# OMNI Process Solutions

Paper Machine Dryer Control Optimization

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
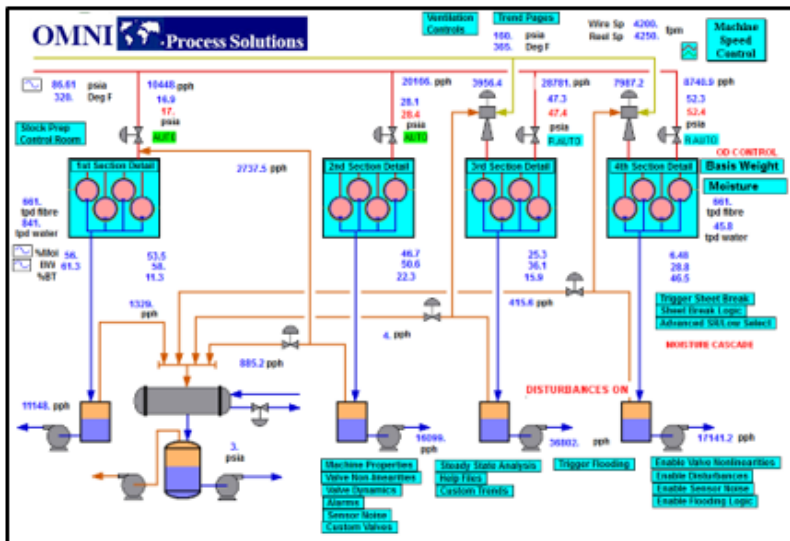
The dryer section plays an important role in paper machine operating efficiency, energy consumption and product quality. Accordingly, dryer section optimization is a high priority. In the area of dryer section control there is much room for improvement. Valve flaws, lack of instrumentation for diagnostics, 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 8 participants to provide individual attention and allow our 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 overide 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 held either at a conference facility or by video conference. 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 to 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.
Nyle Parchim, P. Eng. is an expert at troubleshooting paper machine problems and has extensive experience in the training of paper industry workers and managers.

About Omni Process Solutions

Omni Process Solutions is based in Vancouver, BC. The company conducts process and control optimization surveys and provides a range of training courses related to process control optimization. Visit our web sites at
www.omniprocesssolutions.com for more information about our services.