
Christian Heinemann


Chuck Yu


John Sharp

Lots to learn in three days

The eighth edition of the European Panel Products Symposium, organised by the BioComposites centre in Wales, offered 26 presentations on a wide range of topics to delegates from 23 countries. We bring you a taste of the subjects covered

In some ways, Llandudno in North Wales may seem an unlikely setting for an international conference, but the regular annual October gathering of delegates from all over the world for the eighth European Panel Products Symposium (EPPS 8) proved that it is a popular one.

This symposium, founded by the BioComposites Centre of the University of Wales Bangor, which specialises in panel-related research projects for the industry, always offers a mix of presentations of interest to sales and marketing as well as scientific and technical personnel. This year was no exception.

The symposium took place over three days in the North Wales Conference Centre and was divided into four sessions: Recycling issues and practices; Formaldehyde issues and more; Fundamentals; and Process control and equipment.

As these titles suggest, a lot of ground was covered with, of course, a lot of networking – a vital aspect of any conference.

Dr Paul Fowler, head of the BioComposites Centre, introduced the symposium, pointing out that each delegate had received a CD of the proceedings for the first time, in addition to the normal printed version.

He also said that the Centre is relocating within the Bangor University campus and that this presented both opportunities and challenges for the organisation, which expects to benefit from this new investment. Its world-renowned MDF pilot line is also to be relocated.

The keynote address was given by Mark Angelini of the North American Structural Board Association, based in Ontario, Canada. He pointed to improvements in OSB as a commodity and a speciality product and outlined its development from the original waferboard in 1954.

"It is now the undisputed preferred structural panel for housing, with 75% of the market for wall and roof sheathing and underlayment [in North America]," he said.

China recently accepted the Canadian building code and the SBA is re-writing its manual in Mandarin, said the speaker.

He concluded that the growth prospects for this panel are healthy as it can be engineered for new and different applications by strand geometry and resin use, as well as preservative and anti-termite treatment.

Session 1 on recycling, while the presentations were rather UK-centred, did give valuable insights into the subject.

Tom Fourcade of the Waste and Resources Action Programme (WRAP) UK said that 87% of recycled wood was used for panel production in the UK in 2003, while 8% was used for composting, 1% for energy recovery and 4% for other mechanical recycling products, including animal bedding (a big-money market).

He said the challenges were to maintain value within the system, develop a fully integrated supply chain, match commercial sustainability with regulatory controls and develop technology and processes to keep pace with the market, such as dealing with chemical contamination in waste wood.

Peter Billins, ceo of British Biogen, spoke next on 'Biomass – implications for the forest products industry'.

He predicted that the fossil fuel era will end in 2060, if not sooner, saying that we had had the 'coal wave', followed by the 'oil wave', followed by the 'gas wave' in energy sources. "Coal and oil are relatively easy to transport, but gas is not so easy, requiring expensive pipelines," he pointed out.

He also referred to the dramatic increases in oil prices and to the fact that supplies are now concentrated in the Middle East and Russia, and tied in with particular political/religious situations.

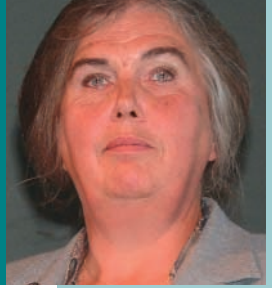
Looking at renewable energy markets, he suggested that wood panel plants could take in recycled wood and split its use between energy, bioethanol production and panels on an integrated site. "Explore the synergies and adopt an integrated, not combative, approach," he advised.

The next paper was presented by Vic Kearley of TRADA Technology in the UK. He described the development of a system to recycle wood panels on a semi-industrial scale. Known as the Fibresolve process, it uses a combination of pressure, vacuum, steam and mechanical agitation to break down MDF and particleboard and recover the fibres for re-use in making new MDF panels. The mark IV version of the chamber has a capacity of one tonne of MDF or two tons of particleboard.

A satisfactory quality of MDF was produced with many, though not all, of the properties equal to virgin wood based boards.

The final paper of session 1 was presented by Mark Irle and concerned the investigation of metal contaminants in recycled wood for particleboard manufacture.

Dr Irle said that good housekeeping by recyclers was needed to prevent preservative treated wood from entering the particle-




Judith Dobbs


Mark Angelini

Paul Fowler

board production process, where chromium content would be a problem.

Session 2 was kicked off by John Sharp on the hot topic of 'Formaldehyde – the big issue'. Mr Sharp particularly addressed the issue of the recent upgrading of formaldehyde to 'confirmed carcinogen' by the IARC (*WBPI* issue 4, 2004, p3).

He concluded: "Formaldehyde is a natural substance, however the dose is important both to workers in panel plants and to end-users. We must set levels at a level proven to be safe for everybody. The livelihood of our industry depends on keeping this whole issue in perspective: don't try to ban formaldehyde as it is present in wood anyway."

Stuart Moodie of SMM Consult in the UK took 'Panel emission analysis and test methods of panel products worldwide' as his theme. He pointed out that the lack of uniformity between countries in methods of measurement could lead to a product passing the test in its country of manufacture, but failing it in the country of delivery.

Japanese standards

Mr Moody particularly pointed out the stringent standards applied in Japan, up to the F**** grade, which few EU panel manufacturers could currently meet. "For the credibility of the wood based panel industry, steps must be taken to ensure that products manufactured are safe and that the industry speaks with one voice," he said. "If we continue to have different allowable levels of formaldehyde release it will only make the populations of those countries which allow high levels suspicious."

'Japanese influence on the global panel market' was the subject of Tony Martin of Akzo Nobel Casco Products Asia, Singapore.

"There is a widespread move to use Japanese testing standards, not only in Australia and New Zealand but also in Asian countries," he said. "In future all companies exporting formaldehyde-emitting construction products for use within buildings to Japan must JIS mark their products. I see this [drive for lower formaldehyde panel products] as a good thing."

Chuck Yu of the Building research Establishment (BRE) in the UK spoke about indoor air quality (IAQ) and emissions of panel products and its importance to producers. He said: "The issues of emissions of formaldehyde and other VOCs from wood based products are important considerations for the wood panel manufacturers, and IAQ is an important social and political issue in European housing markets, and could affect the competitiveness of their products."

Bringing session 2 to a close, Judith Dobbs of Huntsman (Europe) BVBA, Belgium, spoke on 'Regulatory trends and MDI resins'. Ms Dobbs explained the issues posed by the inclusion of MDI resins under existing chemicals regulations and the possible effects of future regulations, as they are continually updated.

Day two began with 'Special guest speaker' Mike Botting, editor of *WBPI*, who gave his view of the changes he had seen during 10 years' reporting on the global panel industry, in terms of technology, production and environmentalism.

Session 3 then began with 'Blowline blending – the next stage' by Kelvin Chapman of MDF Tech Ltd, New Zealand. He looked at resin droplet size and its effect on IB and machining response of an MDF panel.

The second paper on 'Fundamentals' was presented by Christian Heinemann of the Competence Centre Plus Wood in Austria. He looked at the thermokinetic simulation of a hot press cycle in the production of particleboard and MDF.

The purpose of his model was to assess the degree of cure of amino adhesive systems in different areas of the mat during hot pressing so that the response of a variety of adhesive systems to heat could be determined more conveniently than by trial and error.

On a similar subject, Fred Kamke of Virginia Tech in the US looked at 'Predicting cure of a phenol-formaldehyde (PF) adhesive'. This work was jointly carried out with M Serneck of the University of Lubljana, Slovenia.

Dr Kamke said that, in his opinion: "Models are just a tool to help you understand complex processes – you can make predictions based on the information but they are limited in producing accurate results at this time." The goal of his team was to improve the performance of an established simulation model (WBcSim) for the hot pressing of wood based composites.

This is an interactive, website-based, model which is free to access for anybody in the industry (http://kansa.cs.vt.edu/~wbc-sim/). It offers simulation models for rotary drying, strand mat formation, hot pressing and flexural performance of a laminated composite as well as other integrated computing tools. In this case, it was used to predict resin cure, using in-situ measurements of dielectric behaviour.

"Not all PF resins are the same – each formulation is different from the next so the model is only applicable to that particular formulation," Dr Kamke explained.

The basic idea of the process is that prediction of cure rates of adhesives can be used to optimise pressing times.

Turning to LVL production, the next paper was entitled 'Monitoring of temperature and core gas pressure to characterise

and optimise process parameters in the production of laminated veneer lumber'.

It was presented by Klaus Haselhofer of Orica Adhesives and Resins, New Zealand, who pointed out that the principles used have been extensively tested in particleboard, OSB and MDF production, but not until now in LVL. The equipment used was the PressMAN ContiPro system and the results of this research should help to optimise process parameters and production output of LVL, said Mr Haselhofer.

Tim Young of the University of Tennessee Forest Products Centre presented 'Predictive modelling of wood composite properties using genetic algorithms with distributed data fusion'.

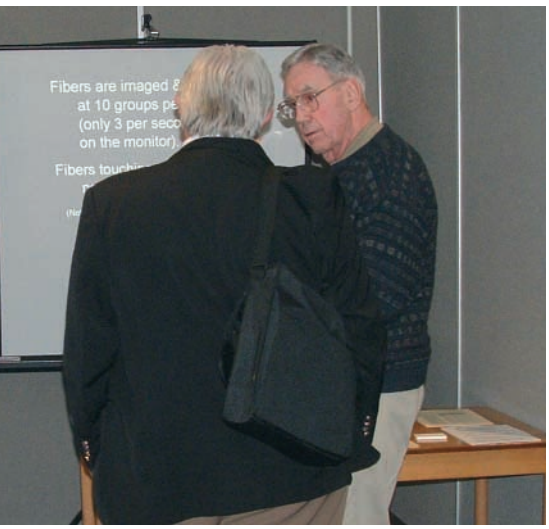
The aim was to identify sources of variation in internal bond and to predict internal bond in MDF panels, thus saving the waste inherent in post-production tests.

"Genetic algorithms use a computerised version of evolution to create optimum solutions for non-trivial problems," explained Dr Young.

He concluded that his system showed promising results which could lead to increased throughput, reduced raw material and resin inputs and could probably pre-

vent board failures in an MDF line.

Rob Elias of host organisation the BioComposites Centre presented the next paper on 'Characterisation of panel surfaces through contact angle and surface energy measurements using a PGX Goniometer'. The process involves dropping a measured drop of liquid onto the panel surface and measuring the contact angle produced by surface tension of the droplet and surface energy of the panel surface.



The system is portable and hand-held and was found to be capable of identifying significant differences between board surfaces treated in different conditions.

Dr Elias' colleague, Paul Fowler, took the podium to report on 'A new bio-resin system for panel products'.

Using rapeseed oil as a base for ozonisation and catalytic reduction, Dr Fowler's team successfully developed a formaldehyde-free resin by steps which he said are achievable on an industrial scale.

"The bioresin system is well-placed to compete with phenol-formaldehyde and isocyanate resin formulations in wood based panel applications," he concluded.

Day three, session 4, was opened by Jörn Döscher of Döscher & Döscher of Hamburg Germany with his paper entitled 'Moisture detection – the next generation'.

He described a "new technology for the woodworking industry" in the form of a microwave system to measure, on-the-line, the moisture content of wood fibres and pressed panels. The system employs the two-parameter microwave measurement method (2PMR).

"Microwaves employ the fact that water is a polar molecule and the second strongest dipolar molecule and is also very small – very important for this technology," explained Mr Döscher.

The 2PMR system makes use of the correlation between water molecules and an electromagnetic field to measure moisture content irrespective of density. The speaker said it can be of particular use in panel production where moisture detection is of special importance at the end of the blow line, in fibre bins and on the forming lines.

'How can your production benefit from image processing techniques?' asked Kai Greten of GreCon, Germany. He pointed out that image processing was a rather new field in the panel industry and is offered by GreCon for inspection of decorative surfaces by the company's Superscan device and for X-ray inspection of mats before the press, as in the new Dieffensor device.

GreCon has sold seven systems to the laminate flooring industry where the fact that the product is normally supplied direct to the final user is an important factor in quality control during production, he said.

It is a camera-based system which he said is more reliable than the human eye.

The Dieffensor was developed in cooperation with German complete panel production line supplier Dieffenbacher and was first installed in September 2004 in an MDF line. It protects the valuable steel press belts from damage by fibre lumps or foreign bodies in the mat.

Image processing was also the basis of the next presentation, by Burkhard Plinke of the Wilhelm Klauditz Institut (WKI) in Germany. He reported on the use of image processing methods to measure OSB strand size and orientation, which seemed to show promise for future on-the-line systems.

Reducing operating costs

After the coffee break, Trajan Sandweg of ATR Industrie-Elektronik, whose wood panel industry activities are now a wholly-owned part of the Siempelkamp group, gave his presentation on 'Systematic reduction of operating costs in the derived timber product industry'.

"In order to achieve rapid increases in productivity, it is essential to provide fast and accurate answers to questions such as 'Which type of board has the highest contribution margin?', 'Which shift is the most efficient?', 'What is the current level of produced quality?' or 'Which plant components have caused the most downtimes?'," he said.

He went on to describe how ATR Prod-IQ (Production Intelligence control technology), a further development of its PROMACS, SPOC and PLM systems, can achieve the answers to those questions and so help reduce operating costs.

A complete change of subject came next, with the presentation by Lars Karlsson of Tri Innovations AB (TRIAB) of Sweden. His subject was 'Powder coating of MDF in the furniture industry'.

TRIAB supplies oven systems and paint lines and has considerable experience in powder coating, although its application to MDF is relatively new.

Ultra-violet (UV) and ultra low-bake (ULB) powders can be used and Mr Karlsson compared the two systems.

He concluded that the entire processing time for the UV powder system cure/cool is shorter than that for the ULB powder and that the powder paint system in general results in fewer coats, less preparation/fewer sanding operations, 95% recycling of powder, a chemical resistant and harder surface and new design possibilities with regard to shape and look.

He said that the lower the processing temperature the better, to avoid problems with the MDF panel itself.

The conference was brought to a close by Mizi Fan of the BRE (UK) talking about 'Wood based panels – material parameters and specifications'. He reported on part of a research project funded by the EC to better understand the properties and behaviour of wood based panels, to facilitate the use of more reliable and consistent test methods at a European level, to facilitate innovation in the use of wood based panels, and the standardisation of manufacturer performance criteria.

Dr Fan concluded that many of the existing test methods studied were not accurate enough and that they did not cover unusual products such as cement bonded particleboard. He concluded: "Current design values in EC5 for long-term performance of wood based panel products are suitable only for bending load…. Using the assumed values in EC5 may have serious safety implications."

Closing the symposium, Dr Fowler said delegates had come a long way in the past three days and that they could go home "well-informed and revitalised to know so much is going on in the industry." □

Copies of this and past years' proceedings are available from the BioComposites Centre, UWB, Bangor, Gwynedd, LL57 2UW, UK or go to www.bc.bangor.ac.uk