Paper Conference and Trade Show (PaperCon 2018)

Charlotte, North Carolina, USA
15 - 18 April 2018

Volume 1 of 3

ISBN: 978-1-5108-7189-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571

Some format issues inherent in the e-media version may also appear in this print version.

Printed by Curran Associates, Inc. (2018)
For permission requests, please contact the TAPPI Press

at the address below.

TAPPI Press
15 Technology Parkway South
Peachtree Corners, Georgia 30092

Phone: (800) 332-8686
Fax: (770) 446-6947

memberconnection@tappi.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

CONTROLLING WEB STRUCTURE

Improving Consistency Control 1
Micheal Hendricks
Practical Aspects of Retention Aids Addition on Web Structure Variability 6
P. Krochak, B. Norman
Monitoring Cross-Thickness Distributions of Fines and CMF by Dyeing and Optical Measurement 16
P. Hansen, K. Johansson
UniqueWeb Structures with Next Generation Fibre Foam Research Environment 25
Jani Lehmonen

PRESS DEWATERING

Rewet in Wet Pressing of Paper 28
J. D. McDonald, R. J. Kerekes
Mathematical Modeling and Simulation of Initial and Mechanical Dewatering of Paper Web in Paper Machine Sections 49
Siegfried Graser, Bettina Grashof, Natalie Osti
Water Balance and Simulation of Wet Pressing in a Two-roll Press Section 55
John Xu, Daniel Hedou

PRODUCTION DYNAMICS

In-Situ Measurements of Stock Flow Conditions in the Twin-Wire Forming Zone 59
Claes Holmqvist, Fredrik Rosén, Daniel Söderberg
Improving Runnability of Pulp Drying Machines 73
Javad Saberian, Frederic Parent, Ivan Pikulik
Dimensional Stability Issues of Lightweight and New Paper Grades: Causes and Remedies 86
F. Parent, J. Saberian, A. Menard

CD CONTROLS

Coordinating CD Profilers by Applying Actuator Deviation Penalty in Multivariable CD Control Optimization 97
Calvin Fu, Jarmo Ollanketo
Cross Direction (CD) Mapping Performance Indices 105
Kerry Figiel
A New CD Actuator Mapping Representation and Its Benefits to CD Controls 123
Shih-Chin Chen

PULP MEASUREMENTS AND CONTROLS

Model based Control and Diagnostics strategies for a Continuous Pulp Digester 136
Moksadur Rahman, Anders Avelin, Konstantinos Kyprianidis, Johan Jansson, Erik Dahlquist
Optimization of Brown Stock Washing Using Advanced Process Control 148
Abhijit Badwe, Ramesh Satini
New Trends in Advanced Process Control and Applicability to Pulp Mill Operations 156
William Poe

INDUSTRY 4.0 FOR PROCESS CONTROL

Agile Infrastructure for Pulp and Paper Applications in the Digital Age 167
Shih-Chin Chen, John Schroeder, Shankar Singh, Steve St. Jarre
The Cloud Historian – An IIOT Corner Stone for the Process Industries 178
Matt Burd, Johan Backström
Digital Transformation and Change Agents 185
Mariana Sandin
Collaborative Monitoring of Critical Equipment Availability in Finland's Newest Pulp Mill 195
Juha Alamäki

CONTROL SYSTEMS: FROM PID INTO THE FUTURE

Coming to Terms with PID 202
Pat Dixon
Cooperative Process Optimization between Paper Machines and Stock Preparation Utilizing Plant Big Data Analysis 209
Takashi Sasaki, Hiroyuki Miyamoto, Atsushi Toyoda
"Control Systems" History 221
Åke Hansson

CS8 – MD CONTROLS

Fuzzy Control On A Fluff Pulp Machine To Reduce Consistency and Moisture Variability 228
A. Lucas
Improving Ash Control and Ash Grade Changes 239
Patrick Lawless, Heinz Osewold, Wilhelm Robin, Shih-Chin Chen
Have You Closed the Loop Around "Automatic" Grade Change Yet? - Achieving Diverse Performance Targets 248
Seyhan Nuyan, Calvin Fu, Risto Kuusisto

KEYNOTE & ASSET OPTIMIZATION

A Framework for IIoT Analytics 261
Eric Harper
Reducing Cost of Ownership and Improving Long Term Performance of QCS Controls 276
Johan Backstrom, Cristian Gheorghe, Stephen Chu, Michael Forbes, Paul Baker
On Optimization of Paper Machines using Economic Model Predictive Control 286
O. Trollberg, A. Ebadat, B. Friberg, C. F. Lindberg, C. R. Rojas, E. W. Jacobsen, H. Hjalmarsson

IMAGING AND MACHINE VISION APPLICATIONS

Evaluating the Contrast of Planar Periodic Patterns on Paper 294
Jukka-Pekka Raunio, Ismo Mäkelä, Markku Mäntylä, Risto Ritala
Understanding the Challenges of Transitioning from Service to Application Support for Defect Detection 303
Wesley Sweeny
Integration of Machine Vision with Paper Machine Controls 306
Slawek Frackowiak

MEASUREMENT TECHNOLOGIES

Towards Total Production Monitoring of Basis Weight and Moisture 313
Catherine Östlund
Reliable On-line Formation Measurement 317
Slawek Frackowiak

Enhanced-performance Infrared Sensors.....324
Keith Lantz
Application of Near Infrared Sensors for Online Measurement of Paper Properties.....336
Sébastien Tixier

INNOVATIVE MODELING AND ADVANCED PROCESS CONTROL

Multivariate Modelling to Optimize Paper Quality and Cost Based on Fiber Morphology Data.....346
Jarmo Kahala
Is Running a Paper Machine Harder than Landing a Man on the Moon?.....353
Todd Jordan

FILLER APPLICATIONS AND MIXING TECHNOLOGY

Mineral/ Microfibrillated Cellulose Composite Materials: High Performance Products, Applications and Product Forms.....363
David Skuse, Mark Windebank, Tafadzwa Motsi, Guillaume Tellier
In-line PCC Technology Cleans Up Circulation Water from Dissolved Materials, Metals and Bio Based Microorganisms Resulting to Clean Process and High Runnability.....375
Jouni Matula, Jari Räsänen, Karri Tahkola

COATING RHEOLOGY

Coating Rheology. A Review and Recent Work.....385
Lisa Weeks, Doug Bousfield
Colloidal Rheology Of Enzymatic Polymerized Polysaccharides.....396
Natnael Behabtu
Pilot Coating With a Hemicellulose-Based Barrier.....403
Peter Rättö, Olof Dahlman, Kristina Junel

NOVEL CHARACTERIZATION METHODS

Broadband Dielectric Spectroscopic Studies of Biological Material Evolution and Application to Paper.....413
Mary Kombolias, Jan Obrzut, Karl Montgomery, Michael T. Postek, Dianne L. Poster, Yaw S. Obeng
Crystal Particle Adhesion to HT Surfaces in Falling Film Flow: A Computational Study.....423
Yuanzheng Zhu, Zixiang Liu, Cyrus K. Aidun

THE ROAD TO SUSTAINABLE PACKAGING I: IMPLEMENTING SOLUTIONS

Novel Bio-Based Coating for Barrier Papers.....430
Michael Bilodeau, Daryl Basham, Nirmal Basi, Jonathan Spender
Enhancing the Barrier Properties of Micro Nanofibrillated Cellulose (MNFC) by Inclusion of Pigment with Designed Surface Modification.....436
C. J. Ridgway, P. A. C. Gane, D. Kisters

THE ROAD TO SUSTAINABLE PACKAGING II: TRENDS & DRIVERS

Innovations in Sustainable Packaging: More Options to Meet Industry Demand.....441
Ian Lifshitz
Improving Recovery of Paper Foodservice Packaging.....447
Rhea Hale
Challenges to the Pulp and Paper Industry for a More Clean, Healthy, Just and Sustainable Future.....456
Joshua Martin
Sustainable Packaging - The Challenges of Waste Management in Paper Packaging.....462
Susan Robinson

LIGHTWEIGHT AND HIGH GRAPHIC QUALITY LINERBOARD

North American Containerboard - A Strategic View and Discussion 469
Sarilee Norton
Trends In Printing and Imaging of High Graphic Quality Corrugated 483
Charles P. Klass
Digital Trends in Corrugate Packaging - Advantages of Digital in the Containerboard Market 491
John Stoffel
Leveraging a Flexible Mindset and Strategy to Bring New Products Under the Mill Roof 499
Doug Carter
Development of Corrugated Board Surfaces Suitable for Water Intensive Printing 512
Per Svending, Johannes Kritzinger, Jon Phipps, Tania Selina, Michel Schenker

COATING OPERATIONS SUCCESS STORIES

Spray Applications for Paper and Board Surface Treatment 516
Pemo Klimczak, Patrick Sundholm
Curtain Coating: New Developments from Voith for Better Coating Quality and Greater Cost Efficiency 527
Martin Schmid, Christoph Henninger
The Influence of Base Sheet and Coating Formulations on the Print Mottle of Graphic Papers 530
Dennis Perpich, Brian Scheller
Energy Savings and Speed Increase on PM 1 Coated Recycled Board Machine at Cartieradi Momo, Italy 532
Geert Dumortier
Determining the Need and Benefit of MultizoneRolls in Calender Operations 543
Stefan Wilms

ANOTHER LOOK INTO FUNCTIONAL COATINGS

PVOH Coatings to Achieve High Oxygen Barrier on Paper 555
Samuel Michel, Shu-Hsien Li
High-speed Manufacturing of Antimicrobial Paper 564
K. J. Brobbey, J. Haapanen, M. Gunell, J. M. Mäkelä, E. Eerola, J. J. Saarinen, M. Toivakka
Innovations in Kaolin - A Naturally Advanced Material 567
Chris Boothby

INNOVATIONS IN COATING PIGMENTS

New Horizons for Calcium Carbonate 577
Tim Bradley
TiO_2 General Presentation 586
Alain Cagnard

VOLUME 2

Synthetic Plastic Pigments 604
Brian Einsla, Femi O. Kotoye
A Comparison of Synthetic Amorphous Silica (SAS) Paper Pigments and introduction of a Novel Sub-Micron PrecipitatedSilica (SMPS) for Glossy High Speed Ink Jet Media 612
Michael S. Darsillo
Calcined Clay: An Effective Alternative to TiO_2 in Paper and Board 621
Prakash B. Malla, Dan Ma, Thiele Kaolin

STRENGTH I: DRY STRENGTH

New Strength Solutions for Packaging Grades Based on Vinylformamide-containing Polymers in Single and Dual Component Systems 635
Anton Esser

Novel Polymer Technology for Improved Productivity & Quality of Unbleached Kraft Containing Packaging Grades 646
Michael Wallace, Christopher Lewis, Arno De Beer

Polyelectrolyte Multilayers and Other Dosage Strategies - Effects on Properties of Paper Sheets Produced in Pilot Scale Using Mill Process Waters 658
Caroline Ankerfors, Magnus Gimåker, Ida Östlund

Multi-functional Polymer Additive for Improved Strength and Productivity 670
William Johnson, David Sirois

STRENGTH II: WET STRENGTH

Wet Strength Resins for Paper and Paperboard Applications 681
Harold Goldsberry

Towards Higher Wet Strength, Easier Repulpability, and Enhanced Compostability 689
Dong Yang, Robert Pelton

Regulatory and Sustainability Initiatives Lead to Improved Polyaminopolyamide-epichlorohydrin (PAE) Wet Strength Resins and Paper Products 708
Mark T. Crisp, Richard J. Riehle

STRENGTH III: NATURAL

Production of Pulps with an Extremely High Fines Content for Use As Strength Agent 725
Elisabeth Björk, Mikael Bouveng, Hannes Vomhoff

Fines-Enriched Pulp As a Strength Agent in a CTMP Middle Ply 741
Elisabeth Björk, Mikael Bouveng, Hannes Vomhoff

Boosting the Elongation Potential of Paper by Mechanical Refining and Additives 761
A. Strand, J. Kouko, A. Oksanen, K. Salminen, A. Ketola, E. Retulainen, A. Sundberg

ADVANCES IN SIZING TECHNOLOGY

Internal Sizing Agents - A General Review of Mechanisms and Properties 771
J. Leckey

Where did the Brightness Go? 783
Aru Tiwari, Ashok Ghosh, Peter W. Hart

ENZYME TECHNOLOGY

What Do I Know About Enzyme Technologies? 794
J. Luo

Cellulolytic Enzymes – Versatile Tools in Papermaking 797
Philip M. Hoekstra, Bernard J. H. Janse

Latest Development of Enzymatic Technologies Provides a New Level of Stickies Control 806
Rosy Covarrubias, Mark Reed

ADVANCES IN MICROBIOLOGY

Metagenomics Testing As a Tool to Solve Costly Slime and Malodor Problems 819
Linda Robertson, John Tillotson

Use of a Biocide to Stabilize Wet-End Chemistry 832
Kevin Macdonald

Monitoring and Control of Biodegradation of Cellulose-Based Products for Agricultural Applications 843
R. Allem, F. Drolet, D. Potvin, S. St-Amour, L. Jalafa, J. F. Le Berre, A. Kingsland

INNOVATIVE APPROACHES TO SOLVING AGE-OLD PROBLEMS

How Hot is too Hot – White Water Heating 849
Todd Varner
Retrocommissioning and Energy Efficiency – Applying this Concept to the Paper Machine Vacuum System 853
Doug Sweet
Importance Of Paper Machine Building Hall Ventilation: A Rigorous Approach For Evaluation And Problem Solving - Case Studies 864
Ajit K. Ghosh

INNOVATIONS IN SHEET AND FABRIC MEASUREMENT

Enhanced Safety for Press Felt Measurement and Evaluation-Innovations in Sheet and Fabric Measurement 877
Wyatt Boyett
How to Judge Felt Permeability on the Fly 884
Marcel Lensvelt
Advancements in Microwave Water Measurement Create New Papermaking Applications 889
Frank Cunnane

INNOVATIONS IN AUXILLARY SYSTEMS

The Highest Level of Fabric Performance Starts with the Cleanest Technique 904
Mark Hodson
Zero Line Control for the Dryer Hood 910
Alfredo Sarli
Reduce Downtime by Eliminating Common Carrier Rope Problems 918
Frank Cunnane, Cristini Na

PAPERMAKING INNOVATIONS WRAP-UP ROUNDTABLE

Papermaking Innovations Wrap-up Roundtable 930
Jeff Reese
Quality Improvement from the Wet End for Board and Packaging Grades 951
M. Lehrner
New Press Fabric Development for Optimizing Packaging Machines 955
Daniel Hédou
Gapforming Trends for Packaging Grades 961
M. Strepp
Steam System Considerations for Conversion from Graphic Papers to Containerboard 968
Mike Soucy
Using Common Sense and Emerging Technologies to Reduce Energy Use 970
Richard Reese, Subhash Deodar

PAPERMAKING SUCCESS STORIES

Innovating for Success with Project Management Principles 983
James Stockard
Roll Handling Innovations 991
Juha Lahtinen
Vacuum System Rebuild 998
Jussi Lahtinen
Vacuum system Rebuild - DS Smith Kemsley PM6 1006
Jussi Lahtinen

Advanced Drying Technology and Curl Control 1014
Andreas Ziegelwanger
Young Professional Perspectives on Innovation in an Established Industry 1025
Steve Tremont

DIGITAL TRENDS AS BUSINESS ENABLERS

Industry 4.0 Trends Help Mills Improve Their Process Information Management 1031
Maria Karlström
Trusted Third Party IoT platforms 1038
Johan Engman
People Transforming the Digital Mill 1043
Mariana Sandin, Brent Lindsey

NEW TECHNOLOGY SHOWCASE (NTS)

The Pulp and Paper Safety Association 1051
N/A
Paper Dryer Inspections 1063
K. Lahrke, R. Hall
ACA - Ash Content Analyzer 1071
Alexander Gruener
Bridging the Gap Between Process Control & Information Systems 1077
N/A
Paper Industry Benefits from New and Innovative Laser Tracker Technology 1083
George LeGrand
INDUSTRY 4.0 - The Revolution, NOW 1090
N/A
Introducing LEUCOPHOR ACK Liquid 1097
Andrew Jackson
New Product Showcase 2018 1101
N/A
Bekaert Solaronics - Non-contact Drying Technologies in the Paper and Board Industry 1110
Stephane Defrance
Neutra Solve™ 510 1119
John Schwamberger
L&W Optitopo - Surface Topogaphy Measurement for Print Quality Prediction 1124
Hakan Osterholm
Digital Solutions 1135
N/A
Pulp Dirt Count Measurement Using On-line Automated Inspection Technology 1142
Alex Poltorak
OrgFusion 1152
Michael Robideau
New Biodegradable Water Based Barrier Coatings to Replace Plastics 1160
Tapani Niskanen
Utilization of Data for Diagnostics 1164
Michael Gee

KEYNOTE: STATE OF THE NONWOVENS INDUSTRY

THE NONWOVENS INDUSTRY - Engineered Material Solutions 1169
Dave Rousse

TECHNICAL TEXTILES

Comparison of Electrospun Polymers in Delivery of Vancomycin for Spinal Surgical Site Infections 1192
Sarah Haas

VOLUME 3

NEW DEVELOPMENTS I

LAB TO LIFE-SAVING: Commercialization Path for Technical Non-Woven Wipes for Military and First Responders 1202
Amit Kapoor
Human Centred Approach to Nonwoven Product Innovation 1218
Matthew Tipper
The Intersection of Academia and Industry 1242
Brian George, Marcia Weiss

NEW DEVELOPMENTS II

The Selection and Use of Aqueous Dispersions in Latex 1259
Jim Finn
New & Emerging Technologies in FR and Intumescent Polymer Compounds 1294
Edward C. Gregor

SUSTAINABILITY

Our Aging Population-Meeting Needs Respectfully and Profitably in the Global Market for Incontinence Products 1305
Melissa Bastos
Soy Chemistry Industrial Applications in Textiles, Films, Nonwovens, Paper and Textile Chemicals 1323
Robina Hogan

FIBER & PROCESS IMPROVEMENTS

For Longer Needle Lifetime and Improved Corrosion Resistance 1357
Mike Pate

TAPPI / IDCON RELIABILITY AND MAINTENANCE (RM)

Building the Reliable Production Partnership 1369
C. Idhammar
Best Practice in Operator Care Routes Documentation 1402
Owe Forsberg
Root Cause Problem Elimination™ 1430
Owe Forsberg
Eliminating the Emotional Priorities in Work Management, Planning and Scheduling 1463
O. Forsberg

MAXIMIZING RECYCLED FIBER PERFORMANCE

Innovative Filling Design Driving Optimization of Dispersion Systems 1503
Kent Albert
Enzymatic Treatment of Recycled Pulp for Improved Inter-Fiber Bonding and Pulp Drainage 1512
Yun Wang, Peiyi Li, Bingyao Zhou, Kecheng Li
Low Consistency Refining -Fiber Quality –Impact on Refining Strategy and Plates 1534
Arvind Singhal

ENERGY REDUCTION IN RECYCLE FIBER MILLS

Steam System Optimization of a Linerboard Paper Machine 1544
Jean-Philippe Levesque

Using Performance Management to Drive Energy Improvement 1550
Chris Conrad
Successful Energy Projects in Board Mills 1560
Joe Peterson

INNOVATIONS FOR ENHANCED PRODUCTION DIGITAL PRINTING

Improving the Inkjet Printability of Folding Boxboard 1586
Peter Dahlvik, Georg Häusler
Novel Approaches to Paper Surface Treatment for High-Speed Inkjet Production Printing 1598
Sachin Agate, Preeti Tyagi, Lokendra Pal, Lucian Lucia
A New Mechanism for Enhancing Adhesion of ElectroreprographicPrinting with Liquid Toner 1611
Daniel F. Varnell

OPTIMIZATION OF COATING APPLICATIONS

A New Model and Approach for Optimizing Barrier Properties in Paper Coatings and Extruded Films 1622
D. Carter
Optimization of Coating with Water Based Barriers 1631
Tom Larsson, Per Emilsson
Microencapsulation - An Enabler for Future Coatings 1642
Fadi S. Chakar

WORLDWIDE INNOVATION TRENDS

Innovation An Added Value Or A Whim Only? 1656
Maja Mejsner

PAPERMAKING INNOVATIONS KICK-OFF AND ROUNDTABLE

Innovating to Profit from New Market Opportunities in the Paper Sector 1684
N/A
Papermaking Innovations Kick-off Roundtable 1698
Jeff Reese

ADDITIONAL PAPERS

Using UV Technology to Generate Oxygen Radicals for Paper Mill Systems 1707
Lance Card
Proper Water Management and the Bio-kidney Effect on Paper Mill Water Systems 1715
Ryan Coda
Next Generation Press Felt Conditioning 1739
Gilles Boulianne
Treatment and Re-use of Mill Effluent using a Breakthrough Anaerobic Reactor 1763
Michel Noordink, Leo Habets, Rienk Prins, Martin Tielbaard
The Maintenance Dept. vs The Maintenance Function 1772
Jay Shellogg
Standard Work Implementations-WHY THEY FAIL 1782
Todd Letherer
Author Index