
Andrés Dieste


Dennis Jones


John Sharp

Popular symposium wins true international status

A new name and a new venue for this year's panel conference in Europe. The International Panel Products Symposium IPPS (formerly European Panel Products Symposium EPPS) moved to Cardiff in Wales, setting a trend for the future of this event

The change of name to IPPS from EPPS means more than just a move from EPPS' traditional location of Llandudno in north Wales, where 10 annual editions were held, to Cardiff in the south of the country.

It was a first step in giving this popular symposium a truly international status. The delegates have always come from all continents and the name 'European' just didn't reflect that fact.

While this first change of venue may be seen as rather undramatic, it was just a first step; the 2008 symposium will be held in Dipoli, Helsinki, Finland, and future events are likely to be held in different locations each year.

Dr Rob Elias, director of organisers The BioComposites Centre (BC), University of Wales, Bangor, welcomed around 120 delegates from 34 countries to the Paramount Angel Hotel, opposite the Millennium Stadium in Cardiff, for the first IPPS.

"We will be showcasing new technologies and ideas and giving industry the opportunity to find out what is happening in research, as well as giving the opportunity for delegates to network and develop new partnerships," he said.

"Keeping pace with all this new technology is difficult. A vast amount of information is available through the World Wide Web, but the source and quality of it needs to be carefully understood. This is where academic partners can help, acting as a filter, helping companies to identify some of the risks and enabling them to focus on the more feasible technologies.

"It would be a great start to IPPS if we could generate some new ideas for the future of our industry," said Dr Elias.

Session 1 was entitled 'Opportunities for wood modification in the panels industry' and this followed on from a two-day conference which preceded IPPS, namely the Third European Conference on wood modification (ECWM3).


The castle at Cardiff, the Welsh capital which offered a new location for the new IPPS

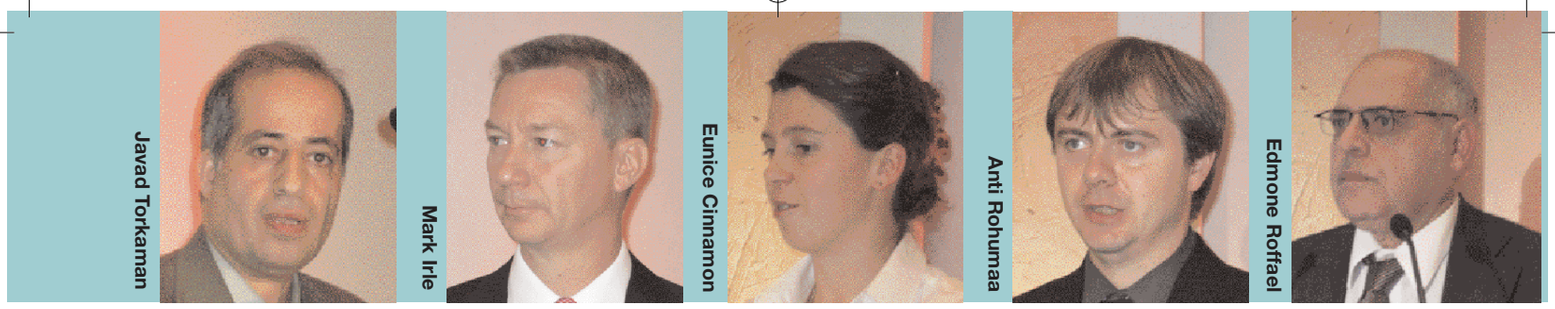
The first speaker, Dennis Jones of Wood Knowledge Wales, looked at the viability of wood modification in the composites industry and suggested that it offers a great range of potential uses. He said that wood's performance could be improved by this modification of its molecular structure, using four principle methods: Chemical (acetylation, furfurylation); thermal; impregnation/polymerisation; and enzymatic modification.

Panel products which could benefit were MDF, for doors and floors, and plywood, said Dr Jones.

Professor Roger Rowell of SP Technical Research Institute, Sweden, and the University of Wisconsin in the US, spoke on acetylated fibreboards and reported that an exterior door with acetylated MDF skin and a wet room wall panel of the same material were both in good condition after 10 years' heavy usage.

Rounding off session 1, Dr Joris van Acker of Ghent University, Belgium, reported on his and Liesbeth De Vetterin's work on edge-coating plywood with organosilicones for water resistance. He said the results were encouraging and could possibly be applied to other panel products.

Next came a keynote address from Eunice Cinnamon of Ukfirst, who gave a furniture maker's perspective on the panel industry and its interaction with the furniture manufacturing sector (see separate



report, p57). Session 2 was on plywood and OSB and began with a paper from professor Clàudio Henrique Soares Del Menezzi of the University of Brasilia. He discussed the utilisation of thermal treatment to enhance the properties of OSB.

Dr Del Menezzi pointed out that OSB usage in Brazil to date has been for packing, civil works fencing and cover and internal furniture structures, rather than for construction purposes, where concrete, tiles and steel are preferred.

The heat treatment was carried out to the whole panel in a plywood hot press and the researchers found improvements in dimensional stability, resistance against fungal decay, weathering and they also obtained a smoother surface.

The additional production cost was estimated at 4-5% and the team felt that it was an economically feasible process.

Dr Joris van Acker returned to the podium to present his work on the moisture dynamics of plywood in exterior applications as a basis for service life prediction. Sixty different types of plywood produced in Europe were tested, comprising different wood veneer species and glue systems and their durability was assessed.

Emphasis on veneer products

Session 2 continued in the afternoon of the first of two-and-a-half days of presentations with a paper on the raw material and process factors influencing bond strength development in veneer based products.

Anti Rohumaa of Helsinki University of Technology, Finland, reported that log soaking affects surface properties such as pH and wet-ability, with veneer soaked in different temperatures having significantly different wetting behaviour, as well as having an influence on development of bond strength.

Andrés Dieste from Georg-August Universität, Göttingen, Germany, tested the performance of plywood produced with fagus, betula and picea species veneers treated with 1,3-dinethyl-4,5-dihydroxyethyleneurea (DMDHEU). He found that betula species gave the best overall performance in terms of dimensional stability and hardness.

A less common form of plywood, made from bamboo, was the subject of investigations by Professor M S Sapuan of the Forest Research Institute in Malaysia. He said there were 14 genera and 59 species of bamboo in his country and, as a raw material for the wood products industry, it matures in three to four years, is an environmentally-friendly plant and has a unique appearance. However, it has inferior dimensional stability to wood and high water absorption.

To influence these characteristics, Prof Sapuan's team impregnated the bamboo with phenol formaldehyde and found good dry and wet bond strengths in 3-ply construction, together with significant improvements in thickness swell, water absorption and linear expansion after a 24-hour cold water soak.

Rounding off the plywood and OSB session – and day one – Jukka Honkanen of Helsinki University compared real and simulated surface topography measurements in birch veneer.

Session 3, Agricultural Panels and Emerging Technologies, was kicked off by Graham Heslop of CS Process Engineering Ltd of the UK (formerly Compak Systems, launched in 1990), as a supplier of agri-fibre panel production lines.

He said that given the seasonal availability and low density of the raw materials, you have to take the technology to the raw material rather than the other way round. He also suggested that smaller-scale plants of around 50,000m³ annual capacity were the maximum practicable size. A typical two-line mill would need a floor space of about 8,000m² in total.

"Global warming and the 'green demand' have seen interest in our products soar worldwide in the last 18 months," said Mr Heslop, who also predicted that 'formaldehyde-free' agri-panels could be a big market, while China is also seen as a major opportunity.

The manufacture of wood products from microwave-modified wood was the subject of Professor Peter Vinden of the University of Melbourne, Australia. Mainly for solid wood, there are some applications in mainly veneer based panels.

'Lightweight particleboard made from annual and perennial plants' returned us to the agri-fibre arena as Peter Meinlschmidt of the wood research institute, WKI Germany, spoke about his joint European project DIPP (Development of Innovative Particleboard Panels).

He studied raw materials from annual plants such as sunflower, hemp, topinambur (Jerusalem artichoke), maize and miscanthus to make particleboard suitable for the furniture industry.

The panels were extruded with tubular hollow cores, which could also be filled with wood or foam and clad with MDF or HPL (high pressure laminate).

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Mr Meinlschmidt reported some promising results for usable lightweight panels in furniture making, although EN300 properties were only met at 650kg/m³. It is early days yet.

Technology and process control

Session 4, day two, was on Technology and Process Control and the keynote presentation was given by Dr John Sharp, a resin and panel process consultant based in the UK and Brazil.

'The status quo of board manufacturing process equipment. Where do we go from here?' was his questioning title, mainly concerning particleboard and MDF manufacture. He looked at drying, blending, forming, pressing and after-press treatment of the finished panel and suggested that "a critical analysis of the various steps in the production of both particleboard and MDF reveals that there is considerable potential benefit in the complete re-appraisal of each step". Resin blending was partic-

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John Wadsworth


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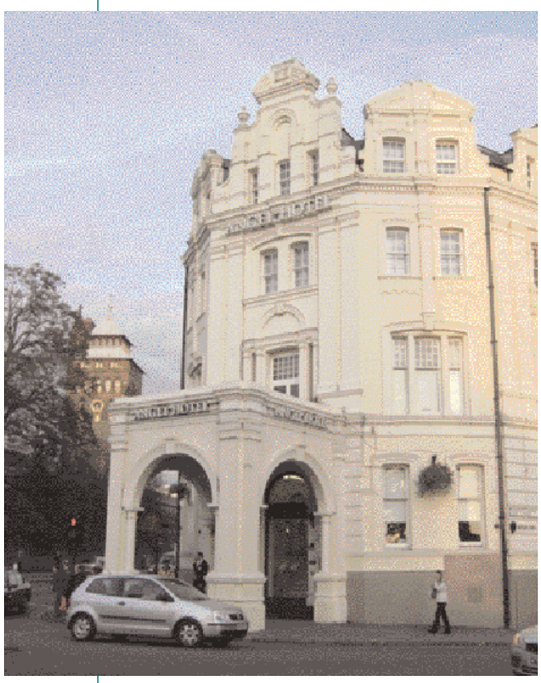
New venue: The Paramount Angel Hotel

ularly singled out for attention.

'Production safety during wood based panel production' was the theme for Ralf Schäckel of GreCon, Germany. He outlined the company's well-known products for spark detection and extinguishing in the entire panel production process.

Thomas Greigeritsch of the University of Natural Resources and Applied Life Sciences, Austria, talked about 'New plant concepts for the production of three-layer natural softwood panels'.

More modern approach required

He reported that there are 25 producers of this panel in Europe and that all have machinery dating back to the manufacture of the first panels in the 1980s. A more modern approach is thus required, such as up-to-date sawing and pressing machinery with high-end automation technologies to reduce manual labour input. Technologies to combine current, perfectly adequate, defect scanning systems with appropriate patching/repairing systems are now required, said the speaker.

'Optimisation of the pressing process through statistical tools' was presented by Trajan Sandweg of Siempelkamp, Germany, who presented the company's Production Intelligence (Prod-IQ) control technology system.

The second half of the second day started with a keynote presentation by *WBPI* contributor and industry consultant John Wadsworth of Intermark Ltd, headquartered in the UK. It was entitled 'Panel market developments – a personal view'.

Mr Wadsworth presented a lot of interesting numbers and analysis on production and trade trends in softwood and hardwood lumber, particleboard, MDF and OSB worldwide, and discussed the future markets for panel products and the likely future structure of the industry itself.

Referring to the increasing consolidation in the industry's ownership, he questioned whether this was beneficial for marketing creativity, whilst acknowledging that capital and technology, key to the industry's well-being, are more readily accessed by the large groups.

Session 5: Resins followed, with a 'Study of the morphology of urea formaldehyde resins' by João Ferra. He studied the microscopic structure of resins as they cured and aged to assess resin penetration in wood pores and the effect of ageing on resin structure.

Valeriu Petrovici of Transylvania University, Romania, looked at the glue shearing strength of some novel adhesive compounds based on mixed furan resin with furfuryl alcohol, ureic resin and lignin in laboratory conditions.

Professor Edmone Roffael of Göttingen University looked at the making of fibreboards from thermo-mechanical (TMP) and chemo-thermo-mechanical (CTMP) pulps and the volatile organic compounds (VOCs) produced. He found that the pulping process does have a decisive influence on the release of VOCs from both the fibres and the finished boards.

Dr Javad Torkaman, University of Guilan, Iran, presented his work on utilising natural phenolic compounds such as bark extracts from Quercus castanifolia (oak) and Alnus subcordata (alder) as bonding agents for particleboard. He reported that smaller amounts of alder than of oak bark extract were required to substitute for 25% of phenol formaldehyde resin.

The final half-day, following an enjoyable Thursday evening Gala dinner in the hotel, with the signature BioComposites fun and a quiz, was given over to Session 6: Raw Materials.

A familiar EPPS speaker – and *WBPI* contributor – Dr Mark Irle of the Ecole Supérieure du Bois, Nantes, France, kicked off with his presentation on the use of recycled paper to make composite panels. He pointed out that in Europe, 62.6% of paper is recycled, but that the true figure is nearer 80% of the possible maximum as tissue paper cannot be recycled.

As an alternative to recycling paper back into paper, he proposed shredding it into particles, mixing it with glue and forming it into panels, thus cutting out the energy consumption of wetting and re-drying the material.

Having tested a number of paper types in the laboratory, Dr Irle reported that newsprint gave the best modulus of rupture (MOR) and the smoothest surface.

He concluded that such panels are possible but that the strength was still well below that of wood based panels. However, packaging and insulation remain possible uses for such panels.

Janis Kazocins of the Latvia University of Agriculture reported on wood species impact on the mechanical and hydrophobic properties of heat treated wood. Whilst his research was based on solid wood, Mr Kazocins foresaw possible benefits for the particleboard industry

The final presentation of IPPS 1 (effectively EPPS 11 as well, really) was given by Sergej Medved of the University of Ljubljana in Slovenia. It concerned the influence of beech particle size used in the surface layer of three-layer particleboard on surface soundness.

The relevance of this physical characteristic is in how well the surface of a particleboard bonds with surfacing papers. The researchers used five different particle sizes and found that the best surface soundness came with boards with small surface particles and with increased surface layer density and compaction ratio, while it decreased with an increasing proportion of the surface which is covered with adhesive.

Dr Elias called the conference to a close with a taste of what to expect in Finland on October 8-10th, 2008: more industry-related themes and more outside visits are among the changes planned; and a workshop on supply chain development. Sounds good. □

This article can only give a brief glimpse into the subjects covered in depth at IPPS. If you would like the full text of the papers presented, this can be purchased from the BC, Bangor University, Gwynedd, LL57 2UW, UK, or www.bc.bangor.ac.uk