ЛЕСОТЕХНИЧЕСКИ УНИВЕРСИТЕТ

Факултет Горска промишленост

UNIVERSITY OF FORESTRY

Faculty of Forest Industry

ОСМА МЕЖДУНАРОДНА НАУЧНО-ТЕХНИЧЕСКА КОНФЕРЕНЦИЯ

EIGHTH INTERNATIONAL SCIENTIFIC AND TECHNICAL CONFERENCE

ИНОВАЦИИ В ГОРСКАТА ПРОМИШЛЕНОСТ И ИНЖЕНЕРНИЯ ДИЗАЙН

INNOVATIONS IN WOOD INDUSTRY AND ENGENEERING DESIGN

ПРОГРАМА И РЕЗЮМЕТА

PROGRAMME AND ABSTRACTS

3-5 ноември 2016

ЛТУ – УОГС Юндола

3-5 November 2016

UF – TEFR Yundola

Браншова Камара на Дървообработващата и Мебелната Промишленост

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DRAFT PROGRAMME
VIIITH INTERNATIONAL SCIENTIFIC AND TECHNICAL CONFERENCE
"INNOVATIONS IN FOREST INDUSTRY AND ENGINEERING DESIGN"
03-05.11.2016
UNIVERSITY OF FORESTRY – Sofia

The Conference Opens on November 03, 2016 at the Aula of the UF with General Plenary Session.
It Continues at YUNDOLA TRAINING AND EXPERIMENTAL FOREST RANGE

November 3, 2016 (Thursday)
9.00 - 10.00 h. Registration of Participants.
10.00 - 12.00 h. Opening, Plenary Session - at the Aula of the UF.
12.30 - 15.00 h. Departure and Arrival at TEFR -Yundola (bus from UF);
15.00 - 16.00 h. Lunch, Accommodation and Registration of Participants;
16.00 - 18.00 h. I Session (Divided into Sections – Halls No2 and No4);
19.30 h. Official Dinner.

November 4, 2016 (Friday)
8.00 - 9.00 h. Breakfast;
9.00 - 11.00 h. II Session (Divided into Sections – Halls No2 and No4);
11.00 - 11.30 h. Coffee Break;
11.30 - 13.00 h. III Session (Divided into Sections – Halls No2 and No4);
13.00 - 14.00 h. Lunch;
14.00 - 16.00 h. IV Session (Divided into Sections – Halls No2 and No4);
16.00 - 16.30 h. Coffee Break;
16.30 - 18.00 h. V Session (Divided into Sections – Hall No2);
19.30 h. Dinner.

November 5, 2016 (Saturday)
8.30 - 9.30 h. Breakfast;
9.30 - 10.30 h. Final Session (for all participants - Hall No2);
11.30h. Departure of the Participants to Sofia.

Браншова Камара на Дървообработващата и Мебелната Промишленост

PROGRAMME

VIII[th] international scientific and technical conference

"INNOVATIONS IN FOREST INDUSTRY AND ENGINEERING DESIGN"

November 3, 2016 (Thursday)

9.00 – 10.00 h. Registration of participants
10.00 – 12.00 h. PLENARY SESSION Opening the conference and plenary papers **AULA of the University of Forestry – Sofia**
Chairman: Assoc. Prof. PhD Zhivko Gochev **Secretary: Assoc. Prof. PhD Desislava Angelova**
1. Prof. PhD Ivan Iliev – Rector of the UF - **OPENING THE CONFERENCE;** 2. Alexander Alexandrov – **IUFRO AND PARTICIPATION OF BULGARIA;** 3. Zoran. Janjić - **INNOVATIVE METHODS IN HIGHER EDUCATION OF THE REPUBLIC OF SERBIA , MODERN TENDENCIES AND TRENDS IN THE DEVELOPMENT OF SERBIAN FURNITURE INDUSTRY**;

4. Rositsa Pesheva - **STATE OF THE SECTOR AND MAJOR TRENDS FOR ITS DEVELOPMENT.**

12.30 – 15.00 h. Departure and Arrival in TEFR - Yundola;

15.00 – 16.00 h. Lunch, Accommodation and Registration of Participants;

16.00 – 18.00 h.

I Session (Divided into Sections – Halls No2 and No4)

Section I (Hall No 2)	**Section II (Hall No 4)**
Chairman: Assoc. Prof. PhD Julia Mihajlova **Secretary: Chief Assist. Prof. PhD Pavlin Vitchev**	**Chairman: Prof. DSc Nencho Deliiski** **Secretary: Assist. Prof. PhD Petar Nikolov**
1. Anelie Pétrissans, E.A. Silveira, Bo-Jhih Lin, A. Caldeira-Pires, WH. Chen, M. Pétrissans - **COMPARISON OF WOOD MILD PYROLYSIS KINETIC MODELS;** 2. Ladislav Dzurenda, Adrián Banski - **EFFECT OF THE TEMPERATURE COMBUSTION OF FUEL-WOOD TO PRODUCE ASH;** 3. Ivan Sopushynskyy, Vasyl Zayachuk, Nikolai Bardarov, Mykola Sopushynskyy, Ruslan Maksymchuk - **SOME FEATURES OFTIMBER QUALITY OF BETULAVERRUCOSAEHRH. GROWING IN CARPATHIAN AGROFORESTRY;** 4. Nikolay Bardarov, Diyana Mladenova - **STUDY ON THE HARDNESS OF OAK WOOD;** 5. Nikolai Bardarov, Stilyana Simeonova - **A STUDY OF THE DISTRIBUTION OF THE VESSELSASA DIAGNOSTICSIGN ;** 6. Neno Trichkov, Daniel Koynov - **QUANTITATIVE YIELDS AT CUTTING THIN LOGSOF SCOTS PINE (*PINUS SYLVESTRIS* L.) FOR DETAILS PRODUCTION WITHOUT DEFECTS;** 7. Neno Trichkov, Daniel Koynov - **CHARACTERISTICS OF DOUGLASII TRUNKS (PSEUDOTSUGA DOUGLASII) FOR SOLID WOOD MATERIALS PRODUCTION.**	1. Zhivko Gochev - **LASER WOOD CUTTING AND MODIFICATIONS IN ITS STRUCTURE;** 2. Nencho Deliiski, Neno Trichkov, Zhivko Gochev, Dimitar Angelski - **TRANSFORMATION OF TWO MUTUALLY CONNECTED MODELS FOR CONVECTIVE HEATING OF WOOD DETAILS BEFORE THEIR LACQUERING IN A FORM, SUITABLE FOR PROGRAMMING;** 3. Natalia Tumbarkova, Nencho Deliiski - **APPLYING OF THE SOFTWARE PACKAGE TABLE CURVE 2D FOR COMPUTATION OF PROCESSING AIR MEDIUM TEMPERATURE DURING FREEZING IN A FREEZER AND DEFROSRING OF LOGS;** 4. Panayot Panayotov - **ADHESION OF GLUING AND PROTECTIVE-DECORATIVE FILMS TO WOOD;** 5. Izabela Radkova - **OPTIMIZATION OF THE PRODUCTION OF PAPER CELL STUFFING;** 6. Petar Nikolov - **THE EFFECT OF INITIAL DUST CONCENTRATION OF WOOD DUST AND SPEED OF FILTRATION ON THE PROCESS OF FILTRATION WITH FABRIC FILTERS "FIBRETEX 1541".**

19.30 h.

OFFICIAL DINNER FOR GUESTS AND CONFERENCE PARTICIPANTS

November 4, 2016 (Friday)

<table>
<tr><td colspan="2">8.00 – 9.00 h.
Breakfast</td></tr>
<tr><td colspan="2">9.00 – 11.00 h.
II Session (Divided into Sections – Halls No2 and No4)</td></tr>
<tr><td>Section I (Hall No 2)</td><td>Section II (Hall No 4)</td></tr>
<tr><td>Chairman: Assoc. Prof. PhD Georgi Vukov
Secretary: Chief Assist. Prof. Izabela Radkova</td><td>Chairman: Assoc. Prof. PhD Vasil Vlasev
Secretary: Assist. Prof. Daniel Koynov</td></tr>
<tr><td>1. Mustafa Kucuktuvek - THE EFFECT OF ADHESIVE RATIO, HARDENER RATIO AND PRESS TEMPERATURE ON SOME TECHNOLOGICAL PROPERTIES OF WOOD BASED COMPOSITE PANELS;
2. Nikolay Yosifov, Stefan Delin - CONTRIBUTION TO THE METHOD FOR DETERMINATION OF THE COMPRESSION RATIO OF WOOD PARTICLES IN COMPOSITE BOARDS;
3. Nikolay Yosifov - ASSESSMENT OF THE SUITABILITY OF LOCAL TREE SPECIES AS A RAW MATERIAL FOR COMPOSITE PARTICLEBOARDS;
4. Nikola Yotov, Viktor Savov, Stoiko Petrin, Ivo Valchev, Viktor Karatotev - STUDY ON POSSIBILITY FOR UTILIZATION OF TECHNICAL, HYDROLYSIS, LIGNIN IN COMPOSITION OF MEDIUM DENSITY FIBERBOARD;
5. Viktor Savov, Julia Mihailova, Rosen Grigorov, Evgeni Molev - NFLUENCE OF PARTICIPATION OF MASS FROM VINE TWIGS ON PHYSICAL AND MECHANICAL PROPERTIES OF FIBERBOARD;
6. Miglena Valyova, Yordanka Ivanova, Ivan Genov - INVESTIGATION OF SOME PROPERTIES OF WOOD-POLYMER MATERIAL BASED ON MODIFIED UREA-FORMALDEHYDE RESIN.</td><td>1. Zhivko Gochev, Georgi Vukov, Valentin Atanasov, Pavlin Vitchev - STUDY ON THE POWER – ENERGETIC INDICATORS OF A UNIVERSAL MILLING MACHINE;
2. Zhivko Gochev, Georgi Vukov, Valentin Atanasov, Pavlin Vitchev - STUDY OF THE PROCESSES IN LONGITUDINAL MILLING OF SOLID WOOD;
3. Valentin Atanasov, Vladimir Spasov, Marian Todorov - RESEARCH ON THE QUALITY OF PROCESSING WITH A VERTICAL LOG BANDSAW;
4. Valentin Atanasov, Marian Todorov, Vladimir Spasov - RESEARCH ON THE QUALITY OF PROCESSING WITH A HORIZONTAL BANDSAW;
5. Konstantin Marinov, Velika Jordanova - ENERGETIC INDICATORS ANALYSIS OF FOREST MILLING MACHINES FOR SITE PREPARATION;
6. Konstantin Marinov, Velika Jordanova - TECHNOLOGICAL RESEARCH OF MECHANIZED SITE PREPARATION FOR AFFORESTATION OF FOREST LAND.</td></tr>
<tr><td colspan="2">11.00 – 11.30 h.</td></tr>
</table>

Coffee Break	
11.30 – 13,00 h. **III Session (Divided into Sections – Halls No2 and No4)**	
Section I (Hall No 2)	**Section II (Hall No 4)**
Chairman: Assoc. Prof. PhD Nikolai Bardarov **Secretary: Chief Assist. Prof. Valentin Atanasov**	**Chairman: Assoc. Prof. PhD Dimitar Angelski** **Secretary: Assist. Prof. Pavlina Vodenova**
1. Vasil Vlasev - **DETERMINATING THE CUTTING FORCES FOR VARIOUS CUTTERS OF THE CUTTING TOOL ON A VERTICAL MILLING MACHINE WITH A BOTTOM-POSITIONED SPINDLE;** 2. Vasil Vlasev - **DETERMINATING THE CUTTING FORCES IN CIRCULAR CUTTING MACHINES WITH REGARD TO THE EFFECT IN THE RADIAL BEATING OF THE CUTTING MECHANISM;** 3. Pavlin Vitchev, Dimitar Angelski, Vladimir Mihailov - **INFLUENCE OF THE PROCESSED MATERIAL ON THE SOUND PRESSURE LEVEL GENERATED BY SLIDING TABLE SAWS;** 4. Bozhidar Dinkov, Nikolina Ilkova - **BUNKER FOR STORAGE OF CHIP WOOD;** 5. Velika Jordanova, Konstantin Marinov - **WORKING SPEEDS FOR SUBSOILING WITH SPECIALIZED FORESTRY ROTOVATORS.**	1. Violeta Jakimovska Popovska, Borce Iliev, Julia Mihajlova - **SCREW WITH DRAWAL RESISTANCE OF COMPOSITE WOOD-BASED PANELS (PART I);** 2. Vassil Jivkov, Ralitsa Simeonova, Assia Marinova - **CORRELATION BETWEEN THE ADHESION SURFACE AREA AND BENDING STRENGTH AND STIFFNESS OF GLUED JOINTS OF FRAME STRUCTURAL ELEMENTS MADE OF PLYWOOD;** 3. Georgi Kyuchukov, Borislav Kyuchukov, Vassil Jivkov, Assia Marinova, Gjorgi Gruevski - **NORMS FOR DESTRUCTIVE BENDING MOMENTS OF END CORNER MORTISE AND TENON JOINTSOF FRAME STRUCTURAL ELEMENTS MADE OF SOLID SPRUCE WOOD WITH A CROSS SECTION OF 50 x 30 mm;** 4. Desislava Hristodorova - **BENDING STRENGHT AND STIFFNESS COEFFICIENTS OF JOINTS BY STAPLES IN SKELETON UPHOLSTERED FURNITURE;** 5. Desislava Hristodorova, Nelly Staneva, Iancho Genchev - **STATIC ANALYSIS OF A UPHOLSTERED FURNITURE SKELETON WITH STAPLE CORNER JOINTS BY FEM;** 6. Dimitrinka Vladeva, Martin Stanev - **SEVERAL OPTIMIZATION PROBLEMS RELATED OPENING MATERIALS FOR THE FURNITURE INDUSTRY.**
13.00 – 14.00 h. **Lunch**	
14.00 – 16.00 h. **IV Session (Divided into Sections – Halls No2 and No4)**	
Section I (Hall No 2)	**Section II (Hall No 4)**

Chairman: Assoc. Prof. PhD Vassil Jivkov **Secretary: Chief Assist. Prof. Ralitsa Simeonova**	**Chairman: Assoc. Prof. PhD Nelly Staneva** **Secretary: Assist. Prof. Desislava Hristodorova**
1. Ivanka Dobreva-Dragostinova - **CULTIVATED SUSTAINABLE PRODUCT AND SPATIAL DESIGN;** 2. Kremena Markova, Tihomir Dovramadjiev - **THE METHOD OF CONTRAST IN INTERIOR FURNITURE DESIGN;** 3. Kremena Markova, Ilia Iliev - **SIMPLICITY OF FORM – A BASIC CRITERION IN RECYCLED PAPER INTERIOR FURNITURE DESIGN;** 4. Genoveva Vladimirova, Yancho Genchev - **OPTICAL ILLUSIONS IN INTERIOR DESIGN;** 5. Regina Raycheva - **RATTAN FURNITURE: TEMPTATION FOR MODERN DESIGN;** 6. Dimitar Dobrevski - **DESIGNING THE FUTURE;** 7. Dimitar Dobrevski - **DESIGN - ART OR SCIENCE?**	1. NenoTrichkov, Nikolay Neykov - **TECHNICAL AND ECONOMICAL CHARACTERISTICS OF PELLETS PRODUCTION IN WOODWORKING AND FURNITURE PRODUCING ENTERPRISES IN BULGARIA;** 2. Nikolay Neykov, Petyr Antov, Vesselin Brezin - **STRATEGIC PERSPECTIVES OF BULGARIAN PLYWOOD PRODUCTION AND TRADE ;** 3. Nikolay Neykov, Petyr Antov, Radostina Popova - **COMPETITIVENESS OF WOODWORKING AND FURNITURE INDUSTRIES IN SOUTHEASTERN EUROPEAN COUNTRIES- TENDENCIES AND CHALLENGES;** 4. Diana Ivanova, Pavlina Vodenova - **DESIGN THINKING AS A INNOVATION TOOL IN ORGANIZATION;** 5. Alexander Radoslavov - **CONCEPTS IN THE RESEARCH APPROACH OF CONSUMER ATTITUDES TO INNOVATIVE PACKAGING SOLUTIONS.**
16.00 – 16.30 h. **Coffee Break**	
16.30 – 18.30 h. **V Session**	
Section I (Hall No 2)	
Chairman: Assoc. Prof. PhD. Yancho Genchev **Secretary: Chief Assist. Prof. Rangel Chipev**	
1. Sasha Lozanova, Rangel Chipev - **VKHUTEMAS SCHOOL AND ITS CURRENCY TO CONTEMPORARY DESIGN TRAINING;**	

2. Marina Mladenova, Boyanka Zhelyazova - **APPLICATIONOF E-LEARNING PLATFORM BLACK BOARD LEARN IN THE FACULTY OF FOREST INDUSTRY;** 3. Pavlina Vodenova - **SYSTEMATIC APPROACH INPLEMENTATION IN DESIGN EDUCATION;** 4. Dimitrinka Vladeva, Martin Stanev - **USING MAXIMA TO TEACH IN MATHEMATICAL COURSES AT THE UNIVERSITY OF FORESTRY;** 5. Desislava Angelova - **EXPERIMENTAL APPLICATION OF METHOD "SKAMPER (ZOPIPPP)» IN EDUCATION PROCESS.**	
19.30 h. **DINNER**	

November 5, 2016 (Saturday)

8.30 – 9.30 h. **Breakfast**
9.30 – 10.30 h. **FINAL SESSION (for All Participants - Hall No 2)** **Chairman: Assos.Prof. PhD Zhivko Gochev** **Secretary: Assos.Prof. PhD Desislava Angelova**
11.30 h. **Departure of the Participants to Sofia**

Dear Participants,

For a more business-like conduct of meetings of the conference and provide sufficient time for discussion on the reports we offer to accept and observe the following

RECOMMENDED GENERAL REGULATION

A. For each thematic sections:

1. Reporting - 10 min, incl.: Basic Thesis (Theme, Purpose, Objectives), Methods Used, Main Results, Conclusions and Recommendations;

2. Questions and answers to the report - 3 ÷ 5 minutes immediately after its submission;

B. For the final session of the conference on November 5, 2016:

1. Presentation of the main issues of reporting and discussion by chairmen of individual sessions (section) - 10 min.;

2. Presentation of issues and recommendations for next conferences - up to 5 min.

Please, any suggestions for improving the current organization and conduct of the conference to submit timely in writing to the Organizing Committee.

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Браншова Камара на Дървообработващата и Мебелната Промишленост

November 3, 2016 (Thursday)

I Session

Section I (Hall No 2)

1. COMPARISON OF WOOD MILD PYROLYSIS KINETIC MODELS

Anelie Pétrissans*[1], E.A. Silveira[1], Bo-Jhih Lin[1], A. Caldeira-Pires[2], WH. Chen[3], M. Pétrissans[1]

[1]LERMAB, EA 4370-USC INRA, Université de Lorraine, Faculté des Sciences et Technologies, BP 70239, F-54506 Vandoeuvre-lès-Nancy, France

[2]LEA, Faculty of Science and Technology, University of Brasília

[3]Department of Aeronautics and Astronautics, National Cheng Kung University, No.1, University Road, Tainan 701, Taiwan

*Corresponding author: A. Pétrissans, e-mail : Anelie.Petrissans@univ-lorraine.fr

Wood mild pyrolysis is a heat treatment process in a temperature range 200–240˚C improving dimensional stability and durability of the material. Even if this preservation method is well developed in the industry, there doesn't exist a reliable way to control the final product quality. Properties of heat treated wood depend on mass loss. Hence, controlling the pyrolysis process means to control precisely this parameter. The purpose of this study is compare different kinetic models and to compare numerical results with available experimental data. The commercial package COMSOL is used here.

Keywords: Heat treatment, modelling, reaction kinetics; thermo-degradation, wood

2. EFFECT OF THE TEMPERATURE COMBUSTION OF FUEL-WOOD TO PRODUCE ASH

Ladislav Dzurenda[1], Adrián Banski[2]

[1]Technical University in Zvolen, Slovakia, dzurenda@tuzvo.sk

[2]Technical University in Zvolen, Slovakia, banski@tuzvo.sk

In this contribution, there are presented the results of experimental works to determined influence of burning temperature fuel-wood of trees species:*Norway spruce, White birch, Beech, Oak, and Black Locust* in the temperature range*t* = 500 – 1000 °C to produce ash.With increasing combustion temperature of fuel-wood production of ash decreases due to thermal decomposition of minerals create the inorganic proportion of wood.

The functional dependences decrease in ash production at the burning temperature are instrumental for objectification of information about ash production from combustion process of fuel-wood in energy facilitiesfor energy, environmental, and ecological analysis and balances.

Disregarding the mentioned facts for example: for choosing standards *ISO 1171:2003* – burning fuel at temperature t = 815 °C, respectively *EN 14775:2010* – at temperature t = 550 °C for determining the production of ash from power plants combustion spruce wood, the balance of burdens relative error of 44.8% and an Black locustfuel wood relative error of 19.1%.

Keywords: fuel wood, combustion, temperature, ash

3. SOME FEATURES OF TIMBER QUALITY OF BETULAVERRUCOSAEHRH. GROWING IN CARPATHIAN AGROFORESTRY

Ivan Sopushynskyy[1], Vasyl Zayachuk[1], Nikolai Bardarov[2], Mykola Sopushynskyy[1], Ruslan Maksymchuk[1]

[1] Ukrainian National Forestry University, e-mail: sopushynskyy@nltu.edu.ua

[2] University of Forestry, Sofia, e-mail: niki_bardarov@yahoo.com

Betulaverrucosa Ehrh. Is economically valuable forest tree species with diffuse porous wood structure. The natural habitat is widely represented in the Eurasian continent. In Ukraine grows in the forest and steppe areas in the area of 0.55 Millionha (5.7% of the total woodland). In the Ukrainian Carpathians birch forests occupy 2.3 Thousand ha. Native birch forms mostly single-stage stands. The pure birch standsare promising in terms of plantation and getting wood with desired properties. Birch veneer logs are of the great commercial value in the furniture production. There are often false core in the stems that reduce significantly reduces the woodquality classes. The wood defect "false core" is often characterized for birch stems that reduces significantly the wood quality and the wood price. In this connection, one of the main silvicultural treatment in the birch stands are the cutting branches. The features of formation of

wood densitywere carried out in birch stems. The influence of site conditions and forest management was considered to determine the wood quality characteristics. The timbers were graded regards wood density and the silvicultural criteria were developed to assess the quality of growing forest trees.

Keywords: birch, wood quality, falsely heartwood, density of the wood

4. STUDY ON THE HARDNESS OF OAK WOOD

Nikolay Bardarov[1], Diyana Mladenova[2]

[1]University of Forestry, Faculty of Forest Industry, Sofia, Bulgaria

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The hardness is among the most important properties of wood. It is closely correlated with the density and mechanical properties. Moreover, it is determines for the processing of wood. The scope of the stem, it varies greatly by their determination is often very difficult.

Work considered the hardness of oak wood, sourced from different habitats in the country and its distribution in the radius of the stem. The influence of age, the width of the annual ring, habitat and altitude. Quality factor is defined hardness in order to compare different samples.

Keywords: wood, oak, hardness, annual ring

5. A STUDY OF THE DISTRIBUTION OF THE VESSELSAS A DIAGNOSTICSIGN

Nikolai Bardarov, Stilyana Simeonova

UniversityofForestry–Sofia, e-mail: niki_bardarov@abv.bg

The distribution of the vesselsin wood is largely genetically stake for each species. Many of the features available are permanent and unique to each species.The size and density of the vessels depend to a large extent by the site conditionsand the location in stem.

The article examines the distribution of the vessels of some tropical trees pecies.The vessels were examined in cross-section. From the next few cells are formed the figures such as

loops. Attitude lap / area (V/S) of the sefigures is discussed.

Keywords: vessels, wood, distribution of the vessels, tropical tree species

6. QUANTITATIVE YIELDS AT CUTTING THIN LOGS OF SCOTS PINE (*PINUS SYLVESTRIS* L.) FOR DETAILS PRODUCTION WITHOUT DEFECTS

Neno Trichkov, Daniel Koynov

University of Forestry, Sofia; Faculty of Forest Industry, e-mail: ntrichkov@gmail.com; daniel_iv@abv.bg

In this work are presented of experimental work results on the establishing quantitative yield cutting of thin round scots pine (Pinussylvestris L.) assortments to obtain details without defects. The experimental work was performed with thin logs obtained from the peak parts of the model stems. They have established the presence, size and number of the wood defects. Following the normal production sequence, thin logs are cut into sections with lengths 500, 800, 1000 and 1200 mm. The received sections (logs for sawing) according to the method sharply sawing are cut onboards and after that on details with width 3, 6 and 9 mm. The results give reason to do analysis and conclusions on quantitative yields and their changes depending of the details thickness and length. The information obtained allows more accurately and objectively evaluate the technology and machinery to the more efficient processing of thin round wood for the production of materials from solid wood.

Keywords: Scots pine (Pinussylvestris L.), stems, size-qualitative characteristics, materials of solid wood

7. CHARACTERISTICS OF DOUGLASIITRUNKS(PSEUDOTSUGA DOUGLASII) FOR SOLID WOOD MATERIALS PRODUCTION

Neno Trichkov, Daniel Koynov

University of Forestry, Sofia; Faculty of Forest Industry,

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The expansions of the raw material base for solid wood materials production are particularly importantin terms of wood deficit and increased consumption. The aim isto use solid wood materials production like replacementwood, which doesn’tdeteriorate the

performance of the finished products, as well as technical and economic production parameters. The douglasii (PseudotsugaDouglasii) is non popular wood species for Republic of Bulgaria. The studies for our country show that this tree species well adapted in these conditions, particularly in areas with high humidity.This gives reason to believe that this tree species is perspective for the production of solid wood materials.

This report presents the results of studies about the size and quality characteristics of douglasiistems. It is established the change in diameter, difference in diameter of the sectionsand bark thickness from the base to the top. It is determinate the presence,type and size of knots along the outer surface of the stem. The results are analyzed and made conclusions about the application ofdouglasii trunks for solid wood materials production.

Keywords: douglasii (PseudotsugaDouglasii), trunks, dimensional and quality characteristics, solid wood materials

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November 3, 2016 (Thursday)

I Session

Section II (Hall No 4)

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1. LASER WOOD CUTTING AND MODIFICATIONS IN ITS STRUCTURE

Zhivko Gochev

University of Forestry, Sofia, e-mail: zhivkog@yahoo.com

In this article a comparison between the specific work of cutting (*A*) with classical cutting instruments and specific energy of laser cutting (E_c) of wood – main parameters that are characterizing this process - is made. Both, empirically and theoretically the specific energy of laser cutting of different coniferous and deciduous tree species is defined. Using the methods of infrared (IR) spectroscopy and raster electron microscopy (REM) the modifications to the chemical composition and the microstructure of the wood in the area of the groove performed by a CO_2 laser beam have been studied.

Keywords: CO_2 laser, timber, laser cutting, specific energy, chemical destruction, microstructural changes

2. TRANSFORMATION OF TWO MUTUALLY CONNECTED MODELS FOR CONVECTIVE HEATING OF WOOD DETAILS BEFORE THEIR LACQUERING IN A FORM, SUITABLE FOR PROGRAMMING

Nencho Deliiski, Neno Trichkov, Zhivko Gochev, Dimitar Angelski
University of Forestry – Sofia, e-mails: deliiski@netbg.com,
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Using the explicit form of the finite-difference method, two suggested by the authors mutually connected mathematical models have been transformed in a form, suitable for programming. For the numerical solution of the transformed models, a software program has been prepared in the calculation environment of Visual Fortran Professional. With the help of the program, the 1D distribution of the temperature along the thicknesses of flat oak details and of their carrying transport rubber band with h_w = 16 mm, l_w = 0.6 m, u = 0.08 kg.kg^{-1}, h_B = 4 mm, b_B = 0.8 m, and t_0 = 20 ^{o}C, during unilateral convective heating for a period of 10 min by circulated hot air with temperature of 100 ^{o}C and velocity of 2 m·s^{-1}, 5 m·s^{-1}, and 8 m·s^{-1} in order to ensure suitable thermal conditions for the subsequent details' lacquering has been calculated, visualized and analyzed.

Keywords: oak details, unilateral convective heating, lacquering, carrying rubber band

3. APPLYING OF THE SOFTWARE PACKAGE TABLE CURVE 2D FOR COMPUTATION OF PROCESSING AIR MEDIUM TEMPERATURE DURING FREEZING IN A FREEZER AND DEFROSRING OF LOGS

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A mathematical description of the change in the processing air medium temperature T_m during freezing in a freezer and subsequent defrosting of logs using a software package Table Curve 2D v.5.01 has been suggested. This package allows for the selection of equations, which provides the best similarity between the calculated with them values of T_m during the log's

freezing and defrosting processes and the respective experimentally established data for T_m. The values of the coefficients in the selected equations have been determined in the work for the cases of decreasing in T_m in the range from about 20 ^oC to about –30 ^oC during separately 30 h freezing and of the following increasing in T_m until reaching of the room temperature during the subsequent 30 h or 50 h defrosting of 6 pine logs with diameter of 240 mm and length of 480 mm.

Key words: temperature, processing air medium, freezing, defrosting, pine logs, Table Curve

4. ADHESION OF GLUING AND PROTECTIVE-DECORATIVE FILMS TO WOOD

Panayot Panayotov

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This report experimentally examined adhesion of glues films formed by urea-formaldehyde: Prefere 4114, melamine-formaldehyde, epoxide resin and polyvinyl acetate polymer adhesive: Jowacoll 124. The Strength of adhesion was determined under the regulation BDS EN 302 and BDS EN 205. This report experimentally examined adhesion of finishing protective-decorative films formed with reactive acide-curing laquer, epoxide and acrylic paints. The Strength of adhesion of hard films was determined under the regulation BDS EN ISO 4624. For these aim are used test sample from beech wood.

Keywords: beech wood; gluing; adhesion; reactive glues, PVAc adhesives; finishing films

5. OPTIMIZATION OF THE PRODUCTION OF PAPER CELL STUFFING

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The optimization is established by the input of automatic equipment. A preliminary analysis is made of the possible effective decisions for the optimization through the automatization of particular operations in the separate stages of the technological process for

the production of paper cell stuffing. Specific automatic equipment is designed which ensures the achievement of optimal values of the technological indices.

Keywords: optimization, paper stuffing, automatic equipment

6. THE EFFECT OF INITIAL DUST CONCENTRATION OF WOOD DUST AND SPEED OF FILTRATION ON THE PROCESS OF FILTRATION WITH FABRIC FILTERS "FIBRETEX 1541"

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The study was conducted using filter fabric "Fibretex 1541". The fabric s resistance for different dust concentrations and at different speeds of filtered air was calculated.

Keywords: wood dust, dust concentration, filtration speed

November 4, 2016 (Friday)

II Session

Section I (Hall No 2)

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1. THE EFFECT OF ADHESIVE RATIO, HARDENER RATIO AND PRESS TEMPERATURE ON SOME TECHNOLOGICAL PROPERTIES OF WOOD BASED COMPOSITE PANELS

Mustafa Kucuktuvek

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This research investigated the effect of adhesive ratio, hardener ratio and press temperature on some technological properties of wood based composite panels. For this purpose, three layers wood based composite panels were produced from a mixture of scots pine (*Pinus sylvestris* L.*)* and black pine wood (*Pinus nigra* V.*)* particles at certain ratios utilizing urea formaldehyde (UF) adhesive. Five types of 18 mm thick panels with an average density of 0.66 g/cm^3 were manufactured with different wood particle ratios. All panels were tested for

physical properties density, moisture content, thickness swelling and mechanical properties modulus of rupture, modulus of elasticity, internal bond strength. The results have shown that adhesive ratio and press temperature were affected on the technological properties of the manufactured wood based composite panels.

Keywords: Composite Panel, Scots Pine wood, Black Pine wood, Urea formaldehyde, Industrial Design Engineering

2. CONTRIBUTION TO THE METHOD FOR DETERMINATION OF THE COMPRESSION RATIO OF WOOD PARTICLES IN COMPOSITE BOARDS

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A mathematical model (algorithm) and a nomogram for determination of the compression ratio in flat-pressed composites on the basis of urea-formaldehyde resin as a binding agent and addition of paraffin have been presented in the investigation.

By means of an algorithm (K_d), the compression ratio of the wood mat during its piezothermal treatment is taken into account.

As input data, following parameters are included in the algorithm for K_d: bulk densities of the input wood raw material and the composite board; the specific weights of the paraffin and the binding agent; the moisture content of the composite board; the percentage of resin and paraffin; the volumetric swelling of wood.

Keywords: compression ratio, composite board, wood component, wood mat

3. ASSESSMENT OF THE SUITABILITY OF LOCAL TREE SPECIES AS A RAW MATERIAL FOR COMPOSITE PARTICLEBOARDS

Nikolay Yosifov

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As a result of investigations of the effect of characteristics of tree species on the physicomechanical properties of composites made of wood particles, an algorithm and a diagram for determination of the suitability of the individual tree species as a raw material for composite particleboards (CPBs) have been proposed. By means of a measurement scale from 0

to 100, the suitability of the tree species as a raw material for CPBs may be easily determined with an accuracy sufficient for the practice.

Keywords: bulk density, specific weight, suitability coefficient, wood substance, degree of volumetric strain, saturation point of wood fibres, strength ratio

4. STUDY ON POSSIBILITY FOR UTILIZATION OF TECHNICAL, HYDROLYSIS, LIGNIN IN COMPOSITION OF MEDIUM DENSITY FIBERBOARD

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In the present report is presented study on possibility for utilization of hydrolysis lignin in composition of Medium Density Fiberboard. For the purpose of the study in laboratory conditions are produced boars with five percentage technical lignin in their composition and different quantity of phenol-formaldehyde resin. The main physical and mechanical properties of board are determined and they have been compared with those of boards without technical lignin. It is compared and visual appearance of MDF with and without technical lignin. On that base is accomplished analyze of the results with proper conclusions.

Keywords: Medium Density Fiberboard; technical, hydrolysis, lignin; Phenol-formaldehyde resin

5. INFLUENCE OF PARTICIPATION OF MASS FROM VINE TWIGS ON PHYSICAL AND MECHANICAL PROPERTIES OF FIBERBOARD

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The wood raw material is deficient both in Bulgaria and worldwide. In Bulgaria vine twigs are widespread lingo-cellulosic waste from agricultural production.

In the present report is presented study about influence on physical and mechanical properties of fiberboards at inclusion of their composition of mass from vine twigs.

Vine twigs are refined by Defibrator laboratory mill. For the purpose of the study are produced fiberboards in laboratory conditions with inclusion of mass from vine twigs in content from zero to twenty percent in increments of five percent. The main physical and mechanical properties of boards are determined. On that base is conducted analyze and proper conclusions are made.

Keywords: fiberboard, lingo-cellulosic waste, vine twigs

6. INVESTIGATION OF SOME PROPERTIES OF WOOD-POLYMER MATERIAL BASED ON MODIFIED UREA-FORMALDEHYDE RESIN

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Wood processing is related to the release of large amounts of waste, such as wood dust, sawdust and others. In order to their utilization perspective direction is the wood-polymer materials production, which can be applied in many industries.

In the present study some physical and mechanical properties of wood-polymer material based on modified urea-formaldehyde resin with chlorine-containing polymers were investigated. The obtained results showed that the increase of chlorinated paraffin content leads to an improvement in all investigated physical and mechanical properties.

Keywords: wood-polymer material, urea-formaldehyde resin, chlorine-containing polymers

November 4, 2016 (Friday)

II Session

Section II (Hall No 4)

1. STUDY ON THE POWER – ENERGETIC INDICATORS OF A UNIVERSAL MILLING MACHINE

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Experimental studies during milling of solid wood were carried out. The current study was performed at the Laboratory of Woodworking machinery, University of Forestry, Sofia. The measurements were carried out using universal milling machine FD – 3 (ZDM – Plovdiv). The correlation between fundamental factors influencing the milling process and target functions, such as cutting force and power, specific cutting work, specific power consumption have been investigated. On the basis of the analysis of the obtained results, practical recommendations have been proposed.

Keywords: universal milling machine, cutting power, cutting force, specific cutting work, wood milling

2. STUDY OF THE PROCESSES IN LONGITUDINAL MILLING OF SOLID WOOD

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In the current study factors, influencing the wood milling process of solid wood have been investigated. Changes in some parameters related to the milling process, depending on the cutting speed, the feed speed and the thickness of the cutout layer have been evaluated. The

measurements were carried out using wood details from beech (*Fagus sylvatica* L.) and Scots pine (*Pinus sylvestris* L.) processed with different cutting tools. The changes of the assessed parameters were graphically presented.

Keywords: wood milling, solid wood, cutting modes, wood milling tools

3. RESEARCH ON THE QUALITY OF PROCESSING WITH A VERTICAL LOG BANDSAW

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Experimental studies concerning the quality of processing when cutting logs were performed. The experiments were carried out in the manufacturing conditions at the Experimental and Training Forest Ranges in Yundola. As a work station a vertical bandsaw with log carriage was used. The correlation between the main factors which affect the process of cutting and appropriate quality indicators was analyzed. The results were compared with those obtained with other similar logs bandsaw's studies. Practical recommendations were proposed.

Keywords: bandsaw with log carriage, logs cutting, surface roughness, quality of processing

4. RESEARCH ON THE QUALITY OF PROCESSING WITH A HORIZONTAL BANDSAW

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Experimental studies related to the influence of some factors over the quality of the resulting lumber were carried out. The venue of the research is the manufacturing conditions in Experimental and Training Forest Ranges in Barziya. As a work station a horizontal bandsaw

for logs *Arsov 90 Ltd.* (Bulgaria) was used. The results were analyzed and compared to some earlier obtained with other machines of this type. Some recommendations for a more efficient usage of this type machines were proposed.

Keywords: horizontal bandsaw, logs cutting, surface roughness, quality of processing

5. ENERGETIC INDICATORS ANALYSIS OF FOREST MILLING MACHINES FOR SITE PREPARATION

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In this paper are presented the results from conducted survey of specialized milling aggregate PT-400 for site preparation of poplar clearings. Experimental research of multifunctional forest milling machine FAE 300/S for crushing stumps, shredding shrubs and trees and deep milling of the soil was performed for the purpose of the study. As a result of this research the relative fuel and energy consumption of the milling aggregate under different operating conditions and variable modes of the milling process are established. Functional and graphic-analytical dependences based on the results are delivered. These dependences show the expression of power and energetic indicators of the milling unit depending on technology and kinematic operating mode. The received results could be applied in science; also they have applications in the theory and the operation of the forest milling machines for land preparation.

Keywords: milling, mulching, fuel consumption, power, forest clearings

6. TECHNOLOGICAL RESEARCH OF MECHANIZED SITE PREPARATION FOR AFFORESTATION OF FOREST LAND

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The establishment of forest plantations on inclined and stony terrains and eroded soils requires preliminary preparation of the areas and the relevants oil preparation. Depending on the peculiarities and the character of the terrain, on the technical means and organization of work,

different technologicals chemes and variations can be applied. Mechanical technologies off erbigopp ortunities for implementation of the seafforestation activities. Favorable soil and climatic environment can be created by them, which makes the mstrong factor for the sustainable development, growth and productivity of the plantations. In the present work, investigation on the technological processes at mechanical soil preparation by bulldozer and soilscarifierunits was performed. Operative photos of the studied processes were made. Expenditures for the operations by quantity and asvalues were determined. Assessment and comparative analysis on the investigated technologies were performed. The results of this study can be applied for the labour and technical norms in soil preparation.

Keywords: soil preparation, bulldozers, scarifiers

November 4, 2016 (Friday)

III Session

Section I (Hall No 2)

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1. DETERMINATING THE CUTTING FORCES FOR VARIOUS CUTTERS OF THE CUTTING TOOL ON A VERTICAL MILLING MACHINE WITH A BOTTOM-POSITIONED SPINDLE

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In the proposed workis presented a study of certain factors by which can be determined thesize of the cutting forces of the individual teeth of the cutting tool on the milling machine. It is also specified and justified the reason for the different size of these forces. This is the different radius of cutting foreach of the blades of the cutting tool. Also discussed and analyzed are the reasons leading to the difference in radii of the cutting blades. Assuch are distinguished: sharpening errors; radial runout of the spindle; looseness in the fitting between the spindle and cutting tool; precession almovement of the cutting tool. It is proposed a reasonable hypothesis to define the size of these forces for a cutter with fourincisors with a theoretically calculated, momentary maximum cutting force. The survey results are applicable to conduct extensive

research on the strengthsizing, aswellasthetorsional vibration of the spindlecaused by the cutting mechanism on the wood milling machine.

Keywords: milling machines, cutting forces

2. DETERMINATING THE CUTTING FORCES IN CIRCULAR CUTTING MACHINES WITH REGARD TO THE EFFECT IN THE RADIAL BEATING OF THE CUTTING MECHANISM

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The cutting forcesincircular cutting machines have been determined by calculating the cumulative radial runout according to known normative documents about the cutting mechanism. The radial runout in this mechan is misseenas periodically zooming in and out of the cutting body to the workpiece. As a result, the speed of this movement is summed with the feedrate. It is found, that its speed is comparable to the feedrate, and it is approximately 25% of its size. The Cutting forces are also equally greater than the traditionally calculated one sand within one full rotation of the cutting tool, they are changed in anasymmetric cycle.

Keywords: Circular cuttingmachines, cutting forces, radial runout

3. INFLUENCE OF THE PROCESSED MATERIAL ON THE SOUND PRESSURE LEVEL GENERATED BY SLIDING TABLE SAWS

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The aim of the experimental study was to evaluate the sound pressure level, L_{pA}, measured at the workplace, generated by sliding table saw, type VA-6 (Altendorf – Germany). The sound level, generated during processing of particle boards, oriented strand boards (OSB) and plywood boards was measured. The influence of the height of the cutting tool above the processed material on the sound pressure level was assessed as well. On the basis of the results graphical relationships between the examined parameters and the changes in the sound pressure

level have been derived. The measurements were carried out according to BDS EN ISO 3744 and BDS ISO 7960.

Keywords: noise, sound emission, sliding table saws, particle boards, OSB, plywood boards

4. BUNKER FOR STORAGE OF CHIP WOOD

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The aim of the current study was to determine the technical characteristics of a cylindrical bunker with conus part for fine wood waste storage, On the basis of the mechanics of the bulk material a theoretical model for evaluation of the angle of the slope and the height of the conus has been derived. Through this model we aim to achieve an even distribution of the tension at the bottom of the bunker.

Keywords: bunker, wood waste storage, bulk material

5. WORKING SPEEDS FOR SUBSOILING WITH SPECIALIZED FORESTRY ROTOVATORS

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In this paper are presented results from survey of different working speeds forestry aggregate PT-400 with multifunctional forestry tiller FAE 300/S on a site preparation for establishment of poplar plantations. Experimental study on the variety working speeds of the machine for subsoiling to 50 cm, on alluvial, medium-heavy and moist soil is conducted. The study was carried out in poplar rooted slash on alluvial soils along the river Danube. As a result, the basic quality indicators, relative fuel consumption, and productivity of the machine at different working speeds were established. Dependencies of the quality, fuel economy and performance of the machine, depending on the operating speed are displayed from the obtained results. Based on data received and accepted economic and technological criteria to optimize

the operating parameters of forestry machine-tractor aggregates were defined optimal working speeds of research tiller.

Keywords: soil preparation, forestry tillers, fuel consumption, performance, optimization

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November 4, 2016 (Friday)

III Session

Section II (Hall No4)

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1. SCREW WITH DRAWAL RESISTANCE OF COMPOSITE WOOD-BASED PANELS (PART I)

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The research presented in the paper includes the study of screw withdrawal resistance of composite wood-based panels for use in construction.

Three experimental wood composite panels were made by combining particleboards and peeled beech, black pine and poplar veneers with thickness of 3,2 mm. The core layer of the composite panels was made of single-layer particleboard with thickness of 16 mm, which was overlaid on both sides with the veneers.

Water-soluble phenol-formaldehyde resin was used for particle bonding and veneering.

The results from the research showed that the different veneer species used for particleboard overlay significantly impact the screw withdrawal resistance perpendicular to the plain of the composite panels.

According to the obtained values of the screw withdrawal resistance, composite panels can be used in construction.

Keywords: composite wood-based panels, particleboard, veneer, beech, black pine, poplar, phenol formaldehyde resin, screw withdrawal resistance

2. CORRELATION BETWEEN THE ADHESION SURFACE AREA AND BENDING STRENGTH AND STIFFNESS OF GLUED JOINTS OF FRAME STRUCTURAL ELEMENTS MADE OF PLYWOOD

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In this study are given the results from investigation on correlation between adhesive area and bending strength and stiffness coefficient of glued corner joints of structural elements made of beech veneer plywood. The strength and stiffness under compression bending test have been determined for five end corner joints (L-shape) and four middle corner joints (T-shape). It was established strong correlation between the size of the surface area of adhesion and bending strength of the joints and significant correlation between the size of the surface area of adhesion and stiffness coefficient of the joints.

It is recommended that the comparative data of bending strength and stiffness of corner joints made of plywood has to be taken into consideration when selecting the type of joints in the construction of furniture made of plywood.

Keywords: plywood, joints, surface area of adhesion, correlation, bending strength, stiffness

3. NORMS FOR DESTRUCTIVE BENDING MOMENTS OF END CORNER MORTISE AND TENON JOINTS OF FRAME STRUCTURAL ELEMENTS MADE OF SOLID SPRUCE WOOD WITH A CROSS SECTION OF 50 x 30 mm

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In the presented research are established the normative values for the destructive bending moments of the most common used end corner mortise and tenon joints of frame

structural elements made of solid spruce wood with a cross section of 50 x 30 mm in arm opening and arm compression bending load.

The normative values of the tested end corner joints follow the same dependencies as the experimental data.

The normative values for the destructive bending moments of the joints in arm opening bending test are at an average 71,6 % from the experimentally established values, and in the arm compression bending test – 72,0 %.

The established normative values for the destructive bending moments of the end corner mortise and tenon joints of frame structural elements made of solid spruce wood with a cross section of 50 x 30 mm can be used for the needs of the preventive quality control of furniture production as well as for the strength design of the sitting furniture, tables and beds. For that purpose it is recommended to draw up these normative values as a normative document which to use in the inner factory control of furniture quality.

Keywords: end corner joints of frame structural elements, destructive bending moments, solid spruce wood, norms for destructive bending moments of corner joints

4. BENDING STRENGHT AND STIFFNESS COEFFICIENTS OF JOINTS BY STAPLES IN SKELETON UPHOLSTERED FURNITURE

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The present study is a result of laboratory testing of joints by staples loaded under compression bending. The aim of this study is to determine the bending strength and stiffness coefficients by investigating the influence of the materials, glue and strengthening through triangular piece of staples joints. The results for bending strength and stiffness coefficients are useful in the selection of material, number of connection elements in design and modeling of skeletons of upholstered furniture.

Keywords: upholstered furniture, staples joints, bending strenght, stiffness coefficients

5. STATIC ANALYSIS OF A UPHOLSTERED FURNITURE SKELETON WITH STAPLE CORNER JOINTS BY FEM

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Staple corner joints are the most commonly used joints in the skeletons of upholstered furniture and directly affect their deformation behaviour, strength, durability and safety of use.

3D geometric model of skeleton for upholstered furniture with staple corner joints is created using CAD system Autodesk Inventor Pro®. A linear static analysis is carried out with CAE system Autodesk Simulation Mechanical® by the method of finite elements (FEM) simulating the loading of skeleton. The analysis was performed with regard to laboratory derived coefficients of rotational stiffness of used staple corner joints. The orthotropic material characteristics of pine solid wood (Pinus sylvestris L.) for the rails and particle boards (PB) for the side plates are considered in the analysis. As a results the distribution of stresses (von Misses and normal), displacements and equivalent strains of upholstered furniture skeleton with staple corner joints are presented and analyzed. Results will surv for optimization of design of upholstered furniture with staple joints.

Keywords: upholstered furniture, skeleton, staple joints, static analysis, stresses, FEM

6. SEVERAL OPTIMIZATION PROBLEMS RELATED OPENING MATERIALS FOR THE FURNITURE INDUSTRY

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Practical problems associated with cutting materials for furniture production are discussed. The corresponding mathematical models are formulated. Their decisions based on the knowledge embodied in the mathematical disciplines, that are taught to the students of speciality Wood Technology, are given.

Keywords: Education of Mathematics, Mathematical modelling, linear optimization

November 4, 2016 (Friday)

IV Session

Section I (Hall No2)

1. CULTIVATED SUSTAINABLE PRODUCT AND SPATIAL DESIGN

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Wood is one of the most widely spread building and manufacturing materials, which has been used from antiquity till nowadays. There are many examples for the application of timber in contemporary design, however, some of the most attractive ones are those related to the development of sustainable design. Growing product and spatial design by modellingconstruction and shape during plant growth is a method experimented in for a long time.In contemporary design these explorations are motivated and justified not by the desire to rule over nature, but by the ambition to take care for it and use resources in a sustainable manner.

Key words: sustainable design, cultivated design, eco-friendly design, growing design

2. THE METHOD OF CONTRAST IN INTERIOR FURNITURE DESIGN

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Contrast is a basic method in compositional shape forming. Its invariants, such as the materialistic contrast (between organic and synthetic), contextual contrast, dimensional, plastic, sensory contrast, etc., make the creation of a valuable designer and cultural product possible. The paper presents samples of classic designer furniture and modern innovations to prove the thesis that the method of contrast has the power to bond the physical features of a product to the emotional contact between it and its user, and thereby to unveil successfully the product properties.

Keywords: design, form, contrast, interior, furniture

3. SIMPLICITY OF FORM – A BASIC CRITERION IN RECYCLED PAPER INTERIOR FURNITURE DESIGN

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"|Less is more"- the credo of Mies Van der Rohe which is an illustration of the idea of simplicity. Achieving simplicity does not mean to think of it as a prerequisite in the design of utilitarian objects but as achieving that feature which provides quick and easy perception of form and vivid memory. Simplicity tends to be a prerequisite of creating a module, multifunctionality, technology and a possibility for the realization of low prime cost through simple technical means. Presented are samples of furniture from recycled paper meeting the standards of simplicity of form as well as the methods of their realization.

Keywords: design, form, simplicity, sustainable, recycled paper

4. OPTICAL ILLUSIONS IN INTERIOR DESIGN

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When designing the interior environment it is necessary to consider optical illusions that arise and affect both the visual spatial perception and psycho-emotional state of the user. The objective of this report is to present examples and principal mechanisms, through which an interior imperfection can be compensated and converted into a rational, functional and a esthetically pleasing solution. This can be achieved by using a specific color tones and shades, horizontal and vertical lines, the effect of the lighting and the correct position in goflighting fixtures, polished ormatte surfaces and others.

Keywords: optical illusions, interior design, impact, lighting JEL: I19

5. RATTAN FURNITURE: TEMPTATION FOR MODERN DESIGN

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Rattan, an exclusively lightweight and exotic material, is a symbol of Asia, of garden terraces and sea hotels. 20th C designers have always been seduced by this material because it is readily combined with metal and wood. It has also been imitated successfully with plastics, used for garden furniture because they are weather-proof. Today's designers are inspired by the sculptural potential of rattan both as a structural material and surface-forming material on the large parts of seating furniture, such as seats and backrests. They do not limit themselves only to garden furniture, but take advantage of this material by using it for the living room and other areas of the home. In the paper, designer works will be analyzed from different periods of the 20th and 21st C, in order to discover the specific features of this material,that make it so attractive.

Key words: rattan, design, form-building, structure

6. DESIGNING THE FUTURE

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In the recent past during the 60s and 70s main form of relationship between design and the future it was the design planning and forecastingbased on certain public ideal. Today, current and most closely tied to leading social trends in society to rethink the aggressive forms of globalization to a more friendly and linked to national traditions practices found in the publications of specialists specific term "glocalization" is a so-called soft design (soft design) . Liguidnoto or unstable and rapidly changing society requires an adequate and responsible for these characteristics design. The mild, not only shaping design more fully reflect trending and new "design thinking" come to replace existing parallel and complementary forms of "industrial thinking" and "commercial" or business thinking. Here plays essential role science and technical development. Since the beginning of the new millennium to date have created more than 30,000 new materials, which are largely still waiting to be implemented in new products and goods.

7. DESIGN - ART OR SCIENCE?

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Without a claim of complete exhaustive report raises controversial issues ripe its clarification and solution. They have been for many years by the appearance of design, even under the least optimistic hypothesis for its origin, yet this issue has not found its final response not only in Bulgaria but also worldwide. The design has both the scars of art, closely related to architecture and other plastic arts, as well as basic technical, engineering characteristics. Design is taught in higher art schools and in a number of technical universities, as recent interest in him has even humanitarian-oriented universities. Primary means of expression is still drawing, although younger designers prefer the ubiquitous computer and often shy even scrawled a feature with a simple pencil. Prototyping revolutionary also has entered the field of digital technology. At the same time denying the existence of the theory of design as well as its scientific character designer for science develops regardless of the skepticism of some of his detractors.

Keywords: Art design, design Science

November 4, 2016 (Friday)

IV Session

Section II (Hall No4)

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1. TECHNICAL AND ECONOMICAL CHARACTERISTICS OF PELLETS PRODUCTION IN WOODWORKING AND FURNITURE PRODUCING ENTERPRISES IN BULGARIA

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During the last few years production of pellets significantly increase its actuality in practice of woodworking and furniture producing enterprises in Republic of Bulgaria. Every producer tries to utilize his waste appeared during the production process and in that way to improve enterprise’s efficient energy use and economic efficiency. Specialized literature and overall information sources are filled of information about different types of pellet devices,

economic and technical parameters, recommendations for optimal capacity, etc.In the same time remains the actuality of researches that reveal economic efficiency derived at different rates of wooden waste. The problem needs to be resolved in the context of different enterprise scale and economic environment in Bulgaria.

Keywords: pellets, installation, investments, efficiency

2. STRATEGIC PERSPECTIVES OF BULGARIAN PLYWOOD PRODUCTION AND TRADE

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Manufacturing of plywood is one of the most important production lines and value adding alternatives in woodworking. Production volumes of plywood increase in all over the world and especially in Asia. These new circumstances face European producers to great competition. In such a market environment producers can go better, extracting the best they can and providing much bigger quality or go downward to the slope of slow harmful dropping out of the market. Bulgaria stands on the crossroad- to improve its plywood production through investments and quality, or to lose its producers waiting until their doors get closed. All these facts define strategic analyses that can outline the future improvement of Bulgarian plywood production like a question of present interest for woodworking industry.

Keywords: plywood, Bulgaria, strategies, analyses, matrices

3. COMPETITIVENESS OF WOODWORKING AND FURNITURE INDUSTRIES IN SOUTHEASTERN EUROPEAN COUNTRIES- TENDENCIES AND CHALLENGES

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Today’s economic and social circumstances face Europe with probably the greatest threats after the global financial crisis in 2008-2011. Great deal of refugees, migrants etc. invade some of the most developed countries as well as some of the poorest on the continent. National budgets suffer under the constant pressure of social costs. Subsidies for business tend

to decrease. Competition in all sectors of the economy has risen. In this environment the competitiveness of some of the poorest and most vulnerable countries in European Union is the key factor for improvement and wealth increment. Bulgaria and Romania so far go together through all the difficulties during their integration and economic development in the union. Woodworking and furniture industries are of the key economic sectors in both countries. The competitiveness of these sectors would reveal the way to sustainability and efficient strategies for improvement. This survey aims to reveal and summarize main indicators for competitiveness based on production, and trade flows, and to outline the future strategies for improvement.

Keywords: competiveness, woodworking, furniture production, Southeastern Europe

4. DESIGN THINKING AS A INNOVATION TOOL IN ORGANIZATION

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The popularity of design thinking in the last few years is part of a wider debate about the role of design in business, and its place in business education. The reason for the surge in interest of the 'methodology' of design, is because of design potential for enabling business – and cultural – transformation, through the application of design processes to other areas. Many famous brandsare experimenting with ways to embed design thinking in their organizational processes, and in using it as a company-wide innovation tool.

Keywords: design thinking, interdisciplinary approach, innovations, organizational processes.

5. CONCEPTS IN THE RESEARCH APPROACH OF CONSUMER ATTITUDES TO INNOVATIVE PACKAGING SOLUTIONS

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The creation of a successful package should be based along with all other processes of conducting serious research on the packaging and its potential buyers /. This innovation cycle in the package is similar to innovation cycles used for the primary product. The data in the study were collected from two sources - primary and secondary, although the latter are significant. In business practices in Bulgaria, research related to the primary stages of the aforementioned cycles often overlooked or completely omitted. The main purpose of this document is to bring more light into this deficiency area. Material presents a theoretical concept.

Keywords: research design, packaging innovation cycle, consumer attitudes

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November 4, 2016 (Friday)

V Session

Section I (Hall No2)

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1. VKHUTEMAS SCHOOL AND ITS CURRENCY TO CONTEMPORARY DESIGN TRAINING

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It is well known that two design schools are given fundamental base to the knowledge and practice of modern design education: Bauhaus (1919) in Germany and Vkhutemas (1920) in Russia.About Bauhaus practice there are a significant volume of publications (articles, studies and monographs) issued in most European languages. The practice and ideas of generations teachers manifested in Vkhutemas are less reflected, discussed and analyzed in Western historiography (history and theory of design). Even in the Soviet Union publications until 1989 related to the history, education and teachers associated with him in Vkhutemas are insufficient. It's researched the place and role of Vkhutemas as in the formation and evolution of design in Russia and its close links and relationships with similar processes in development of Western design. This publication contains general information on the history and creative practice of Vkhutemas and focuses ontheir legacy at the beginning of the 21st century, and influence on design training today.

Keywords: Vkhutemas, design methodology, design in Russia

2. APPLICATIONOF E-LEARNING PLATFORM BLACK BOARD LEARN IN THE FACULTY OF FOREST INDUSTRY

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Results from the use of e-learning platform: An analysis is made for assessment of students and teachers in the University of Forestry from the work with e-learning platform BlackboardLearn and its influence on the results.

Key words: e-learning, innovative learning technologies, interactive learning, quality of e-learning

3. SYSTEMATIC APPROACH INPLEMENTATION IN DESIGN EDUCATION

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One of the main ways of exploring a system is its modeling, i.e. abstract reproduction of its structure, theoretical, conditional differentiation of its elements. A major problem with the approach to the modeling of design-process of a particular product as a complex system is the establishment of its composition, analyzing, establishing the role each element plays in the structure, and the nature of relationships between these elements.

To facilitate an understanding of the methodology of the design, and for the sake of clarity, are considered specific examples. Initially they analyzed simplified somewhat conditional schemes of design and gradually proceed to the more complex design tasks.

This report willpresented actual results achieved by the students of "Engineering Design", Bachelor of Science in the 6th semester. The methodology is implemented in the practical lessons in "Design of residential interior and furnishings".

Keywords: systematic approach, design methods, education experiment

4. USING MAXIMA TO TEACH IN MATHEMATICAL COURSES AT THE UNIVERSITY OF FORESTRY

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A teaching experience of enriching the content of mathematical courses with ideas and interesting mathematical problems is presented. Mathematical courses have become more comprehensible since the software Maxima was applied in solving problems and presenting graphics of functions. Now, Maxima is used to being considered as a useful tool when teaching Mathematics parts 1 and 2 and Mathematical methods of technical sciences (engineering). This paper contains some specific mathematical problems and a method for using Maxima when teaching the simplex method.

Keywords: mathematics education, mathematical analysis, linear optimization

5. EXPERIMENTAL APPLICATION OF METHOD "SKAMPER (ZOPIPPP)» IN EDUCATION PROCESS

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This paper consider experimental application of the method "SKAMPER (ZOPIPPP)" in the learning process of students in "Engineering Design". The method "SKAMPER (ZOPIPPP)" belongs to heuristic methods that use textual and verbal techniques to stimulate creative thinking. The application of the method is performed in the laboratory exercises in discipline "Innovative and strategic design" with students from "Master" degree in two consecutive years. The initial conditions, temporal and thematic limitations in conducting the experiment are exposed. Based on the results obtained analyzing the application of the method in the learning process of students with the aim of creating new and improving existing products.

Keywords: design education, heuristic methods, design process, creative thinking