

2007 TAPPI Coating & Graphic Arts Conference

**4/22/2007 – 4/25/2007
Hyatt Regency Miami
Miami, FL**

Updated: 3/26/2007

4/22/2007
Session 1:

5:00 p.m. – 6:30 p.m.
Opening Session, Awards, And Keynote Speaker

1-1

Keynote Speaker

Saara Söderberg, Pöyry Forest Industry Consulting Inc. (Speaker)

Saara Söderberg is a Senior Consultant with Pöyry Forest Industry Consulting in Montreal, Canada. With more than 15 years of industry and consulting experience, Söderberg's expertise lies in the areas of coated paper manufacturing, economics, and benchmarking. Her current responsibilities include assisting clients with M&A, strategy and mill development, and restructuring and operational improvement initiatives. She holds a Master of Science degree in Paper Technology from Helsinki University of Technology.

4/23/2007
Session 2:

8:30 a.m. – 10:00 a.m.
Coating Structure - Printing Relationships

Session Moderator

Steve Ottone, Dow Reichhold Specialty Latex

2-1

Evaluation Of Print-Through With Color Theory

Martti Makinen, University of Joensuu (Speaker)

Timo Jääskeläinen, University of Joensuu

Jussi Parkkinen, University of Joensuu

The perceived color of an object depends on lightness, hue and saturation. Most optical standards of the paper industry ignore this, and they take into account only lightness. In practice this means that they are adequate only for analyzing black print and white paper. Recently it was found, that unlike standard definitions of opacity, a color difference model is able to predict perceived covering ability of a sheet of paper satisfactory regardless of the color of the paper or the print. The color difference model is also applicable for analyzing print-through. The method is not only able to predict how disturbingly print is seen from the reverse side of the sheet, but it is also possible to separate effect of the penetration of the ink or its components from the imperfect covering ability (opacity) of the sheet. In addition, at least for some printing methods it is possible to calculate a rough estimation for the penetration depth of the ink.

2-2

Complete Determination Of Bulk Density And Coating Porosity

Cathy Ridgway, OMYA (Speaker)

Patrick A. C. Gane, OMYA

During mercury intrusion at low pressure into uncoated and pigment-coated papers irreproducible large pore volumes are frequently recorded, which prevent detailed determination of total composite porosity by mercury porosimetry alone. A novel occlusion-correction procedure is reported here, in which the absorption volume of hexadecane into the void structures and its displacement by the skeletal structures are combined with the mercury intrusion data to allow the coating and the substrate to be separately assessed. This may be achieved by scaling the intrusion into the uncoated permeable substrate to that of the coated substrate intrusion curve. The resulting intrusion curve is then further scaled to an absolute porosity and bulk volume of the coated sample. The values so derived are compared to those obtained by the traditional method of approximating the intrusion volume into the coating, and comparing this with the same coating applied to an aluminum foil substrate. A method for estimating coating coverage derived from these analyses, by considering the modification of the base paper after coating in the region of the base-coating interface pores, is described.

2 – 3

Design Of Coating Structure For Flexographic Printing

Janet Preston, Imerys Minerals Ltd (Speaker)

A. G. Hiorns, Imerys

D. J. Parsons, Imerys

P. J. Heard, University of Bristol

In flexo printing, advances in pre-press technology have improved the quality to the extent that it now competes with rotogravure and offset printing. Print quality is influenced by topography, porosity and surface energy. Optimising these results in good transfer of the ink to the surface, without any reticulation. This study investigated the influence of different pigment types, binder levels and calendering conditions on the coating structure and printability of board coatings. We used a Focussed Ion Beam (FIB) Microscope to visualise the penetration of the ink into the coating layers. The choice of coating pigment had a major impact on the properties of the final board. 100% PCC gave a high gloss surface and a high brightness and whiteness. However on its own, the surface was rather porous leading to higher ink penetration and lower print density. Higher print gloss and density were achieved on coatings with a broad particle size distribution carbonate, and a

higher latex level. However addition of platy partner clays to the porous PCC coating can fill up some of the surface pores. This demonstrates that a multi-pigment approach can add value to the paper maker by engineering an optically efficient surface for high quality printing.

4/23/2007
Session: 3

8:30 a.m. – 10:00 a.m.
Impact Of Asia On Global Coated Paper Trends - Panel Discussion

Session Moderator

Amy Dimmick, Specialty Minerals

Panelists:

Eric Wangen, StoraEnso

Tony Noon, Imerys

Donna Babcock, The Dow Chemical Company

Saara Söderberg, Pöyry Forest Industry Consulting Inc.

3 – 1

Wood Free Coated Paper Market Outlook For China

Eric Wangen, StoraEnso (Speaker)

China has been growing economically at an unprecedented pace. Its middle class equals the population of the United States and ranks No. 2 to the US in GDP Purchasing Power. Massive capital investment has been made in coated woodfree paper capacity in preparation for its growing consumer market. The government has a challenge how to apply its limited material and energy resources to this growth as well as navigate the social and political issues.

Today, many Western's view Chinese sourced paper as low cost option like the consumer goods it produces. A review of the capacity growth, projected demand, product design and the available resources will reveal that China's primary target is its domestic market. This domestic focus does have to address a number of key issues including fiber sourcing, consolidation and resource allocation.

3 – 2

The Demand For Mineral Pigments In Asia

Tony Noon, IMERYS (Speaker)

Until about 2000, the Japanese paper industry had been the major user of mineral pigments in Asia. Coating formulations had generally tended to be kaolin rich – talc and kaolin tended to be the dominant filler pigments. Starting from about 1997, the Chinese paper industry began its meteoric rise, which is predicted to

continue for the foreseeable future. The Chinese growth is built on state of the art papermaking equipment requiring up-to-date filling and coating pigments for maximum efficiency. Calcium carbonate (both GCC and PCC) usage has grown such that it is now the predominant pigment in use for both coating and filling. The smaller industries in South Korea, Taiwan, Indonesia, India and Thailand also began to follow this trend. In future, Japanese paper production is forecast to be relatively flat but there is a trend towards equipment modernization via scrap and rebuild – here again the emphasis is now on increasing the ratio of calcium carbonate compared to kaolin and/or talc in all mineral pigment applications. Changes in overall fibre usage are also impacting on the potential future quantities of mineral pigments required in Asia – this is particularly so in countries such as China and India where uncoated paper production has typically relied on agricultural residues such as straw and/or bagasse. The weakness of such fibres normally limits mineral filler levels – talc has been the traditional filler in these grades in China and India. Because of their small-scale nature, coupled with environmental concerns, many of the paper mills using agricultural residues are being phased out – larger mills using woodpulp are predicted to both take up the vacuum as a result of these mill closures and be the driver for any growth in uncoated paper production. Mills using woodpulp are able to use much higher mineral filler loadings than mills using agricultural residues. One important point to bear in mind is that, unlike fibre, mineral pigments are not a renewable resource. This presentation will examine the potential demand for such mineral pigments and try to shed some light on potential supply issues in the future.

3 – 3

Impact Of Asia On Global Coated Paper Market Trends - Panel Discussion

Donna Babcock, The Dow Chemical Company (Speaker)

The paper industry in Asia is growing dramatically and Asian companies are investing in modern, high speed production equipment. This trend is changing the global balance of the coated paper market. This overview is designed to explore latex binder trends around the world to understand the regional differences in terms of overall binder consumption and technology evolution.

Latex binder technology continues to adapt and improve as global market needs change to accommodate regional raw material differences, base sheet differences, and equipment modifications which impact binder requirements in a formulation. Latex suppliers are developing the right chemistry solutions to meet basic manufacturing requirements and are delivering continued

optimization of the total coating formulation cost to assist with the challenging economic environment the coated paper industry faces. This overview will also demonstrate the importance of binder suppliers providing local solutions by leveraging global knowledge and strong research and development in order to assist in continued technology development and success in the industry.

3 – 4

Trends In Trade Flow, Growth And Production In Asia

Saara Söderberg, Pöyry Forest Industry Consulting Inc. (Speaker)

Current global trade flows are changing dramatically as a result of Asia's increasing demand for paper and paperboard, and rapid capacity growth. Significant growth in paper and paperboard production capacity is increasing Asia's (and especially China's) appetite for papermaking fiber, both virgin and recovered, potentially to the detriment of other producing regions. China has invested in most modern and largest scale production equipment and this has changed the global industry structure. Based upon the modern, large scale paper machines and imported fiber from low cost regions, Chinese and other Asian producers are very competitive producers of many pulp and paper grades.

4/23/2007

Session: 4

10:30 a.m. – 12:00 p.m.

Hot Topics In Printing Panel Discussion

Session Moderator

Nancy Plowman, NPA Associates

Panelists

Nancy Plowman, NPA Associates

Don Duncan, Wikoff Color

4 – 1

Hot Topics In Printing - Panel Discussion

4/23/2007

Session: 5

10:30 a.m. – 12:00 p.m.

Advances In Coating Materials: Designing Pigments And Binders For Value And Performance

Session Moderator

Prakash B. Malla, Thiele Kaolin Company

5 – 1

Pigment And Binder Combinations To Optimize Value And Performance For Light Weight Coated Paper

Amy Dimmick, Specialty Minerals Inc. (Speaker)

Kimmo Huhtala, Specialty Minerals Nordic

Finding the balance between cost and performance can be difficult, and there are a multitude of different pigments, binders and additives that are available to choose from. This study takes a very simple approach and uses a few pigment and binder combinations to give a glimpse of the possibilities that exist by varying these components from both a paper performance and cost view point.

5 – 2

Latex Morphology Impact In Narrow Particle Size Distribution Pigmented Formulations

Holly Dunnill, The Dow Chemical Company (Speaker)

Femi Kotoye, The Dow Chemical Company

John Oates, The Dow Chemical Company

Rachel Green, The Dow Chemical Company

Evelyn Wilson, The Dow Chemical Company

Narrow Particle Size Distribution (NPSD) pigments offer higher glossing and higher brightness than their traditional counterparts. This is an appealing concept for the coated paper customer as they can use less TiO₂, less optical brighteners and less glossing additives for an opportunity to save money. Because of these properties, many North American coated paper mills are either using some level of a NPSD, exploring higher levels, or undertaking strategic decisions for major conversions to NPSD. However, as the coated paper maker moves in this direction, he/she will face issues with formulation water holding, machine runnability, coated sheet strength and potentially print properties. The performance gaps identified in comparing NPSD pigments to traditional coating pigments can be minimized or overcome with the right latex morphology. Three latex morphologies and their impact to the paper coating formulation and finished sheet properties are presented.

5 – 3

Optimization Of Steep Carbonate Coating Formulations With Ultra Fine Platy Kaolin

Benny Hallam, Imerys (Speaker)

Chris Nutbeem, Imerys

Tatsuya Asano, IMERYYS Minerals Japan

Maintaining high paper gloss without compromising light scattering potential in steep particle-size-distribution carbonate coating recipes is non-trivial. While the use of fine blocky kaolin is accepted practice for gloss generation with standard carbonates, there is doubt over its compatibility with steeper pigment blends. This is because the enhanced light scattering potential of such

coating systems is a result of large, clearly defined pores. As these become larger, there is a chance that the fine kaolin will partially fill them, thereby reducing the system's light scattering potential. Additionally, the partial filling of these pores would further increase the ink setting rate of the system. It is proposed that the use of ultra fine, but platy, kaolin may overcome these shortcomings. This assumes that the aspect ratio of the kaolin plates can be engineered to be sufficiently fine to aid gloss development, but concurrently have a large enough plate diameter to stop it from filling the voids created by the steep partner carbonate. The performance of coatings formulated with such a kaolin, a new product development, is reported here for the first time and is contrasted against that obtained from a fine blocky kaolin.

4/23/2007
Session: 6

12:00 p.m. – 1:30 p.m.
Coating Fundamentals CIG Lunch And Learn

Session Moderator

David Vidal, PAPRICAN

6 - 1

Ultrasound For Characterizing Concentrated Dispersions And Emulsions: Particle Sizing, Zeta Potential, Micro-Rheology

Andrei Dukhin, President of Dispersion Technology Inc, NY

There are two independent ultrasound based techniques for characterizing particle size distribution, rheology and z-potential in concentrated dispersions and emulsions: Acoustics and Electroacoustics.

Acoustic spectrometer measures attenuation of ultrasound for a set of frequencies and calculates corresponding particle size. In addition this attenuation spectra and sound speed can be interpreted in rheological terms, as the high frequency extensional visco-elastic properties.

Electroacoustic spectrometer deals with the coupling between electrodynamic phenomena and the sound wave pressure field. Particles generate an electric current, the so-called Colloid Vibration Current (CVI) due to the motion caused by ultrasound pulse. Electroacoustic spectrometer measures this current and calculates ζ potential. The seminar will lead on to a discussion of the advantages of these ultrasound based techniques over other methods. Various existing applications of ultrasound for characterizing a paper related colloids are presented.

Use Of Acoustics To Monitor The Film Split In Printing

Sanna Tuominen, KCL, Oy Keskuslaboratorio (Speaker)

On-line process status information provides tools to enhance productivity, runnability and quality. In this work we demonstrate the power of on-line acoustic technique to monitor the status of the heat set web offset (HSWO) printing blanket. The changes in the print quality (e.g. vanishing dots) were easily linked to the changes in the blanket status. The printing trials were performed on KCL's production scale HSWO press at the speed of 6.2 m/s. In the acoustic method a microphone was fixed on the upper side of the 4th printing unit. In order to maximize the film splitting sound, the microphone was oriented towards the nip exit. The microphone detected the signal from both image (film splitting) and non-image (adhesion/stickiness) areas. FFT analysis was performed to obtain the power spectral density from the acoustic data. The signal was time filtered in order to separate the image and non-image area behavior. The results of two commercial heat set inks on six LWC-type coated papers and varying press settings are presented. The increase of sound intensity coming from the non-image area was linked to the formation of accumulations on the printing blanket. This phenomenon was repeatable; washing of the blankets brought the signal level back to the original value from which it gradually increased again as the run proceeded. The signal level on the non-image area was typical for a given set of process conditions and materials, and it was noticed that the feed levels of fountain solution and ink properties play a critical role. The increase in fountain solution level retarded the formation of accumulations on the blanket. Thus, on-line acoustic measurement can be used to monitor the state of the blanket and the fountain solution feed can be adjusted to prevent build-up formation. One way to utilize the acoustic measurement would be to use it as a part of the existing process control system to optimize the blanket washing cycles, which would greatly reduce waste and improve print quality. This would also help the printer to keep constant print quality during print-runs. We would like to encourage the discussion on further applications and utilization possibilities of the acoustic method for example in coating processes.

4/23/2007

Session: 7

12:00 p.m. – 1:30 p.m.

Calendering Cig Lunch & Learn

Session Moderator

Mark Sorenson, Andritz Huster, Inc.

Common Calendering Defects Open Discussion

4/23/2007
Session: 8

12:00 p.m. – 1:30 p.m.
Coating Materials And Emerging Technology CIG Lunch

Session Moderators

Amy Dimmick, Specialty Minerals & Ravi Mukkamala,
Rohmnova

8 – 1

Update On Biopolymer Nanoparticle Latex Development And Applications

John Van Leeuwen, EcoSynthetix (Speaker)

Biopolymer nanoparticle latex is a new class of paper coating binders that competes favorably with both S/B and other latexes and specialty coating starches. The biopolymer latex is made from renewable resources, and hence its price is not tied to the price of oil. The product was first introduced at last year's TAPPI conference and an update will be given on the market development work done to date and the applications that are being pursued. The biopolymer latex, marketed under the trade name ECOSPHERE[®], has shown excellent properties with up to 75% replacement of the S/B latex in both laboratory and pilot coater evaluations. The product provides good water holding and can reduce the need for natural or synthetic water holding agents. Pilot coating trials showed a number of other favorable properties: increased bending stiffness, increased CIE whiteness, increased IGT dry pick. Under optimized calendering conditions, the biopolymer has gloss properties that were at least as good as latex and significantly better than starch containing coating formulations. Among other advantages are improved opacity properties.

8 – 2

Latex Replacement By Starch – Modern Starch Technology Offers Possibility To Save Costs And Improve Quality At The Same Time

Detlev Glittenberg, Cargill Industrial Starches (Speaker)

The paper first analyses options to reduce costs during the production of double coated wood free papers. Costs can be reduced by:

- using Ultra filtrated Coating Colour as pigment additive in pre-coating colours
- reduction of binder level by increasing coating colour solids
- optimisation of synthetic/natural binder proportion at maximised solids

- increasing the proportion of pre-coating in total coating

The paper then describes in detail the results of those different measures alone and in combination on pilot and plant scale by:

- switching from a more viscous to a less viscous starch to increase coating colour solids
- dispersing and cooking the starch in the Ultra filtrated Coating Colour to maximise solids
- reducing drying energy with simultaneous improvement of mottling by increasing coating colour solids
- improving quality and realizing savings by replacing a 10 parts Latex/ 6 parts Starch binder composition with one of 7 parts Latex/ 7 parts starch at increased coating colour solids
- using low viscosity starch in the pre-coating formulation to positively influence cracking in the fold
- applying pre-coat weights of 12 –14 lbs per side at 4600 ft/min using a free jet coater with proportional reduction of the subsequent top-coating

Although the examples cited are all from wood free papers, we are confident that within certain limitations the results can be transferred to the wood-containing sector.

4/23/2007
Session: 9

12:00 p.m. – 1:30 p.m.
Printing Cig Lunch & Learn

Session Moderator

Margaret Joyce, Western Michigan University

9 – 1

RFID The Next Opportunity For Rotogravure
Walter Siegenthaler, Max Daetwyler Corp (Speaker)

4/23/2007
Session: 10

1:30 p.m. – 3:00 p.m.
Market Trends In Commercial And Industrial Printing And Imaging

Session Moderator

Chuck Klass, Klass Associates

10 – 1

Trends In Printing, Imaging And Packaging Paper And Paperboard
Chuck Klass, Klass Associates (Speaker)

Changes in advertising media, electronic communication, retailing and logistics are driving changes in paper, paperboard and printing/imaging methods. This presentation and session will look into marketplace

drivers, expected trends and implications for the paper and paperboard industry.

10 – 2

2006 Profile Of North American Fine Papers Utilized In Offset Printing

Andrew DeMaio, The Dow Chemical Company (Speaker)
Femi Kotoye, The Dow Chemical Company
David Smith, The Dow Chemical Company

Due to continually changing technologies, raw materials and globalization in the paper and printing industries, Dow Paper Latex periodically profiles coated papers to assess their current optical and printing performance. The specific focus was North American fine papers utilized in offset printing, including grade #1, #2, and #3 brands of sheet fed and web fed coated papers. Analysis of the results revealed the expected differences in optical performance between brands grouped in the #1, #2 and #3 grades. Conversely, it was also found that there was no statistical difference in printing performance between the grades. With respect to web fed brands versus sheet fed brands, it was found that there was only a slight inferiority in the measured printing and optical performances of web compared to sheet but the wet strength of web papers was much poorer.

10 – 3

How To Survive And Thrive As Commercial Printing Goes Digital

Glen Hopkins, Hewlett Packard Corporation (Speaker)

Digital printing has largely been confined to the office environment, on demand printers and specialty applications such as photo printing, banners and engineering graphics. Digital imaging technologies, especially ink jet, are undergoing dramatic improvement and can now produce quality and run at speeds comparable to web offset and gravure. Digital printing does away with prepress and make-ready and also allows customization of individual signatures in a large volume press run. These capabilities will facilitate digital printing taking significant market shares from offset, gravure and flexo in commercial, industrial and packaging printing. Papermakers will need to adapt to survive and thrive in this “Brave New World.”

4/23/2007
Session: 11

1:30 p.m. – 2:30 p.m.
Supplier Showcase

Session Moderator

Jan Walter, Western Michigan University
Bob Kearney, Western Polymer Corporation

1:30 p.m.

I³: Innovation Ideation Initiative – Pioneering The Way For The Future Of Kaolin

Cynthia Mercer, Thiele Kaolin Company

For more than 50 years, Thiele Kaolin Company has been one of the world's leading sources for high performance, tailored kaolin clay products. Thiele understands the need to look beyond the current scope of typical mineral-based solutions to deliver innovations in mineral technology, processing capability and application assistance that offer the best solutions to our customers and the evolving marketplace. Innovation Ideation Initiative, or I³, is a program created by Thiele that fosters process, product, market, and management innovation. This presentation will give an overview of the I³ program, including why innovation in kaolin products and processes is vital to the industry.

1:38 p.m.

ValZone - Metal Belt Calender

Martti Tuomisto, Metso Paper USA Inc.

A breakthrough in calendering of coated paper and board is introduced. It features a ValZone Metal Belt Calender before coating. ValZone's heated steel belt plasticizes paper on both sides in one 40" long nip, producing flat, smooth surfaces for coating, resulting in excellent printability and appearance. Good profiling capability and preservation of strength and bulk are other benefits. ValZone can help boost production by 20-40% by removing bottlenecks, such as a Yankee dryer or wet stack on coated board.

1:46 p.m.

NON CONTACT DRYERS: OUTSTANDING ENERGY SAVINGS

Georges Quenard, Bekaert

Many NORTH AMERICAN mills have NON CONTACT DRYERS installed: GAS or ELECTRICAL INFRARED systems and AIR DRYERS. They know how much they spend in energy costs but do not know the real efficiency of their system. Quite often it is even lower than expected. Significant energy savings are at stake by up-grading or changing existing Non Contact dryers. 30 to 40% energy savings are achievable on systems which are quite big. We shall go through the up-grading possibilities and also present the highest efficient Non Contact Dryer in the market to help you to figure out savings that you may get.

1:54 p.m.

AcquiData

Isabella Mitchell, AcquiData, Inc.

AcquiData, Inc proudly announces the release of Testream/CS v 7.0 and will be presenting an overview of the key enhancements. These enhancements include a number of new reports - control charting, cpk

analyses, box and whiskers charting, beater curve reports and histograms – as well as new automatic data collection features: reading count control, ‘auto send’, and *three* different test reading filter options to catch errors. Testream/CS v 7.0 amply reflects the 20+ years’ experience of AcquiData, Inc. in the automation of paper testing laboratories.

2:02 p.m.

Electric IR Profiling & Drying

Cato Sandberg, Cato Sandberg’s Coating Consulting

Electric IR is emerging as a viable way of drying after any coating application. The new DryMaster electric IR from Ircon Drying Systems AB in Sweden can serve as the single drying source because the cooling air from cooling the lamps is redirected to scrub the vapor barrier away from the sheet. Electric IR is some 4x more efficient than Gas IR (BTU basis) and could cut the drying cost in half compared to Gas IR.

2:10 p.m.

DynaCoat C - a new compact coater design

Martin Kustermann, Voith Paper GmbH & Co. KG

The new “baby” in VOITH’s coater family called DynaCoat C is directed to those applications where an economic and compact design is the optimum choice. Its compact design with minimum space requirements in MD allows for quite economic rebuilds of older existing coater stations earlier supplied by -but not limited to- e. g.: Beloit, Valmet, Jagenberg. It’s also first choice for smaller and slower running machines. With the new thermally decoupled blade beam design there is no need for an external water circulation system in order to secure blade beam straightness in hot areas. The full integration of controls reduces the time for peripheral installations tremendously, allowing for short paper to paper rebuild shut downs.

2:18 p.m.

Omyajet Pigments for Inkjet Coatings

Stephen Stueck, OMYA Inc.

Omya has developed a family of high quality pigments for the rapidly growing inkjet market. Omyajet B is designed for high quality matte inkjet grades and Omyajet C, which is typically applied with a metered size press, delivers an improved inkjet printable surface to business papers.

2:26 p.m.

Improving Inkjet Print Performance with Fumed Silica at the Size Press

Leo Nelli, Degussa Corporation

A very thin layer of a fumed silica based coating (0.5-1.0 g/m²) applied to plain paper at the size press improves inkjet printing performance. The silica coating behaves as an inorganic sponge with a well defined void and

channel structure to absorb ink rapidly for enhancing color qualities. Cationic and anionic fumed silica dispersions at high solids content are easily combined with commonly used components used at the size press.

2:34 pm.

Cargill's Solution for high quality coating at reduced costs: C*Film 07302, 07311, and 07325

Ashok Mishra, Cargill Inc.

Cargill has successfully developed a proprietary modification technique to create a range of "C*Film starches" ideally suited for binder cost optimization. Their rheology makes them perfect for customers requirements for modern application technology used in single and multiple coated woodfree, woodcontaining papers and paperboards. The viscosity stability at high solids of C*Film starches has demonstrated excellent performance in coating applications. These applications range from pigmentation and pre-coating at very high solids to high-speed coating. In addition, these new starches are chlorine-free and completely AOX-free to further support "greener" papermaking processes.

2:42 p.m.

Dow High Performance Latex Product Line Continues to Expand - Meeting the Ever Changing Needs of the Paper Industry

Greg Welsch, The Dow Chemical Company

Over the years, Dow has introduced new products to the paper industry that meet our customer's needs for new technology. From high strength latexes that have offered our customers an opportunity to reduce coating system cost through binder level reduction to improved appearance products for coat weight reduction in paperboard, Dow has delivered enabling solutions to our industry. We are proud to report that Dow has continued to innovate and develop solutions for new market needs. This year we will introduce two unique latex technologies that enable improved performance in narrow particle size distribution (NPSD) pigment systems as well as a unique high strength latex that also offers improved paper stiffness. Our family of products for NPSD pigment systems will demonstrate the performance gaps identified in comparing NPSD pigments to traditional coating pigments can be minimized or overcome with the right latex choice. Expanding our industry leading position in high strength latex technology, we now offer a unique product that delivers improved coated paper stiffness while retaining high strength latex performance required to meet the demands of high speed printing processes.

4/24/2007
Session: 12

8:00 a.m. – 12:00 p.m.
Additives Tutorial

Session Moderator

Gordon Bugg, Eka Chemicals Inc.

12 – 1

Additives Tutorial

A series of presentations and panels covering the primary groups of coating additives for aqueous coatings used in the manufacture of paper and paperboard. Although termed a tutorial, this is not a dry review of textbook coating, but emphasizes the practical application of the various chemistries that are in general use. Practical information on the selection, application, measurement and troubleshooting of the various additives will be discussed and the attendees will have the opportunity to interact with the highly experienced presenters to discuss any particular applications. An excellent means of making new contacts and learning more about those minor components that have such a major impact on coating performance. As a bonus, a section on barrier coating applications which complements other Conference presentations on the same topic will be included

4/24/2007

Session: 13

8:30 a.m. – 10:00 a.m.

Ink, Paper, and Electronics - Panel Discussion

Session Moderator

Jan Walter, Western Michigan University

13 – 1

Printing Electronic Devices on Paper

Gary Baum, Consultant

13-2

Printing Integrated Circuits

Erika Hrehorova, Western Michigan University

13-3

Printing RFID Antenna with Conductive Inks

Jeff Parker, Acheson Colloids Conductive Polymers

13-4

Standards for RFID and EPCs in Packaging

Ian Robertson, EPC Global Inc.

4/24/2007

Session: 14

8:30 a.m. – 10:00 a.m.

Improving Coating Uniformity And Process Runnability

Session Moderator

Stig Renvall, Metso Paper

14 – 1

The Effect Of Color Immobilization On Spray Coated Paper Quality

Akinobu Chatani, Nippon Paper Industries Co., Ltd. (Speaker)
Koji Okomori, Nippon Paper Industries Co., Ltd.

The suitable conditions to obtain good paper quality and coating runnability of spray coating were investigated. Sufficient spread and merger of spray droplets on the base paper are very important to obtain uniform coating formation as well known. In this study, we focused on the correlation between the base paper properties and the immobilization time of coating color. When the lower bulk base paper was used, the immobilization time was getting longer and the base paper coverage was better. Moreover, the long immobilization time caused by the color properties, such as coating formulation and solid content, improved the base paper coverage. The optimization of the coating color for the base paper would be important to design for spray coating, in addition to the coating formulation as known by previous works, for example color viscosity. The spray coated paper under the optimized condition was higher gloss than that of blade coated paper. Note-worthy, this optimum condition enabled to achieve high speed coating at maximum 3150 m/min and to obtain good quality paper.

14 – 2

Pressure Driven Flow Into A Slit And The Onset Of Clogging

Rajan Iyer, Imerys (Speaker)

Chris Basciano, North Carolina State University

Tony Lyons, Imerys

Douglas W. Bousfield, University of Maine

Pressure driven flows of fluid suspensions through narrow geometries are often encountered in the paper industry. Premetering of coating suspensions is gaining increasing attention to overcome the requirement of overapplying materials to a surface then metering at the surface and recirculating. Curtain coating and spray coating are newly developing technologies for high speed coating. New understandings of particle shape and size distributions allow application of ultrathin layers for maximum efficiencies but with rheological challenges. A good understanding of the application processes with these pigments is needed to visualize the processes and the dynamic conditions that occur.

Some of the phenomena encountered with these premetering devices, and rheometers themselves, create nonlaminar flows and logjams of particles in converging geometries. A good understanding of the mechanisms of clogging is lacking in the literature. In this work, experiments with a slit rheometer are compared to a finite element model to relate pressure drop in the slit to viscosity and flow rates. Particles are found to be able to form clusters and span large distances in a converging flow

geometry. These results suggest a maximum solids limit. Pilot coater work has demonstrated that such solids limits do exist for application of low coat weights.

14 – 3

Multivariate Analysis Of Gloss Of Coated Papers

Ramin Farnood, University of Toronto (Speaker)

Ernesto Caner, University of Toronto

Carlos Quijano-Solis, University of Toronto

Ning Yan, University of Toronto

In this study, multivariate regression analysis was used to analyze the influence of pigment properties, coating weight and calendering conditions on the micro-gloss and micro-gloss non-uniformity of coated papers. Delaminated, undelaminated, and engineered kaolin clays, as well as ground calcium carbonates were included in the study. The analysis showed that pigments size and aspect ratio, and coating and calendering conditions had strong effect on the micro-gloss properties. However, the broadness of pigment size distribution had no significant impact on the average microgloss and its variability.

4/24/2007

Session: 15

10:30 a.m. – 12:30 p.m.

Barrier Coating - Panel Discussion

Session Moderator

Franco Palumbo, Graphic Packaging Corporation

15 – 1

Talc For Barrier Coating

Fuushern Wu, Rio Tinto Minerals (Speaker)

Barrier paper and paperboard are an important part of packaging solutions. They provide not only aesthetic to the packaging but also protection against: water and vapor, oil and grease, air and gases. These high performance products often serve niche markets. Common barrier technologies include poly-coated, laminated, waxed, fluoro-treated, and water-based barrier coatings. Re-pulpability and recyclability, Perfluorooctanic acid (PFOA) concerns, sustainable development initiative, and the pressure to reduce product cost are some of the challenges and opportunities.

Performance of barrier coatings is highly dependent of the types of barrier polymer and enhancement pigment such as talc, clay, and mica used in the coating formulations. High performance talc (HPT) based barrier products are found to be most cost efficient for barrier applications due to their unique performance characteristic. Most importantly, HPT products can be tailored for

optimal performance. High performance barrier talc products have shown to enhance Oil and Grease Resistance, Moisture Vapor Transmission Resistance, and prevent blocking of coated papers. HPT products can potentially reduce barrier polymers and/or coat weight, resulting product cost reduction as well as contributing to the sustainable development initiative.

- 15 – 2 **Barrier Requirements For Flexopackaging**
Stuart Sharp, EXOPACK (Speaker)

- 15 – 3 **Strategies For Economical Alternatives For Wax Replacement In Packaging**
Roman Popil, IPST @ Georgia Tech (Speaker)
Margaret Joyce, Western Michigan University

Water resistance for packaging applications by aqueous polymer coatings is considered with emphasis on improving the economics necessitated by recent escalating costs and unavailability of paraffin wax for coatings. Studies are reported of incorporation or blending of various pigments towards waterproofing linerboard along with changes in relevant physical properties. Impregnation of polymer/pigment bends is observed to increase strength properties substantially. Observations are made of surface flame treatment and curtain coating which can lower the coating basis weight required to attain a level of water resistance. Mention is made of the potential for electrospinning to supplant conventional coating technologies.

- 15 – 4 **New Generation Latex And Polyolefine Dispersion Based Products For Barrier Applications**
Jamel F. Attal and Femi Kotoye, The Dow Chemical Company (Speakers)

This presentation will review some of the key performance targets and testing protocol for barrier. Additionally, some coating strategies to overcome some of the key issues will be presented. Performance examples for Oil and Grease barrier applications will also be presented.

- 15 – 5 **Fluorochemicals For The Paper And Packaging Industry - Current Status And Essential Facts**
Joseph T. Martinko, E. I. DuPont de Nemours & Co., Inc. (Speaker)

The presentation will review the unique chemistry, uses and societal value of fluorochemicals in the paper and packaging industry. In addition, the current product stewardship and regulatory status of fluorochemical products will be discussed.

4/24/2007
Session: 16

10:30 a.m. – 12:00 p.m.
Coated Paper Bulk And Stiffness

Session Moderator

Don Hiscock, DuPont Soy Polymers

16 – 1

The Elastic Modulus Of Paper Coating In Tension And Compression

Parvez Alam, Åbo Akademi University (Speaker)

Qian Xu, Åbo Akademi University

Martti, Toivakka, Åbo Akademi University

Helena Hämäläinen, Tampere University of Technology

Seppo Syrjälä, Tampere University of Technology

The mechanical properties of paper coatings were studied in tension and compression. Coatings were formulated with soft and hard latexes and using different latex fractions for the sake of comparison. The elastic modulus was determined under static loading conditions and showed no effect when using different loading rates. Voigt, Reuss and Halpin-Tsai models were used to predict the elastic modulus of coatings in compression and tension. In tension, the models showed a high level of variability and no particular model could be deemed suitable for predicting the tensile modulus of coatings. In compression, the Voigt model was shown to predict the elastic modulus of coatings to within one standard deviation of the experimental mean and the reason for the success of the Voigt model as a means of predicting the compressive modulus is related to its micro-deformational characteristics.

16 – 2

Effect Of Pigment Shape On The Compression Response Of The Coating Layer

Pooya Azadi, University of Toronto (Speaker)

Ramin Farnood, University of Toronto

Ning Yan, University of Toronto

In the present paper, a particle flow model was used to study the effect of pigment morphology on the packing and compression behavior of the coating layer. Spherical, platy and needle-like pigments are considered in this study. Strain-stress behavior of the coating layer and in-plane and out-of-plane movements of the

pigment particles are computed under the same maximum compression stress. Moreover, changes in the orientation distribution of the platy particles due to compressive stress are quantified. Simulation results showed that consolidation of high aspect ratio pigments under gravity will lead to coating layers with a higher initial porosity. The in-plane movements of the pigment particles due to the compression process are negligible relative to the magnitude of the surface roughness of the coating structures. Rearrangement of the platy particles to form a smoother surface is also observed. These results can help better understand the compression and smoothing phenomena in the calendering process.

16 – 3

Factors Affecting The Printing Strength Of Kaolin-Based Paper Coatings

John Husband, IMERYS Minerals Ltd. (Speaker)

Janet Preston, IMERYS Minerals Ltd.

L. F. Gate, IMERYS Minerals Ltd.

D. Blair, University of Edinburgh

P. Creaton, University of Bristol

We have studied the pick strength of kaolin coated papers as a function of the pigment particle size, morphology and binder level. We found that dry pick using oil and oil-based inks depended on the particle size. Coarse clays gave stronger coatings than fine clays. When predamping with water, the strength depended on the interval between predamping and printing. Coarse clay coatings had the greatest sensitivity to water, with the lowest strength when wet and the highest when dry. Results indicate that the permeability of the coatings to water is the critical factor affecting wet pick. A new finding was that ink oils also reduce the strength of the coating layer. The loss in strength depended on the fluid polarity, being greatest with water and least with mineral oil. This effect of fluid may indicate disruption of bonding between latex and the kaolin surface. Hence the pick resistance of a coating layer is a result of the interactions between the ink and coating. Oil penetration from the ink into the coating increases the applied stress through tack build, and simultaneously reduces the strength of the coating. Improving mineral and binder adhesion may be the key to obtaining better coating strength.

4/24/2007
Session: 17

1:30 p.m. – 3:00 p.m.
Advances In Coating Binder Technology - Panel Discussion

Session Moderators

Ravi Mukkamala, Rohmnova

Amy Dimmick. Specialty Minerals

Panelists

Juha Saari

Jackie Laurich

Femi Kotoye

17 – 1

Use Of Starch Ester Derivatives And Dispersions Of These As Novel Binders In Paper Coatings

Juha Saari, VTT Technical Research Centre of Finland

Starch esters with the degree of substitution (DS values) > 2 constitute of a class of biodegradable, amorphous, thermoplastic polymers which can be used as water dispersions for potential substitutes for crude oil based binders in paper coatings and adhesives.

Native starch ester derivatives can be dispersed in water at 60 -100 °C by using a combination of a plasticizer and a protective colloid, preferably selected from the group of cold water soluble polyvinyl alcohols. Solid contents of 50% with the viscosity less than 1000 cp and the average particle size within the range of 200 to 1000 nm is achievable.

Recently novel methods have been developed also for simultaneous molecular weight and substitution pattern manipulation of the starch molecule. Transglycosylation of starch ester with diol results in formation starch polymer with characteristics of Mw: 20 000 - 250 000 g/mol with the DS value in the range of 2 to 3, glass transition temperature of + 158-160 °C, and ISO brightness value of 88 for a purified product. Furthermore NMR studies have revealed that most the free OH groups are located at C-6 position in the starch anhydroglucose unit. Enhanced solubility in organic medium makes the polymer suitable as a starting material for preparation of highly nano-porous precipitated starch acetate and submicron scale spherical starch ester particles. Additionally, chemically cleaved and partially deacetylated starch polymers can be usable in novel hot melt adhesives with good thermal stability. The polar character of starch acetate itself and the presence of free hydroxyls may play an important role in observed binding capability of starch particles to the fiber surface.

17 – 2

Can We Have Our Cake And Eat It Too?

Jackie Laurich, Rhomnova

Coated paper producers are constantly trying to balance market needs such as brightness, gloss, and opacity with cost to remain competitive. Technology advances with respect to machine improvements and coating raw materials, such as engineered pigments, have enabled the mills to achieve these goals. Latex continues to play a key role in the coating formulation and a simple low cost latex capable of running at high speeds and binding even the nano-particle size pigments is on everyone's wish list. As a result, latex suppliers are challenged with delivering performance and value in a wide variety of formulations. So, is there a universal cheap latex?

17 – 3

Global Evolution of Binder Technology in Coated Freesheet
Femi Kotoye, The Dow Chemical Company

Latex technology continues to evolve as a response to changes in Productivity, Paper Quality and Environmental Regulations. This presentation looks at current trends in these drivers and makes a prediction on future binder development to address these trends.

4/24/2007
Session: 18

1:30 p.m. – 3:30 p.m.
Factors Affecting Print Gloss And Measurement Techniques

Session Moderator
James Brown, Rohmnova

18 – 1

A Diffractive Glossmeter For Local Gloss Measurements Of Papers And Prints

Mikko Juuti, University of Joensuu (Speaker)
Hanna Koivula, Åbo Akademi University
Martti Toivakka, Åbo Akademi University
Kai-Erik Peiponen, University of Joensuu

This work reports on a new method to detect and analyze gloss, gloss variation and gloss mottling of papers and prints. Gloss variations of different paper products can be obtained with the aid of the diffractive glossmeter used in this study. As we believe that the results achieved have much importance in industrial optical inspection of paper and printing, furthermore online measurement of gloss using DOG is possible which might be interesting also.

18 – 2

Comparison Of Dynamic Print Gloss Measurement Techniques

Hanna Koivula, Åbo Akademi University(Speaker)

Mikko Juuti, University of Joensuu
Douglas Bousfield, University of Maine
Janet Preston, Imerys
R. Silvennoinen, University of Joensuu
Kai-Erik Peiponen, University of Joensuu
Martti Toivakka, Åbo Akademi University

Optical properties are an essential quality measure when papers are printed with an ink to produce an image on paper. Measurement of optical properties, such as print gloss, as a function of time provide means to study ink setting behaviour and paper-ink interactions. This study compares three different methods for measuring dynamic print gloss: a dynamic gloss meter, a diffractive optical element based glossmeter (DOG) and a polarized light reflectometer. Four double coated papers were printed at varying ink levels. The technical details of the measurement techniques are compared and discussed. Dynamic print gloss results are evaluated in the light of current ink setting theories. Each of the methods is very applicable to ink setting studies. The results indicate that the measured print gloss is a combination of the influences from printing conditions, ink filament formation in the printing nip, and ink-leveling.

18 – 3

The Influence Of Blanket Type On Print Gloss Development

Masanori Kawashima, Nippon Paper (Speaker)
Douglas W. Bousfield, University of Maine

The development of print gloss is reported for the first time using actual printing inks, coatings and blanket materials. The print gloss for several blanket textures is measured at different printing conditions and ink levels. The results show that the surface structure of the blanket material has a significant influence on print gloss development. In addition to the blanket, the printing speed and ink amount also have an influence on print gloss. Nip pressure had little influence on print gloss. Higher blanket roughness and high printing speeds correlate with low gloss. Print gloss is a complex function of ink amount and depends on the printing surface. A model, based on the surface tension driven leveling of an ink filament, is proposed to predict the print gloss right after printing. The model predicts the correct gloss dynamics and gives insight into the length scale related to the blanket texture.

18 – 4

Relationship Between Ink Film Topography And Print Gloss In Offset Prints On Coated Surfaces

Goran Strom, STFI-PF (Speaker)

Model coatings with different micro roughness but similar and low macro roughness were prepared and laboratory printed. The coating micro roughness strongly affected the print gloss at low inking levels, corresponding to one or two full tone layers. The effect of coating micro roughness decreased with ink amount and was insignificant at inking levels of 3-4 g/m², which corresponds roughly to 3-4 full tone layers.

A strong correlation between ink film micro roughness and print gloss was established.

Remaining ink filament patterns that had survived the ink levelling process were observed with a fast setting coating but not with a slow setting coating. The amplitude of the filaments was a few tenth of a µm only and was strongly dependent on ink amount. The filaments were observed in wavelength bands between 15 and 125 µm, which can be regarded as a sub-macro roughness region. Their impact on print gloss was estimated on some 6 gloss units.

4/24/2007
Session: 19

3:30 p.m. – 5:30 p.m.
Hagemeyer Happy Hour

Session Moderators

Tony Lyons, Imerys
David Vidal, PAPRICAN

19 – 1

Hagemeyer Happy Hour

Grab a cold one and join in on the fun! Mix and mingle with your colleagues as you join in on casual topic-based discussions. It also gives you a great opportunity to present your everyday challenges, ideas and theories in an environment where everyone else is focused on finding solutions together. Named in honor of Robert "Bob" Hagemeyer, this annual event has become a must-attend and is a great place to get to know your fellow attendees better. Come armed with a topic or thought for discussion.

4/25/2007
Session: 20

8:30 a.m. – 12:00 p.m.
Advanced Rheology Tutorial

Session Moderator

Rajan Iyer, Imerys

20 – 1

Basic Rheology

Rajan Iyer, Imerys (Speaker)

The fundamental aspects of rheology of fluids will be explained. The measurement techniques that are typically used, the shear rate versus viscosity behavior of common fluids and the relevance to typical process conditions that are experienced during application process common to the paper industry will also be discussed.

20 – 2

Rheology Of Printing Inks

Douglas Bousfield, University of Maine (Speaker)

The flow and deformation of inks determine the final printed product quality and process issues such as coating pick, linting, rub, and set-off. The rheology of different types of inks will be reviewed. Methods to measure rheology will be described. The ink parameters that influence the rheology will be discussed. Other issues, such as ink emulsification, will also be described. New computer models that use inputs from the rheology measurements to predict gloss, ink tack, and ink setting will be covered.

20 – 3

Rheological Challenges Of Engineered Pigments: Mill Experiences

Martha Newall, IMERYS (Speaker)

The use of shape engineered pigments for coating and size press applications will challenge some traditional and long-accepted "rules-of-thumb" in terms of their flow properties. Engineered pigments have generally had their particle size distribution or particle shape manipulated to enhance their performance. However, the shape and steepness of these products makes them more challenging to pump, store, make-down, and meter -- all processes that can be optimized and managed through a good understanding of their flow properties.

This tutorial will examine mill experiences and findings that have led to new protocols for their use. Methodologies and measurement approaches used to characterize coatings containing engineered pigments will be presented. Consideration is given to limitations and challenges faced when operating under mill run conditions.

20 – 4

Rheology And Blade Coating Defects

Richard 'Rick' L. Glisson, RhomNova (Speaker)

This presentation will cover the most common forms of blade defects, including streaks, scratches, and weeping, and will explore the potential causes, including both mechanical and rheological concerns. Troubleshooting tips will be presented on how to determine which type of defect is present and how to reduce or eliminate it. The impact of coating solids on runnability and quality will also be discussed, as well as the role of rheology modifiers and dispersants as coating runnability aids.

4/25/2007
Session: 21

8:30 a.m. – 10:00 a.m.
Cost Reduction Strategies

Session Moderator

Franco Palumbo, Graphic Packaging Corporation

21 – 1

Mill Experiences In Raw Material Cost-Out Efforts

Sheryle Tepp, Stora Enso (Speaker)

This presentation provides a brief summary of Stora Enso Stevens Point Mill's cost out efforts around raw materials. Drivers, Methodology, Continuous Improvement and several examples will be covered, as well as path forward.

21 – 2

Potential Opportunities For Cost Reduction Within The Design And Process Of Coated Paper And Paperboard Grades

David L. Abundis, BASF (Speaker)

The presentation will review potential opportunities for cost reduction across the mill's supply chain and the design/ process parameters of the coated grade development. The paper will review potential cost saving opportunities in each of the following areas:

- Base Paper
- Raw Materials
- Coating Recipe
- Manufacturing Process
- Final Product Quality and Performance
- Transportation
- Logistics/Materials Management
- Cost of Service/Quality/Procurement
- New Technology

The paper is designed to stimulate discussion during the round table session. I hope we outlined some ways and ideas that can be

investigated and potentially reduce costs from the inception of the product design, through the production/supply processes, and finally at your customer.

21 – 3

Reformulation In European Multi-Coated Paperboard

Don Hiscock, Dupont Soy Polymers (speaker)

This presentation describes the results of a coating cost reduction program undertaken in a triple-coated European recycled paperboard mill. The strategy and process used to reduce coating costs while preserving key properties required by the mill's customers are reviewed. The main steps in the reformulation program included (1) defining what was critically important to the mill's customers, (2) ensuring capable techniques were in place to measure these factors, (3) developing sound technical strategies, and (4) ensuring the gains in the program were sustained over time. Formulation details and commercial cost reduction achievements that represented significant savings to the mill are presented .

4/25/2007

Session: 22

8:30 a.m. – 10:00 a.m.

Keys To Commercial Success In Today's Coated Paper Marketplace

Session Moderator

Chuck Klass, Klass Associates

22 – 1

Metered Size Press Coating Formulation Design For Fiber Reduction

Richard Gagnon, Solae (Speaker)

Jan Walter, Western Michigan University

Joel Kendrick, Western Michigan University

Rajan Iyer, Imerys

Leslie McLain, Imerys

Roger Wygant, Imerys

A major driving force in paper technology development is the reduction in cost of paper production. A primary material cost in the paper production process is wood fiber, the cost of which is increasing rapidly. Reducing fiber usage is difficult, as paper properties are tightly coupled to the amount of fiber. Advances in coating formulation design have begun to show how coatings may be designed for fiber replacement without sacrificing paper properties. Both pigment and binder influence coating mechanical properties. Pigment shapes and sizes, and binder types and amounts are all relevant variables. We report here on combinations of these variables investigated at laboratory and pilot scales.

Variations in average coating pigment shape are achieved by varying the ratio between GCC and kaolin, and by varying the platiness of the kaolin. Flatier average pigment shape tended to improve stiffness. Many size press binder formulations consist of a sole starch component. Laboratory and pilot scale experiments show synergistic interactions between starch and protein, leading to reduced binder migration into the substrate. Results demonstrate that stiffness and other mechanical and optical properties can be moved above a linear basis weight dependence on fiber amount with significant potential economic advantages.

22 – 2

Overcoming/Avoiding Hurdles In Filmcoating

Martin Kustermann, Voith Paper GmbH (Speaker)

Dennis Partheymuller, Voith Paper GmbH

The demands of film coating today exist in a large operational window with machine speeds from 300 m/min to 2000 m/min, different coating agents and a large range of coat weights. Within a very broad product spectrum, the challenge is to achieve the required paper qualities for offset, roto and speciality papers and also good machine runnability. Limiting or disrupting factors in film coating (see Fig. 1) are: Misting [1], unstable web run after the nip (“sheet stealing” [2]), colour spitting at the rod [3] and factors like orange peel [4], coating build-up at the applicator rolls, vibrations and many more. In the study, several pilot trials were performed and experience from production lines were taken to investigate the parameters that influence runnability. The work especially focuses on machine parameters in order to improve or influence runnability and final paper quality. Results of different machine parameters on runnability and final paper quality could be evaluated:

- Influence of base paper properties on web release conditions.
- Web release geometry and its impact on misting and quality of the coated paper.
- Influence of rod speed on colour spitting at the rod.
- Impact of diameter of application rolls on misting (Difference between roll diameters of 1000 mm and 1500 mm).

The trials showed, that an expansion of the operating window with larger roll diameters is possible, because of reduced misting rates between 70 and 100 %. The new realizations of web release, rod speed and roll diameters in future will assuredly have an impact on the machine design.

22 – 3

Is It Possible To Produce Double Coated Woodfree High Gloss Art Paper With An MSP+MSP Production Line?

Kimmo Huhtala, Specialty Minerals Nordic (Speaker)

Olavi Imppola, Minerals Technologies Inc.
Sheryl Hildén, KCL
Sanna Tuominen, KCL

The paper industry has experienced continuous paper price erosion during the last 10 – 15 years. During this period the industry has streamlined its production and organizations, machine speed and efficiency have been increased, and high performing value adding raw materials have been selected to reduce total raw material costs. In some areas, such as machine width, the limit has been reached and development is now focused on more efficient production concepts. One such concept is to significantly increase the profitability of the paper making line. The coating concept is based on a robust and high efficiency film coating technology and performance minerals.

4/25/2007
Session: 23

10:30 a.m. – 12:00 p.m.
Nanotechnology In Paper Coating - Panel Discussion

Session Moderator
Phil Jones, Imerys

23 – 1

**Summary Of Current US AF&PA Agenda 2020
Nanotechnology Roadmapping And Focus Areas**
Phil Jones, Imerys (Speaker)

23 – 2

**Exploiting The Opportunities Offered By Nanotechnology In
The Development New And Improved Paper And Board
Products**
Graham Moore, PIRA (Speaker)

This presentation will review recent developments in nanotechnology and explore the opportunities offered in the creation of paper and board products with improved or novel functional properties.

23 – 3

**Using Thin-Crystal Engineered Kaolins To Enhance
Mechanical Properties Of Coatings**
John Husband, IMERYS Minerals Ltd. (Speaker)

Potential gains in mechanical properties (elastic modulus, tensile strength and stiffness) can be realized by reducing the z-direction size of the building blocks to nanoscale dimensions

23 – 4

Binder Technology for Nanomaterials
John A. Roper III, The Dow Chemical Company (speaker)

This presentation will give a general overview of the different roles for binders when used with nanomaterials. Nanoparticles have very small dimensions and high surface areas which presents challenges in choosing the right binder system. Also the binder itself can be designed in a way to contribute to the nanostructure of the composite material.

23 – 5

Paper Requirements For Ink Jet Printed Thin Film Electronics
Gary Baum, consultant (Speaker)

This would be a discussion of printed (primarily ink jet) electronics or optical displays, and the requirements on the substrate (in particular, paper).

4/25/2007
Session: 24

10:30 a.m. – 12:00 p.m.
Substrate Influences On Performance

Session Moderator

Edward Vincent, NewPage Corporation

24 – 1

Increasing Bulk And Bending Stiffness Of Coated Papers Through Basestock

Xuejun Zou, Paprican (Speaker)

This paper shows contribution of basestock and coating layer to bulk and stiffness and how to preserve bulk while achieving gloss and smoothness targets.

24 – 2

Evaluation Of Loblolly Pine Mechanical Pulps In LWC Paper

Zhirun Yuan, PAPRICAN (Speaker)

Cyril Heitner, PAPRICAN

Although the wood cost of loblolly pine (*Pinus taeda*) is lower than that of northern softwoods due to its fast growth rate and suitability for plantation harvesting, loblolly pine mechanical pulps tend to have poor quality and are mainly used in low-value grades such as newsprint. Our recent studies have shown that low-intensity refining or chemical pretreatments can significantly improve the mature pine pulp quality and make it possible to be used in high-value grades like lightweight coated paper (LWC). In this report, we present our evaluation of the use of bleached low-intensity mature loblolly pine thermomechanical pulp, bleached mature pine chemi-thermomechanical pulp, and bleached juvenile pine thermomechanical pulp in LWC paper, focusing on basesheet structure and surface roughness as well as their effect on coating

quality and printability. Results show that, compared to a control sheet using a commercial spruce/aspen bleached thermomechanical pulp, it is possible to use loblolly pine mechanical pulps in LWC furnish. However, pre-calendering is the key to reduce sheet porosity and surface roughness in order to attain good coating holdout and uniform coverage.

24 – 3

Surface Topography Contribution To RFID Tag Efficiency Related To Conductivity

Mario Cruz, Western Michigan University (Speaker)

Margaret Joyce, Western Michigan University

Paul Fleming, Western Michigan University

Marion Rebros, Western Michigan University

Alexandra Pekarovicova, Western Michigan University

A Radio Frequency Identification Device (RFID) is a new technology oriented to the distribution and storage industries. RFID technology is used to identify, track and store information about groups of products, individual items, or products components using radio waves. An RFID device needs an antenna in order to receive a signal and transmit information. The conductivity of the ink directly controls the read range of the RFID tag. The stamping process applied today to produce the RFID antenna works with foil or copper. These etched metal RFID tags offer good read ranges, but the present cost is too high to achieve widespread implementation. However, with the use of conductive ink to print RFID tags, it is expected that production costs will be lower, enabling the broader scale application of this technology. To obtain a suitable implementation of conductive inks in RFID technology, it is important to understand the ink/substrate interactions. For this work, the influence of SBS coated board topography on ink conductivity was studied. The surface topography was altered by using two different coating application methods to apply a coating at different coat weights, then calendering the coated samples at different calendering pressures. A conductive ink was then applied and the resistivity of the ink measured. The results showed the resistivity to be strongly influenced by surface topography.