Book of Abstracts

COST Action FP1407
Final Conference

LIVING WITH MODIFIED WOOD

Belgrade, Serbia
12-13 December 2018

University of Belgrade – Faculty of Forestry

COST Action FP1407

Understanding wood modification through an integrated scientific and environmental impact approach (ModWoodLife)

Living with modified wood

Final COST Action FP1407 International Conference

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Book of Abstracts

Editors: Goran Milić, Nebojša Todorović, Tanja Palija, Andreja Kutnar

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Local organiser preface

It is both a pleasure and a privilege for the Department of Technologies, Management and Design of Furniture and Wood Products, Faculty of Forestry to host the final conference of COST Action FP1407. This honour has given us an opportunity to establish a more visible position within the European network of wood related institutions.

Wording of the title - “Living with modified wood” - signifies that the time in which we live has provided us with technologies of wood modification that will ensure that never again will this material be regarded as a lesser material with a short life-span. Wood, as one of the rare living materials, is experiencing a worldwide renaissance, one that could not have been considered possible just a generation ago. For these very reasons, the primary goal of this conference is to foster, forge and encourage the cooperation and exchange of ideas between wood modification researchers and experts in related fields and, hopefully, help them grow.

Belgrade, as a city with a long and rather eventful history, is an environment where sparse moments of peace and prosperity have instilled a way of thinking that appreciates the little things in life. This setting emphasises even more the pressing need of the modern age to live more organically, ethically and above all, ecologically – and what better way than living with an organic material such as wood.

Success of this event would not have been possible without the effort of the entire team of my colleagues. I would like to thank them and to express my deepest gratitude to Andreja Kutnar, Chair of COST FP1407, for leading this fantastic Action, and for her continuous help in organising this Final Conference.

Last but not least I would like to thank all of the participants and contributors of the Final COST FP1407 Conference. I wish you to have a memorable time in Belgrade.

So let us look forward to an exciting conference!

Goran Milić

Preface

Welcome to the fourth and final international conference of COST Action FP1407 "Understanding wood modification through an integrated scientific and environmental impact approach" (ModWoodLife). This conference, "Living with modified wood", held in Belgrade, Serbia December 12 and 13, 2018 brings researchers and professionals together to share and disseminate their work. Their research contributes significantly to our Action's objectives. It is especially rewarding too see contributions that have resulted from collaborations developed and strengthened through this network. Since the beginning of the Action in 2015, we have delivered new knowledge in the field of wood modification and environmental impact assessment. We can all be proud that during our Action, the European Union recognized the need to strategically approach activities, research, and policy to reduce climate change. Among the key strategies that were accepted in the past three years are the Circular Economy (2015), the Paris Agreement (2016), the Research and Innovation Roadmap 2050 – A Sustainable and Competitive Future for European Raw Materials (2018), as well as the recently renewed Bioeconomy strategy. Although our Action did not directly contribute to these documents, I am convinced that the activities of our network and its participants accelerated their adoption. At the same time, it is clear that our collaboration must continue after the Action ends on March 9, 2019. Going forward we should jointly contribute to "closing the loop" of product lifecycles through greater recycling and re-use and bring benefits for both the environment and the economy.

I would like to thank you for your great collaboration. Besides the new knowledge we created, our new friendships will continue for many years more!

Wishing you a successful and memorable conference in Belgrade.

Andreja Kutnar
Chair, COST FP1407

Human interaction with wood – what to measure, how to measure?

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Incorporating nature into the built environment, either directly or indirectly, can reduce physiological and psychological indicators of stress, while increasing productivity, creativity and self-reported levels of well-being (Mcsweeney *et al*. 2015). Research in this area provides an evidence base of positive health impacts of wood use in the built environment (Burnard and Kutnar 2015). However, the measurement of perception of aesthetical quality of materials is challenging. The majority of research related to materials interaction consider sensory perception using a single, two, three or more modalities (Fujisaki *et al.* 2015). In fact, people use all their senses in order to explore the surrounding world. The richness of subjective experience depends on the number of sensory modalities received at once. This attitude is particularly useful while designing new products. Customers perceive product characteristics through the sensory modalities that are closely connected to material properties. Hence, visual, tactile and olfactory stimuli play a major role in the case of wood. The visual impression of material includes perception of the surface colours, glossiness and pattern. The tactile sensing includes an object's weight, temperature, roughness and hardness. Smell impressions depend on perceiving the volatile molecules that are emitted from in the material. For that reason, at the initial step of new product development, customized scenarios of the sensory events that occur when a person meets a product or uses it are prepared (MacDonald 2002).

Several methods for verification of user preferences might be implemented including surveys and hedonistic/preferences tests. They might provide quantitative and/or qualitative feedback. Selection of materials, as well as target groups of respondents, should be carefully planned in order to obtain reliable results. Tests can be performed with prior training of the responders or without any preparation. Assessment can be performed by using only visual stimuli or including other senses (in both cases use of real or virtual samples can be

implemented). Using real samples and employing more senses than only vision (hearing, taste, smell and/or touch) during the assessment is a superior approach. In preference tests attractiveness of materials/products is ranked in comparison to the set of alternative samples representing the variability range of available choices. Respondents might perform two types of comparison: single-attribute or multi-attribute comparison. Human perception tests might be supported by measuring physiological responses in order to provide a more complete picture of human emotions (Landowska 2014, Kotradyová *et al*. 2017, Landowska *et al.* 2018). Tests of preferences might be designed in a more complex way and combined with other than aesthetics factors influencing the customer choice. These may include economic issues (investment cost, maintenance frequency) or environmental awareness (local/imported resources or natural/modified wood) (Sandak *et al*. 2015). It is also necessary to provide sufficient isolation from other environmental stimuli in the testing environment in order to ensure that the responses are mostly due to the tested stimuli.

Preference test approach can be considered as a very useful tool for conservation/maintenance scheduling. In this case the goal of the test is to define limits for the customers' tolerance for surface defects due to ageing, usages or deterioration. This research provides an overview on recent state of the art methods suitable for assessment of interaction between human and materials from the perspective of materials aesthetics and function. The review is combined with presentations of case studies conducted by authors. Furthermore, the influence of economic, environmental and cultural aspects on the preference changes is discussed.

References

Burnard M.D., Kutnar A. 2015. Wood and human stress in the built indoor environment: a review. Wood Science and Technology, 49, 5, 969–986

Fujisaki W., Tokita M., Kariya K. 2015. Perception of the material properties of wood based on vision, audition, and touch. Vision Research, 109, 185-200

Kotradyová V., Salcer I., Vavrinsky E. 2017.Environmental Simulations and their Role in the Research of Human Responses to Environmental Stimuli, Applied Mechanics and Materials, 861, 618-624

Landowska A. 2014. Emotion monitoring - verification of physiological measurement procedures, Metrology and Measurement Systems, 21, 4, 381-388

Landowska A, Sandak A, Sandak J. 2018. Measurement of elderly people preference and acceptance of natural materials with wearable sensors, Proceedings Book of first sheld-on conference meeting, Riga, 10-13

MacDonald A. 2002. The scenario of sensory encounter: cultural factors in sensory-aesthetic experience. In: Green, W.S., Jordan, P.W. (Eds.), Pleasure with Products: Beyond Usability. Taylor & Francis, 113-123

Mcsweeney J., Rainham D., Johnson S.A. Sherry S.B., Singleton J, 2015. Indoor nature exposure (INE): a health-promotion framework. Health Promotion International, 30, 1, 126-139

Sandak J., Riggio M., Sandak A., Santoni I. 2015. What is superb wood surface? Defining user preferences and service life expectations. Forest Products Journal, 65, 3-4, S68-S73

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