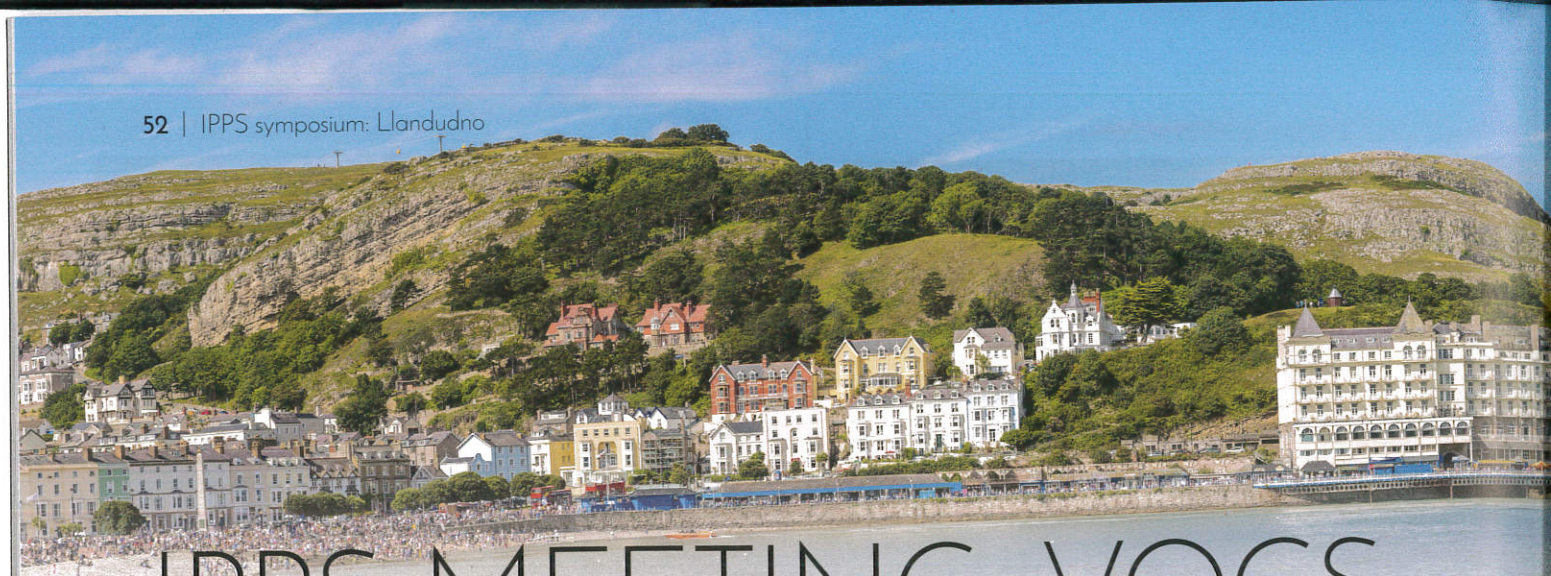

IPPS MEETING: VOCS AND NEW PANELS

The International Panel Products Symposium was held from October 4-6 at its now-traditional venue of Llandudno, north Wales, UK. It again brought together delegates from academia and industry to explore developments in wood technology to mutual gain. Julian Champkin was there

The IPPS symposium was dedicated this year to the memory of Professor W. B. (Bart) Banks, who died in June 2017. As Professor of Forest Science at Bangor University from 1992 until 1997 he played a key role in establishing the BioComposites centre, introduced many students to the potential of new products and technologies, and started many of them on successful careers in the industry. Much of his work has resulted in the products and processes used today.

The biennial symposium is organised by the BioComposites Centre of Bangor University. Rob Elias, director of the Centre, in his welcoming address, pointed out that the time between a technology being developed in academia and it reaching industrial production used to be 20 years. It is now around five. With novel composites, additives and processes being developed, to say nothing of new structural timber techniques, closer contacts between the two areas are ever more needed.

The first topic of the symposium, addressed by three speakers, was the increasingly-important one of Volatile Organic Compounds (VOCs) and emissions-scavenging. The keynote talk was given by Martin Ohlmeyer of the Thünen Institute of Wood Research. Speaking on *Evaluation of VOC emissions at the European level,* he stressed the numerous obligatory and voluntary approaches to evaluating and classifying VOC emissions – the German AgBB, the French Decree, the Royal Belgium Decree and many more.

These are single-country approaches, each with different principles and aims. Clearly a Europe-wide approach for testing and evaluation is necessary. The formal voting process for the new EN 16516 was recently finalised and publication of the standard is expected soon. In the light of this upcoming regulation procedure, research will be needed into VOC emissions and effects. One important question it raises is the effect of individual products on indoor air quality. Professor Ohlmeyer described ongoing research at the Thünen Institute in which emissions are compared under controlled conditions in standard model rooms, and air quality in them is compared.

Health considerations must also be researched. Toxicological threshold values exist for a series of single substances; however, wood products generally give out a mixture of different substances and not enough is known about these or their effects. Rapid test methods for VOC emissions are needed for quality control and to guide future development of new and existing types of panels in the industry.

A number of reports have spotlighted increasing concerns over the impact of VOCs, including, but not limited to, formaldehyde

The next speaker, Simon Corby of the Alliance for Sustainable Building Products, detailed some of these, including one from the Royal College of Physicians in 2016 entitled *Every breath we take.* Humans spend approximately 90% of their lives indoors; the quality of indoor air that we breathe can therefore have considerable effects on health. Levels of VOCs are often two to five times higher indoors than outdoors.

Mr Corby detailed a disturbing case of a school in Scotland where teachers became concerned about high levels of reported pupil and staff discomfort in a new classroom. Formaldehyde levels in it were found to be ten times WHO guidelines, some 12 months after occupation. The classroom provider/ developer admitted that he knew very little about specifying for low formaldehyde. The case study illustrates how developers do not have a good understanding of the effects that product selection or substitution can have on performance and air quality.

Sergei Medved of the University of Ljubliana, Slovenia, spoke on incorporating pine bark into panels as a formaldehyde scavenger. Despite some use as fuel (though its calorific value is low) and as landscaping material, much bark remains unused after logging and debarking operations and is in effect a waste material

Phenolic-like components in it, however, suggest using bark dust in panel production as a formaldehyde scavenger. Preliminary experiments have given encouraging results. The proportion of bark dust as a material constituent of panel mats needs to be higher than 5% to have a positive influence in reducing formaldehyde emissions.

The second major topic of day one of the symposium was Plywood and Laminates. Efriede Hogger of the Competence Centre for Wood Composites and Wood Chemistry in Linz, Austria, gave results of analysis of the cold tack of urea in plywood production.

Matthew Schwarzkopf of the University of Primorska, Slovenia, gave a fascinating talk on treatments of Notofagus pumilo and N antarctica, from Southern Patagonia and Tierra del Fuego. The Notofagus genus is also known as southern beech. Forests in the region are generally unmanaged. However, efforts have begun towards sustainable harvesting. The trees in the managed areas are encouraged to grow quickly, resulting in lower density wood with poorer mechanical properties. Wood densification techniques, applied to the harvested wood, can remedy this, making the timber viable for high value products. Initial

Llandudno, North Wales, venue for the 2017 IPPS symposium

results are encouraging, giving MOE values of the densified composites from these woods that are higher than those from commercially-produced structural composite lumber materials such as LVL. A second stage of the project is needed to assess the stability of these improvements over time.

Recycling was the topic of session three. The opening speaker was *WBPI*'s regular columnist Dr Mark Irle. At present, recycled wood makes up 31% of wood used to make particleboard in Europe. If selective processing of recovered wood can be made more efficient, this proportion might rise.

Much recovered wood is categorised as Class B – that is, potentially painted and glued but not pressure treated. It can include, for example, such things as window frames, and therefore can contain timbers of relatively large dimensions. Current practice is to chip these into particles to be used in board manufacture. This, however, is wasteful.

Processing such larger pieces into lamellae – that is, into planed rectangular pieces, of optimal size 20 x 60mm, with the outer contaminated surfaces of the source wood removed – is more complicated but yields products of much higher value. In practice, however, this requires evidence that Class B recovered wood, once it has been machined into lamellae, can be considered 'clean' of contaminants, to the extent of complying with EPF standards.

Analysis has shown that this is indeed the case. This opens the way to recovering greater volumes of usable wood from recycling and using it to make higher-value products.

A talk from Craig Bartlett, of MDF Recovery Ltd, (see article in *WBPI* April/May 2017) on designing and setting up an MDF recycling process emphasised, with some humour, the practical difficulties involved. If attempting such a project in the UK, a constant and uninterrupted supply of tea for every worker involved would seem a necessity!

The next topic, Bioresins, was covered by three speakers, including Ana-Maria Ferreira of the University of Porto, Portugal, who spoke on the effect of magnesium lignosulfonates on urea-formaldehyde resins.

An innovation to close the day was an open meeting, chaired by Professor Ohlmeyer, in which all the participants were invited to discuss the potential development of a Europe-wide network for the study of wood emissions and VOCs, with funding possibly to be provided by the COST framework. Opinions were sought from the floor – and indeed from all interested parties, including readers of *WBPI*. For more on this, and on how you can contribute to the discussion, see the Editor's comment on page 3.

The second day opened with a session on Innovations in Boards. Frauke Bunzel of the Fraunhofer Institute described Wood Foam, a new wood product, 100% based on lignocellulose, the biomass of cell walls of trees and other woody plants. The material's own binding forces hold the foam together, eliminating the need for additives, binders or resins, and thus also eliminating any health risks from such additives. The wood foam has high mechanical strength. Its sponge-like nature means that its water absorption is high, but it remains dimensionally stable when wet. As a lightweight material with many air cavities, applications could include thermal insulation, sound-absorbing acoustic boards, or as a packaging material to replace polystyrene. Both ecological and environmental advantages would follow.

Papers on moisture migration in bio-based panels, and on sprayable hot melt hydrophobes, concluded the Innovations session.

The final session of the conference was on resins. Topics were alternative formaldehyde-free urea resins, UF resins with high storage stability, and the development of second-generation amino resins.

Posters presented included light-weight hybrid panels using wood and in-situ foaming of polystyrene granules; wood plastic composites made with birch false heartwood residues; a new particleboard modified with carbon nano-tubes; and a study of miscanthus straw for composites. All of these illustrated the Symposium's role in bridging the divide between academic research and industry.

The conference dinner included a quiz testing knowledge of panels and previous conferences and, more importantly, the presenting of the Harry Earl Memorial Prize, sponsored by CRC and Kronospan.

This prize is to assist promising students by supporting their training through attending international events and the like. Ana-Maria Ferreira, whose paper is mentioned above, was a worthy winner. ●

Ana-Maria Ferreira receiving the Harry Earl Memorial Award from Keith Godber of CRC (left) and Chris Ryan of Kronospan

Participants in the symposium