

UDC 674

ISSN 1857-8381 (print)  
ISSN 1857-9140 (on-line)  
INDEXED in EBSCO's research databases  
**EBSCO**



**SS. CYRIL AND METHODIUS UNIVERSITY  
IN SKOPJE  
FACULTY OF DESIGN AND TECHNOLOGIES  
OF FURNITURE AND INTERIOR – SKOPJE  
REPUBLIC OF NORTH MACEDONIA**



# **WOOD, DESIGN & TECHNOLOGY**

*JOURNAL OF*

*WOOD SCIENCE, DESIGN AND TECHNOLOGY*

**Vol. 10, No 1, Pg. 1-114  
Skopje, 2021**

## **WOOD, DESIGN & TECHNOLOGY**

Scientific, Professional and Information Journal of Wood Science, Design and Technology

Vol. 10, No.1 / Pg. 1- 114, Skopje, 2021

**UDC** 674

**ISSN** 1857-8381(print)

**ISSN** 1857-9140(on-line)

**INDEXED in EBSCO's research databases**

### **Published by**

Ss. Cyril and Methodius University, Skopje, North Macedonia

Faculty of Design and Technologies of Furniture and Interior, Skopje

### **Dean**

Goran ZLATESKI, Ph.D.

### **Editor in chief**

Goran ZLATESKI, Ph.D. Faculty of Design and Technologies of Furniture and Interior, Skopje, North Macedonia

### **Editors:**

Borche ILIEV, Ph.D. Faculty of Design and Technologies of Furniture and Interior – Skopje, North Macedonia

Vladimir KARANAKOV, Ph.D. Faculty of Design and Technologies of Furniture and Interior, Skopje, North Macedonia

Goran ZLATESKI, Ph.D. Faculty of Design and Technologies of Furniture and Interior, Skopje, North Macedonia

### **Editorial Board:**

Remy MARCHAL, LaBoMaP / A&M ParisTech Rue Porte de Paris 71250 Cluny, France

Jan SEDLIACIK, Faculty of Wood Sciences and Technology, Technical University in Zvolen, T.G.Masasyka 24 96053 Zvolen, Slovakia

Ottaviano ALLEGRETTI, CNR IVALSA - Timber and Trees Institute via Biasi 75 38010, San Michele all'Adige (TN), Italy

Zeljko GORISEK, Department of Wood Science and Technology, Biotechnical faculty, University of Ljubljana, Slovenija

Mladen BREZOVIC, University of Zagreb, Faculty of Forestry, Croatia

Julija MIHAJLOVA DIMITROVA, University of Forestry, Faculty of Forest Industry, Sofia, Bulgaria

Anatolii CHUBINSKII, Saint-Petersburg State Forest Technical University, Faculty of Mechanical Technology of Wood, Russia

Atif HODZIC, University of Bihac, Faculty of Technical Engineering, Bosnia and Herzegovina

Sergej MEDVED, University of Ljubljana, Biotechnical Faculty, Slovenija

Alan ANTONOVIC, University of Zagreb, Faculty of Forestry, Croatia

Mitko NACEVSKI, Ss. Cyril and Methodius University, Skopje, Faculty of Design and Technologies of Furniture and Interior, Skopje, North Macedonia

Branko RABADJISKI, Ss. Cyril and Methodius University, Skopje, Faculty of Design and Technologies of Furniture and Interior, Skopje, North Macedonia

Konstantin BAHCHEVANDJIEV, Ss. Cyril and Methodius University, Skopje, Faculty of Design and Technologies of Furniture and Interior, Skopje, North Macedonia

**Language Editor:** Marija AVSHAR

### **Editorial Office :**

Ss Cyril and Methodius University in Skopje

Faculty of Design and Technologies of Furniture and Interior – Skopje

Ul. 16 Makedonska Brigada br. 3, PO box 223, 1000 Skopje, North Macedonia

Phone: +389(2)6154590; Fax: +389(2)6154590

E – mail: wood.journal@fdtme.ukim.edu.mk

Website: [http://www.fdtme.ukim.edu.mk/en/wood\\_journal/index.html](http://www.fdtme.ukim.edu.mk/en/wood_journal/index.html)

All rights reserved

©2021 Faculty of Design and Technologies of Furniture and Interior, Skopje, North Macedonia

No part of the material protected by this copyright notice may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying recording or by any information storage and retrieval system, without written permission from the copyright holder.

Printed by Evropa 92 – Kocani, North Macedonia

# P r e f a c e

Dear Colleagues,

I am pleased to introduce the Vol. 10, No1, 2021 of the International Scientific Journal “Wood, Design & Technology” published by the Ss. Cyril and Methodius University, Faculty of Design and Technologies of Furniture and Interior in Skopje, the Republic of North Macedonia. The journal includes all new theoretical and experimental findings in the fields of wood technology, furniture and interior design or any closely related fields. Its mission is to provide an international forum for interdisciplinary scientific communication.

We are very satisfied with the interest that we achieved in the previous nine volumes; the number of articles we received for review was steadily growing. It is our great pleasure to bring a new journal into the field of wood researching. Despite this challenge, this journal aims to provide readers worldwide with high quality peer-reviewed articles on a wide variety of issues related to wood, design and technology.

After conducting blind reviews as required, 13 papers were selected to be published in this volume. Each of them falls within the journal’s scope and makes a significant contribution to international research.

The papers herein describe and provide experimental results from the various techniques used in wood technology, wood construction and furniture design, such as:

logs’ freezing process; determination of some basic parameters at wood particles movement along the helical area of screw mechanisms; the potentials of workshops as an informal tool in architectural design education; as well as the learning-by-building method, Macedonian wood industry in pandemic conditions; shared children room design that meets both children’s psychological and physiological needs; analyses of the state of Macedonian forests wood processing industry and the market of industrial roundwood; state of school chairs in elementary schools and whether the chairs are with the requested dimensions of the EN 1729-1:2006 standard; analyses of the resistance of lacquered wood surfaces to abrasion; understanding of machining factors as foundation for predicting the behavior of the material in the machining process; decorative properties of wood surface finishing with oils and hydro oils; dimensional stability of experimental multiplex plywood reinforced with cotton based prepreg; analysis of the relation between the quality grade of beech sawlogs and the quality of milled lumber; methods and results of conservation-restoration treatments on the 18<sup>th</sup> century commode.

I would like to thank our readers and authors for their continuing interest in the Journal “Wood, Design & Technology”, and each and every member of our Editorial and Review Boards for their hard work and dedication, which made it possible to bring out one more issue of this journal to the multidisciplinary international audience from wood sector.

Best regards,

Prof. Goran Zlateski  
Editor-in-Chief  
International Journal “Wood, Design & Technology”  
Ss. Cyril and Methodius University – Skopje, North Macedonia  
Faculty of Design and Technologies of Furniture and Interior in Skopje

Go to the website for information about journal  
“Wood, Design & Technology”:  
[http://www.fdtme.ukim.edu.mk/en/wood\\_journal/index.html](http://www.fdtme.ukim.edu.mk/en/wood_journal/index.html)

## CONTENTS

Natalia Tumbarkova, Nencho Deliiski EXPERIMENTAL RESEARCH OF SOME PARAMETERS OF THE LOGS' FREEZING PROCESS .....	1
Konstantin Marinov A THEORETICAL ANALYSIS OF FORESTRY AND WOOD PROCESSING MACHINES WITH SCREW DEVICES .....	8
Bojan Karanakov, Jovan Ivanovski PETITE TIMBER STRUCTURES IN/AND ARCHITECTURAL DESIGN EDUCATION .....	14
Mira Stankevik Shumanska, Živka Meloska, Ivana Antovska MACEDONIAN WOOD INDUSTRY IN PANDEMIC CONDITIONS	
Mira Stankevik Shumanska, Živka Meloska, Ivana Antovska MACEDONIAN WOOD INDUSTRY IN PANDEMIC CONDITIONS .....	25
Zejnlabedin Aziri, Umnije Aziri SHARED BEDROOM FURNITURE DESIGN FOR SIBLINGS OF OPPOSITE GENDERS .....	32
Rostislav Berezjuk, Mat j Jav rek, Dalibor Šafa ik Mira Stankevik Shumanska, Goran Zlateski ANALYSIS OF WOOD REMOVALS AND CONSUMPTION IN NORTH MACEDONIA IN THE PERIOD 2015-2020 .....	40
Elena Jevtoska, Gjorgji Gruevski, Ivana Antovska, Marija Krstev ANALYSIS OF SCHOOL CHAIRS DIMENSIONS IN PRIMARY SCHOOLS IN THE MUNICIPALITY OF AERODROM – SKOPJE .....	52
Anastasija Temelkova RESISTANCE OF WOODEN LACQUERED SURFACE TO ABRASION .....	62
Marija Djurkovi , Gradimir Danon ANALYSES AND VALIDATION OF CUTTING FORCES PREDICTION MODELS IN WOOD MACHINING.....	69
Tanja Palija, Igor Džin i , Ivan Vu i evi DECORATIVE PROPERTIES OF WOOD SURFACE FINISHING WITH OILS AND HYDRO OILS .....	83
Violeta Jakimovska Popovska, Borche Iliev, Mitko Nacevski DIMENSIONAL STABILITY OF MULTIPLEX PLYWOOD WITH MAINLY UNIDIRECTIONAL GRAIN ORIENTATION .....	91
Ana Marija Stamenkoska, Branko Rabadziski, Goran Zlateski INFLUENCE OF BEECH SAWLOGS ( <i>FAGUS SYLVATICA</i> L.) QUALITY ON MILLED LUMBER QUALITY .....	100
Joško Bogdanovi CONSERVATION-RESTORATION TREATMENTS ON THE EARLY 18 <sup>TH</sup> CENTURY COMMODE FROM THE SUMMER VILLA GU ETI -GOZZE NEAR DUBROVNIK .....	106