



Paper Machine Dryer Control Optimization Course

Your technical resource for improving Pulp and Paper process control performance

Topics covered include:

- 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.

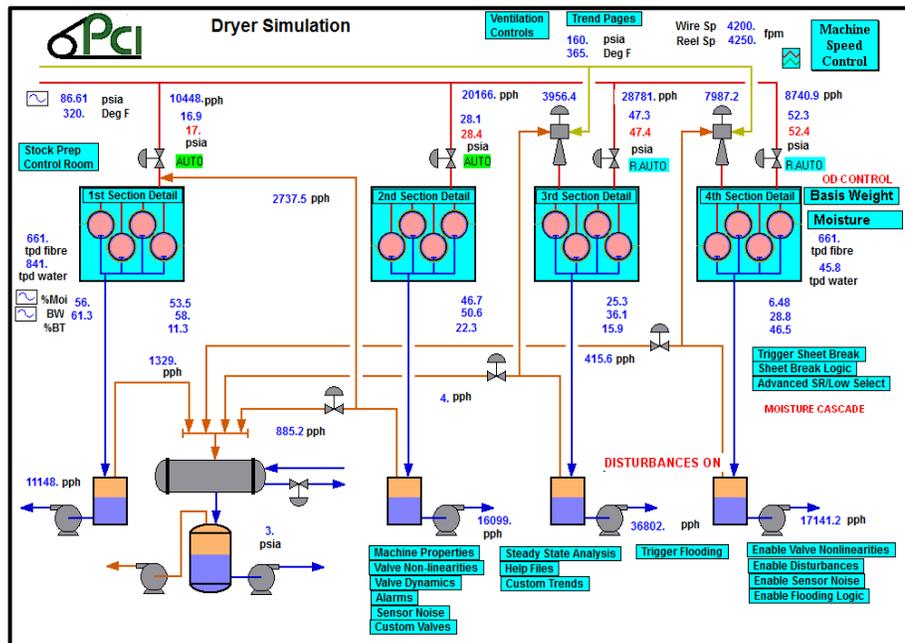
This two-day course strengthens the attendee's ability to identify and troubleshoot paper machine dryer control problems. Approximately 30% of the course is devoted to a computer-based DCS-like process simulator, where the operator practices the concepts presented during the lectures.

Course Fees...

CDN per student	\$1500.00
USD per student	\$1200.00

(Canadian Taxes Included.) Fees include a full set of course notes.

The course is limited to 15 participants to provide individual attention and allow our expert instructors to address specific attendee issues.



Dryer Control Optimization Course Schedule

Day 1

- Lecture 1** **Introduction to Paper Machine Dryers**
08:00-09:00 Basic functioning of the dryer section
Steam and condensate handling systems
Process design Issues affecting control performance
- Lab 1** **Introduction to Dryer Control Simulator**
09:00-10:00 Navigating the simulator
- Lecture 2** **Conventional Dryer Control Strategies**
10:00-11:00 Objectives of the Moisture, Pressure, Differential loops
Split ranging / Low select override strategy
Blow-through versus Differential control
Response to sheet breaks and recovery
- Lecture 3** **Dryer Section Process Dynamics**
11:00 – 12:00 Pressure loop dynamics
Moisture Control Dynamics
Blow through / Differential Dynamics
Process Design and operating factors that affect dynamics

Lunch Break

- Lab 2** **Understanding Dryer Loop dynamics**
12:30-14:00
- Lecture 4** **Tuning Strategies / Methods**
14:00-15:30 Dealing with the slow, complex pressure controller dynamics
Decoupling the pressure and blow-through loops
Optimizing the moisture controller tuning
- Lab 3** **Tuning the Dryer Loops**
14:30 – 15:30 Controller setpoint and load response

Day 2

- Lecture 6** **Advanced Regulatory Control Strategies**
08:00-09:30 Steam Pressure - Temperature linearization
TC Output characterization, Pressure/ Differential interaction, Moisture cascade ratio
- Lab 4** **Linearizing the Dryer Control loops**
09:30-11:00
- Lecture 7** **Dryer Supervisory strategies**
11:00 – 12:00 Set point management for constant % drying load
Dryer flooding over ride control
Sheet break logic
Warm-up Logic
- Lab 5** **Exploring Dryer Supervisory strategies**
13:00 – 14:30
- Lecture 8** **Dryer troubleshooting techniques**
14:30 – 15:30 Common problems
Analytical troubleshooting procedure for dryer loops
- Lab 6** **Troubleshooting Dryer Control problems**
15:30 – 16:30
- Wrap-Up and Discussion**
4:30 – 5:00

Course Location...

The course is being held at a conference facility. Attendees are responsible for arranging their own accommodations.

Accommodations ...

For convenience, we recommend that registrants stay at the hotel course site.

About the Course ...

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.

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.

Instructors Include...

Doug Nelson, P.Eng. has over 30 years of industrial process control experience. He has extensive experience in process control training of operators, E/I techs and process control engineers.

About ProNamics...

ProNamics Control Inc. is based in Vancouver, BC. The company conducts process and control optimization surveys, prepares process simulations to establish best practices and provides a range of training courses related to process control optimization. Visit our web sites at www.pronamicscontrol.com for more information about our services.