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Tibor L. Alpár
Associate Professor
University of West Hungary, Faculty of Wood Sciences
Bajcsy-Zs. u. 4.
Sopron H-9400, Hungary
Phone: 36205321187
atibor@fmk.nyme.hu

Conference topic: technical innovations for regional economic development

Title (POSTER): Advanced wood-cement compatibility with nano mineral

Tibor L. Alpar, associate professor, University of West Hungary, Faculty of Wood Sciences, Institute of Wood and Paper Composites, Sopron, Hungary
Eva Selmeczi, engineer, University of West Hungary, Faculty of Wood Sciences, Institute of Wood and Paper Composites, Sopron, Hungary
Levente Csoka, associate professor, University of West Hungary, Faculty of Wood Sciences, Institute of Wood and Paper Composites, Sopron, Hungary

ABSTRACT: Conventional utilization of wood concerning cement are formworks. Wood was always preferred as formworks at building grounds because of its natural advantages: like availability, easy to work with it, it can be easily removed and reused after setting of concrete.

Wood and cement are like fire and water. Most wood species are more or less not compatible with cement hydration. How can we still join these two very different materials when they really don't like each other to create great wood-cement composites (WCC)?

Hydration and so final strength of WCC is sensitive on wood extractives. Water dissolves water soluble chemicals of wood - some of these are inhibitors: hemicelluloses, sugars, tannins. The process of inhibition: sugars absorb on Alit (tri-calcium silicate), creates a gel around it and water can not access it so the hydration can not occur.

Using conventional additives (eg. $MgCl_2$, $CaCl_2$, $Al_2(SO_4)_3$, Na_2SiO_2) the hydration of cement can be accelerated, to avoid inhibition effect of sugars (can't absorb on Alit), and the hydration skin can be formed around it.

In our research (supported by TÁMOP 4.2.1.B-09/1/KONV-2010-0006) new additives were applied to increase the joining powers between wood (*Populus* spp.) and portland cement, so the strength of the final product. The applied additive was montmorillonit nano particles and PDDA to modify the surface charge of wood fibers. The results of comparison tests were very satisfying, the increase of bending strength was above 20%.