

Transilvania University of Braşov
Faculty of Wood Engineering
Department of Wood Processing and Design of Wood Products

PROPOSED TOPIC FOR DOCTORAL STUDIES –ADMISSION CONTEST 2019

Doctoral field: **FOREST ENGINEERING**

Doctoral coordinator: **Prof.dr. Maria Cristina TIMAR**

Topic 1:

Ageing of wood surfaces finished with transparent coatings in indoors conditions: effects and innovative solutions for stabilisation

Aspects to be considered within the research project:

- Ageing of materials: factors, effects
- Colour of unfinished wood surfaces (wood species relevant for modern furniture manufacturing) and modification under the action of the main ageing factors (light and temperature);
- Influence of ageing factors on the properties of transparent coating films (transparent, colourless finishing materials relevant for present/modern technologies);
- Influence of ageing factors on the finished wood surfaces (transparent, natural colour);
- Innovative solutions for stabilising the colour of wood surfaces finished with transparent, colourless coating materials.

Minimal requirements for the admission examination (ORAL):

- Wood species relevant for furniture manufacturing/ interior design
- Colour theory – the CIE Lab system , measurement of colour
- Determination of light fastness (resistance to light) – accelerated testing
- Current trends in the international research referring to ageing /colour stabilisation of wood surfaces (for indoors applicatios)

Recommended reading :

1. Rowell R. (editor) : Handbook of *wood* chemistry and wood composites, 2013 (relevant chsapters)
2. Williams S. Finishing of wood – book chapter – available at:
https://www.fpl.fs.fed.us/documnts/fplgtr/fplgtr190/chapter_16.pdf
3. Timar M.C. Ameliorarea lemnului, Editura Universităţii Transilvania Din Braşov, 2003. (relevant chsapters)
4. Liu X.Y : Contributions to the study of ageing phenomena of wooden substrate and traditional materials for transparent finishes - a comparative approach for Europe and China with applicability in furniture conservation / restoration [& 1 CD anexa] – PhD teză de doctorat 2017, disponibilă în Biblioteca UTBv
5. http://repositorio.unb.br/bitstream/10482/10498/1/ARTIGO_AestheticsAppreciationWood.pdf
6. http://perso.telecom-paristech.fr/~angelini/master_spsiv/2006/papers_for_presentation/color_comparison_hill.pdf
7. *** Collecţiön of ProLigno journal <http://www.proligno.ro/ro/index.htm> (relevant articles)
8. *** Literature survey on the topic – research articles available on the internet sources by key words searching

Topic 2:

Fungal infestation in historic buildings – consequences on the wood cultural heritage, intervention methods

Aspects to be considered within the research project:

- fungal attack of wood in service, types of fungi, conditions determining the fungal attack, forms of degradation, diagnosis;
- risk of reactivation of fungal attack in adequate conditions of temperature and humidity and propagation to new wood and mobile cultural objects;
- methods to reduce the risk of (re) activation of fungal attack and conservation of wood cultural heritage items;
- experimental study on the comparative efficiency of some methods/products for antifungal wood preservation
- case studies.

Minimal requirements for the admission examination (ORAL):

- biological wood degradation agents, natural durability of wood: definition and durability classes;
- representative wood species for constructions and mobile cultural heritage (furniture), properties and natural durability;
- types of wood degrading fungi, specific development conditions and mechanism of attack / particularities of fungal attack, practical consequences;
- concepts of cultural heritage, mobile and immobile patrimony, preventive conservation, active conservation, restoration;
- preventive and curative methods for wood preservation – classical approaches and new developments / trends in worldwide research and the practice of conservation.

Recommended reading :

1. Timar M.C. Ameliorarea lemnului (Wood improvement), Editura Universității Transilvania din Brașov, 2003. (in Romanian, representative chapters)
2. Timar M.C. Restaurarea mobilei- teorie și practică (Furniture restoration- theory and practice), Editura Universității Transilvania din Brașov, 2003. (in Romanian, representative chapters)
3. http://www.transsylvania-nostra.eu/download/05_livia_bucsa_degr_biologice_str_lemn.pdf
4. http://epa.oszk.hu/03100/03141/00006/pdf/EPA03141_transsylvania_nostra_2014_2_081-092.pdf
5. *** Collection of ProLigno journal <http://www.proligno.ro/ro/index.htm> (Articole representative)
6. *** Literature survey on the topic – research articles available on the internet sources by key words searching

Topic 3:

Unconventional wood resources/sorts with exquisite aesthetical value – characterisation and adequate treating/coating solutions for valorisation (in furniture/interior designul)

Aspects to be considered within the research project:

- Ageing /degradation of wood in aerobic and anaerobic conditions- factors, conditions and associated phenome
- Aged wood – definition, structural characteristics, chemical features, physical properties, durability, aspects of gluing and finishing, aesthetic valences
- Subfossil wood – definition, structural characteristics, chemical features, physical properties, durability, aspects of gluing and finishing, aesthetic valences
- Degraded old wood / frail wood– definition, characterisation, stabilization treatments/ active conservation, aesthetic valences
- Ideas/concepts of valorization

Minimal requirements for the admission examination (ORAL):

- ageing, degradation and fossilization of wood: factors, conditions, associated phenomena;
- principles/methods of old wood dating (dendrochronology, C14 dating);
- biotic wood degradation agents, natural durability of wood- definition and classes of durability;
- preventive and curative wood preservation methods- classical and modern approaches in research and conservation practice;
- subfossil wood: definition, characteristics, importance in Europe as scientific challenge and valorization potential;
- subfossil wood in Romania- present status - acknowledgement, scientific reserach and valorization.

Bibliografie recomandată:

1. Timar M.C. Ameliorarea lemnului, Editura Universității Transilvania Din Braşov, 2003. (capitole reprezentative)
2. Timar M.C. Restaurarea mobilei- teorie și practică, Editura Universității Transilvania Din Braşov, 2003. (capitole reprezentative)
3. LIU X.Y : Contributions to the study of *ageing* phenomena of wooden substrate and traditional materials for transparent finishes - a comparative approach for Europe and China with applicability in furniture conservation / restoration [& 1 CD anexa] / -teză de doctorat 2017, disponibilă în Biblioteca UTBv
4. Fengel D. Ageing and fossilization of wood and its components. Wood Science and Technology, 1991 25(3), pp. 153-177.
5. Rede V. Essert S. Kodvanj J. Annual ring orientation effect on bending strength of subfossil elm wood, Journal of Wood Science, 2017, 63(1), pp 31-36. <https://doi.org/10.1007/s10086-016-1596-x>
6. Fengel F, Wegener G (1984) Aging and fossilization. In: Fengel D, Wegner G (eds) Wood, chemistry, ultrastructure, reactions. Walter de Gruyter, Berlin, pp 407-413
7. Kolar T, Rybnicek M. Physical and mechanical roperties of Subfossil Oak (Quercus sp). ACTA UNIVERSITATIS AGRICULTURAE ET SILVICULTURAE MENDELIANAE BRUNENSIS, 2010
8. Sava G.O. Popa I., Sava B.T et al: INTERVALIDATION OF DENDROCHRONOLOGY AND 14C DATING ON A 700-YR TREE-RING SEQUENCE ORIGINATING FROM THE EASTERN CARPATHIANS, 23rd International Radiocarbon Conference, Trondheim, Norway, 17-22 June, 2018, DOI:[10.1017/RDC.2019.56](https://doi.org/10.1017/RDC.2019.56)
9. *** Articole de specialitate – surse internet accesibile prin motoare de căutare funcție de cuvintele cheie
10. <http://subfossil.cz/en/homepage/>