

Paper Machine Dryer Control Optimization

Managing the drying process to improve process efficiency

September, 2006

COURSE TOPICS:

Drying Fundamentals
Regulatory Dryer Control Strategies
Tuning methods for the Dryer loops
Control techniques for nonlinearities
Managing dryer section pressure targets
Sheet Break control logic
Improving energy efficiency
Measuring benefits of improved control
Dryer section troubleshooting

The dryer section plays an important role in paper machine operating efficiency, energy consumption and product quality. Accordingly, dryer section optimization is a high priority. In the area of dryer section control there is much room for improvement. Valve flaws, lack of instrumentation for diagnostics, and poor tuning all degrade regulatory loop performance. There are often no supervisory strategies in place to manage the drying load, respond to sheet breaks, optimize energy efficiency and deal with the fundamental non-linearities in the dryer loops. These supervisory strategies can be easily implemented in modern distributed control systems.

COURSE DESCRIPTION

The objective of this course is provide the attendees with the knowledge and tools to improve dryer control performance. *Paper Machine Dryer Control Optimization* is a hands-on course that uses a process simulation as a learning tool to understand dryer process fundamentals, dryer controller tuning, regulatory and supervisory control strategy options, and troubleshooting techniques. The ProNamics dryer optimization simulator provides a realistic environment to train paper machine operators, E&I mechanics and process engineers. The simulation includes advanced supervisory strategies to improve drying stability, prevent flooding, improve energy efficiency, minimize loop interaction and linearize the control loops. Typical dryer section problems, embedded in the simulator provide an ideal environment to develop troubleshooting skills.

INSTRUCTORS

Doug Nelson, P.Eng. has over 23 years of pulp and paper process control experience. He has authored papers on paper machine dryer control, control valve selection and the uses of process simulation in optimization surveys.

Nyle Parchim, P Eng has over 25 years of production management experience in the pulp and paper industry. He is an expert at troubleshooting paper machine problems that were causing breaks, runnability and quality problems, and has extensive experience in the training of paper industry workers and managers in the US, Canada and Australia.

WHO SHOULD ATTEND

The course is primarily intended for process engineers, control engineers or instrumentation engineers who have responsibility over the optimization of the paper machine dryer section. The course explores the implications of process equipment design and process variability and therefore would be beneficial for maintenance and design engineers.

COURSE LOCATION

The course will be held at the Lonsdale Quay Hotel, 123 Carrie Cates Court, North Vancouver, BC V7M 3K7 (Phone (604) 986-6111). Attendees are responsible for arranging their own accommodations.

REGISTRATION

Registration fee is \$2000 CDN (\$1070GST included) or \$1800 US for the 2-day course. Attendees need to register 3 weeks in advance to ensure space and materials will be available. ProNamics reserves the right to cancel the course based on a minimum number of registrants. The course is limited to 15 participants.

COURSE SCHEDULE

Day One

- Introduction Course Objectives**
8:00-9:00
- Lecture 1 Paper Machine Drying Fundamentals**
9:00-11:00
Heat Transfer Fundamentals,
Steam Properties, Evaporation Rates
- Lab 1 Evaporation rates**
11:00-12:00
- Lecture 2 Dryer System Designs**
1:00-2:30
TC, Cascade, Blowthrough, Condensate
handling, Steam Header interaction
- Lecture 3 Dryer Control Strategies**
2:30-3:30
Regulatory control objectives,
split ranging, low select
- Lab 2 Dryer system responses**
3:30-5:00
Effect of Pressure, HTC on Drying rates

Day Two

- Lecture 3 Dryer Loop Performance**
8:00 - 9:30
Recognizing loop performance problems, sheet
break response, impact of process design, con-
trol strategy, tuning, maintenance issues
- Lecture 3 Measuring Process Dynamics**
9:30 - 10:30
Open Loop bump tests, Non-linearities,
Interactions between dryer loops
- Lab 2 Dryer Loop dynamics**
10:30-12:00
Pressure, Differential, Moisture loops
- Lecture 4 Lambda Tuning Fundamentals**
1:00-3:00
1st order and integrating loops
- Lab 3 Pressure, differential tuning**
3:00-5:00
1st order and integrating processes

Day Three

- Lecture 5 Moisture Control Performance**
8:00-9:00
Evaluating performance, Feedforward
strategies, non-linearities
- Lecture 6 Advanced Dryer Control Strategies**
9:00-12:00
Linearizing loop dynamics, Low select
'deadband' issues, Constant % drying, Sheet
break logic, Flooding control, Energy usage
- Lab 4 Advanced Control Techniques**
1:00-3:00
Differential loops, TC versus Cascade
Pressure loop, Temperature versus pressure
Moisture loop, Production rate
- Lecture 7 Costs/Benefits of Improved Control**
3:00 - 4:30
Impact on Energy Efficiency, Moisture vari-
ability, runnability

Day Four

- Lecture 8 Impact of Steam Header Control on
Dryer Performance**
8:00 - 9:00
- Lecture 9 Energy Efficiency Issues**
9:00—10:00
Heat recovery systems
- Lecture 9 Troubleshooting Techniques**
10:00—11:00
- Lab 5 Troubleshooting Dryer Problems**
11:00—3:00
- Wrap up and Discussion**
3:00—4:00

ABOUT ProNamics

ProNamics Control Inc. is a Vancouver based pulp and paper process control consulting company. The company conducts process and control optimization field surveys, prepares process simulations to establish best practices and provides a range of training courses related to process control optimization. ProNamics Optimization and Evaluation Field Surveys are designed to maximize the mill's economic returns. The surveys are focused on improving product uniformity, increasing mill production efficiency and reducing operating costs. For further information visit our web site www.pronamicscontrol.com.

REGISTRATION FORM / CONTACT US: Fax to OMNI at 604-925-9311

Name: _____ Position: _____
 Company: _____ Email: _____
 Address: _____

Phone: _____ Fax: _____

Payment: Full Payment Enclosed Invoice my company Charge my AMEX Credit Card

Card Number: _____ Expiry Date: _____

Name Of Cardholder: _____

Signature: _____ Date: _____

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