

PEERS Conference 2017

Maximizing Success Through Innovation

**Norfolk, Virginia, USA
5 - 8 November 2017**

ISBN: 978-1-5108-5246-4

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.

Copyright© (2017) by the TAPPI Press
All rights reserved.

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

SESSION 1: KEYNOTE

Disrupter or Disrupted? How Innovation Defines Your Destiny.....	1
<i>Robert C. Tiede</i>	

SESSION 2: DIGESTER CONTROL

Critical Design Parameters for Continuous Digesters - Consequences of New Production Targets and How to Accommodate Them.....	26
<i>Nicolaos Lemieux, Stefan Antonsson, Anders Hjort</i>	
Control Design Concepts for Supervisory Batch Digester Control	42
<i>Ertan Yuzak, Sylvain Duclos, David Shearin, William Poe</i>	
Dry Chip Feedrate Control Using Online Chip Moisture	52
<i>Wesley Gilbert, Ivan Trush, Bruce Allison, Randy Reimer, Howard Mason</i>	

SESSION 3: STATE OF THE INDUSTRY

Advancing Manufacturing Technology for the Pulp & Paper Industry	67
<i>David B. Turpin</i>	

SESSION 5: NONWOOD FIBER PRODUCTION

Non Woods in Today's Marketplace	77
<i>Mark Lewis</i>	
A Novel One Step Method to Prepare Carboxycellulose Nanofibers from Raw Biomass and Their Applications to Remediation for Heavy Metal Ions	97
<i>Priyanka Sharma, Ritika Joshi, Sunil K. Sharma, Aurnov Chattopadhyay, Benjamin S. Hsiao</i>	

SESSION 6: NEW TECHNOLOGY SHOWCASE

Optimizing the Cooking Process Using an Online NIR Chip Moisture Analyzer	98
<i>Cheryl Sewell</i>	
DURALYZER-2™ - Process Analyzers.....	103
<i>Russel Hodges</i>	
Soot Blow More With Less Steam	109
<i>Johan Holmér</i>	
Collaboration Toward Successful Energy Management Projects	115
<i>Tatiana Rafione, Enrique Mateos-Espejel, Murray Walters, Doug McKenzie</i>	

SESSION 8: CHIP QUALITY MANAGEMENT TUTORIAL

Chip Quality Interactive Tutorial	120
<i>Alastair Twaddle</i>	

SESSION 9: MAINTENANCE SOLUTIONS

The Art of Information Management for a Tank Integrity (TI) Program.....	154
<i>Nancy Hoffman</i>	
A Hundred Years of Corrosion in the Pulp & Paper Industry	158
<i>Max Moskal</i>	

SESSION 10: NONWOOD PULPING & CHARACTERIZATION

Does the Kappa Number Method Accurately Reflect Lignin Content in Nonwood Pulps?	167
<i>Sabrina Burkhardt</i>	
Pilot Papermaking with Malaysian Oil Palm Empty Fruit Bunch Pulp: Part 3	177
<i>Robert W. Hurter, Medwick V. Byrd</i>	

SESSION 11: MEASURE IT SO YOU CAN IMPROVE

Stickies Diagnostic Methodology: What is Your Fiberline Stickies Removal Efficiency?	194
<i>Joff Cowan</i>	
NIR Digital Image Analysis for Deinking Evaluation	207
<i>Roland Gong</i>	

SESSION 12: BIOREFINERY BRIDGE I

Rapid Delignification of Wood at 80°C using an Easily Recyclable Hydrotropic Acid: Potential for Pulp Production	214
<i>Jonyong Zhu, Qianli Ma, Huiyang Bian, Liheng Chen, Rolland Gleisner</i>	
Ethyl Xylosides Formation During SO₂-Ethanol-Water (SEW) Pulping of Sugarcane Straw	220
<i>Adriaan van Heiningen, Asif Masih Sharazi</i>	

SESSION 13: RECYCLING 101 OCC SYSTEMS

Recycling 101- OCC Systems	233
<i>William Pitman</i>	

SESSION 14: MEASUREMENT & CONTROL

Predicting the Impact of Wood Fibers Processing Using Fluorescent Carbohydrate Binding Modules	286
<i>Mark Reed, Yannick Hebert-Ouellet, Fatma Meddeb-Mouelhi, Vinay Khatri, Cui Li, Bernard Janse, Kevin MacDonald, Marc Beauregard</i>	
Pulp Mill Installation and Operations of Standardized On-Machine Visible Dirt Measurement	291
<i>Roland Trepnier, Jennifer Boese</i>	
Pulping and Stock Prep - Profitable Online Testing	300
<i>Joff Cowan, Humphrey Moynihan</i>	

SESSION 15: PLANT OPTIMIZATION

Expansion of Chemical Recovery Capacity at Södra Cell Värö Mill, Sweden	317
<i>Raymond Burelle, Anders Wernqvist, Randy Stern, Fredrik Vedin, Carl-Jonas Krus, Anders Fransson</i>	
Material Constraints for Maximizing Power Production from Kraft Recovery Boilers	333
<i>Keijo Salmeoja</i>	
Current Steam Turbine Technology and its Applicability in the Pulp and Paper Market - Including Case Studies	339
<i>Exor Montes</i>	

SESSION 16: BIOREFINERY BRIDGE II

Developing Lignoboost for the End User Lignin Quality Requirements	347
<i>Kristin Lindholm, Randy Stern, Henrik Wallmo, Gene Christiansen, Anders Littorin, Hanna Karlsson</i>	
Carboxymethylation of Hemicellulose and Hemicellulose-based Hydrogels	358
<i>Wenhui Geng, Richard A. Venditti, Joel J. Pawlak, Hou-min Chang</i>	
Kinetics of Deacetylation of Northeast Hardwood	368
<i>Joseph Genco, J. Snell, R. Patil, H. Pendse, A. Van Heiningen</i>	

SESSION 17: RECYCLING IMPROVEMENTS

- ProLab Refiner Based Method for Evaluating Strength Potential of Recycled Fiber** 386
Ashok Ghosh, Breland Edwards, Peter Hart

SESSION 18: BROWN STOCK WASHING

- Brown Stock Washing Experience - Lessons Learned.....** 396
Lee Brunner
- Evaluating Brown Stock Washing.....** 407
Mona Henderson
- Improving Organic Removal in Brown Stock Washing Process** 416
Kraig R. Kent

SESSION 19: OPERATING SOLUTIONS

- Pre-Evaporation Choices for Incremental Evaporative Capacity in Existing Mills** 423
D. Kinley Moore
- Leaching and Crystallization Methods for Chloride and Potassium Removal from Recovery Boiler Fly Ash.....** 434
Anti Frigard, Petteri Turikainen
- Novel Chemical Solution Addresses Organic Fouling in Pulp Mill Stripping Systems.....** 443
Scott LeGrand

SESSION 20: IMPROVED KILN OPERATIONS & EFFICIENCY I

- Achieving 18 Months of Production on Lime Kilns in the Pulp & Paper Industry.....** 446
Andrew Wisner
- The Use of Parametric Analysis to Identify Opportunities for Improved Operations of Lime Kilns.....** 460
Glenn M. Hanson, Richard Manning, Peter W. Hart
- Monitoring the Free Lime Content in Lime Mud Using Zeta Potential.....** 476
Wei Ren, Honghi Tran
- Characterization of a Dusting Lime Kiln – A Mill Study** 488
Henric Dernegård, Harald Brelied, Hans Theliander

SESSION 21: PROJECT MANAGEMENT PANEL

- Project Controls for Improved Project Performance** 501
D. Chris Bailey
- Improving the Performance of Capital Projects in the Pulp & Paper Industry.....** 511
Katherine Marusin

SESSION 22: DIGESTER CORROSION PANEL I

- Batch Digester Inspection and Maintenance at Domtar Espanola** 518
Alex Shank, Jonathan Fallat
- Insights on the Panama City Batch Digester Explosion** 536
Max Moskal
- Case Study Service Thinning of a Duplex Stainless Steel Batch Digester: Dissolving Pulp Process** 549
Max Moskal, Ronald Lansing

SESSION 23: CHEMICAL SOLUTIONS

- Control of Sulfidity in a Modern Kraft Pulp Mill.....** 554
Martin Wimby, Mats Nordgren, Henrik Wallmo, Asta Humalojoki, Eevi Smolander

Update on Optimizing Black Liquor Recovery Throughput and Increase Campaign Life with Chemical Additives.....	560
<i>Chris Smyrniotis, Emil Rivera, Heng Wang, Scott Bohlen, G. Anderson</i>	

SESSION 24: OXYGEN AND PEROXIDE BLEACHING

Using Online Bubble Size and Total Dissolved Solids (TDS) Measurements for Investigating the Performance of Oxygen Delignification	580
<i>Riku Kopra, Heikki Mutikainen, Olli Dahl</i>	
Effects of Lignin Chemistry on the Oxygen Bleaching Stage Performance	586
<i>Hanson Jameel, Valeria Juste Gomes, Hou-Min Chang, Robert Narron, Jorge Colodette, Peter W. Hart</i>	
Impact of Dissolved Lignin in Peroxide Bleaching.....	597
<i>Niclas Andersson, Caroline Wilke, Ulf Germgard</i>	

SESSION 25: DIGESTER CORROSION PANEL II

Continuous Digester Repairs for Corrosion and Cracking.....	605
<i>Margaret Gorog</i>	
Corrosion in Digesters.....	624
<i>Robert Carlström, Anders Hjort</i>	

SESSION 27: HYDRAULICS RELIABILITY, KILN ENERGY SAVINGS, RECOVERY SAFETY & DOWNTIME

The Ten Hydraulic Reliability Checks You Aren't Making.....	634
<i>Jack Weeks</i>	
Improved Recovery Boiler Cooling and Washing Practices	645
<i>Raymond Burelle, Mike Trivett, Mike Ward, Timo Karjunen</i>	

SESSION 28: RECOVERY BOILER OPERATION & CONTROL

Formation Mechanisms of "Jellyroll" Smelt in Kraft Recovery Boilers	654
<i>Honghi Tran, Andrew K. Jones</i>	
The Effect of Smelt Composition on Smelt Droplet-Water Interaction in the Kraft Recovery Boiler Dissolving Tank.....	666
<i>Eric Jin, Markus Bussmann, Honghi Tran, Andrew Jones</i>	
Use of Vent Stack Temperature as a Feedforward Variable for Dissolver TTA Control.....	677
<i>Wei Ren, Brennan Dubord, Jason Johnson, Bruce Allison</i>	

SESSION 29: WATER SYSTEM IMPROVEMENTS TUTORIAL

Proper Water Management and the Bio-kidney Effect on Paper Mill Water Systems.....	687
<i>Ryan Coda</i>	

SESSION 30: ENVIRONMENTAL – WATER TREATMENT

Wastewater Microorganisms: Where, When, and Why.....	711
<i>Shawn Whitmer</i>	
Disruptive Measures in Wastewater Treatment	714
<i>Ronald Pote, Trevor Ghylin</i>	
Four Approaches to Water Filtration	722
<i>Bill Nichols</i>	

SESSION 31: IMPROVED KILN OPERATIONS & EFFICIENCY IIS

Selection of Lime Recovery Kiln Refractories to Balance Cost and Efficiency	728
<i>Chris Macey</i>	
Effect of Ring Formation on Burner Flame Stability in Lime Kiln.....	730
<i>Girish Mohanan, Markus Bussmann, Honghi Tran, Richard Manning</i>	

SESSION 32: BLEACHING OPTIMIZATION

Evaluation of Acid Stage and of Hydrogen Peroxide on Alkaline Extraction of Eucalyptus Kraft Pulp.....	741
<i>Rafael dos Santos, Luana Oliveira da Silva, Jose Claudio Caraschi</i>	
Alternative Fiberline pH Control Methods When Inlet pH Sensors Are Not Feasible.....	749
<i>James Goldman</i>	
Decreased Water Usage in a Softwood ECF Bleaching Sequence - Full Mill Simulations	755
<i>Pia Jour, Karin Lindgren, Katarina Gutke, Johan Wallinder</i>	

SESSION 33: CONTROLLING FLUE GAS EMISSIONS

Feasibility of Fabric Filters in Reducing Dust Emissions from Kraft Recovery Boilers.....	763
<i>Pauliina Sjögård, Jukka Roppanen, Keijo Salmenoja, Mika Jarvinen</i>	
Factors Affecting Particulate Removal Efficiency of Kraft Recovery Boiler Electrostatic Precipitators	
- A Technical Review	775
<i>Ezzat Jaroudi, Ivan Sretenovic, Greg Evans, Honghi Tran</i>	
Recovery Boiler SCR A Challenge and an Opportunity in Retrofit Cases	788
<i>Jarmo Maniskkasalo, Erkki Valimaki</i>	

SESSION 35: LIME KILN PANEL

Lime Kiln Operations Panel (35): Mill Operations Perspectives.....	798
<i>Henric Dernegard, Sodra Cellulose</i>	

SESSION 36: EFFICIENCY OPTIMIZATION

An Update on Mixing of High Momentum Flux Jets with a Confined Crossflow: Computational Analysis and Applications to Recovery Boiler Air Systems	808
<i>Viljami Maakala, Mika Jarvinen, Ville Vuorinen</i>	
Reducing Steam Generation Variability Through Advanced Biomass Combustion Controls.....	822
<i>Benoit Janvier</i>	

SESSION 37: ENVIRONMENTAL/SUSTAINABILITY - WATER

Plant and Boiler Energy Efficiency Evaluations	829
<i>Stephen Campbell Jr., Marcel D. Berz, Moriel A. Arango, John F. La Fond</i>	
Evaluation of a Novel and Green Bench Top and On-Line COD Analyzer for Pulp Mill Effluents	844
<i>Stephanie Horner, Brian O'Connor, Maggie Grierson, Robert Menegotto, Marjatta Piironen, Iiris Joensuu</i>	
Primary Clarifier Odor Control - Anson-Madison Sanitary District.....	855
<i>Kevin Jacobs</i>	
Comparative Life Cycle Assessment (LCA) of Elemental Chlorine Free and Total Chlorine Free Bleaching	862
<i>Tiago de Assis, Neethi Rajagopalan, Tiago De Assis, Richard Venditti, Hasan Jameel</i>	
Author Index	