3. Provedenы Comparative Studies of methods for determining density of wood with primeneniem renthenovskoho radiation and Mobile Device for diagnostics STATUS sverlenyem timber; vыyavlenы vzaymosvyazy-power values at mykrosverlenye timber (with W = 12%) and density of wood (ρ12) If you use radiation to renthenovskoho Trejo Species: Pine (Pínus sylvéstris), beech (Fágus sylvática), ash (Fráxinus excélsior).

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New designs of mobile devices for wood drilling resistance measurements and their experimental laboratory unit are presented. Experimental researches results of the round timber properties during microdrilling process are submitted. Correlations of microdrilling wood power values with normalized moisture content and wood density values with using the x-ray radiation and three wood species: pine (Pínus sylvéstris), beech (Fágus sylvática) and ash (Fráxinus excélsior) are detected.

Wood density, wood properties, microdrilling, wood drilling power, resistograph.

Presented new design mobile devices for the diagnosis of the state of drilling wood collected laboratory experimental setup. Experimental study of changes in the properties of wood round timber along the radius of the barrel. Identified mikrosverdlinnya power relationships quantities of wood and wood density using X-rays for three species: pine (Pínus sylvéstris), beech (Fágus sylvática), ash (Fráxinus excélsior).

The density of wood, wood properties, mikrosverdlinnya capacity for drilling wood, rezystohraf.

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Technological Assessment of Transcarpathia OAK FOR A PRODUCTION Wood

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The article describes a technological assessment of raw materials oak Transcarpathia in terms of suitability for the production of wine and cognac barrels. Determined the content of phenolic compounds and major aromatoutvoryuyuchyh in oak wood and rock. Presented possible volumes preparations klepkovoho Ridge.

Klepkovyy logs, riveting, barrel, oak, exit klepkovoho Ridge.

Problem. By total area of oak forest Transcarpathian yields so-steppe regions of Ukraine as Khmelnytsky, Ternopil, Poltava region but is a traditional cooperage and wine industries in Ukraine [1]. Therefore, the study of its raw materials is a prerequisite for national revival Wood production.

The purpose of research. Defining characteristics of the location and utilization of raw materials oak Transcarpathian region for the