

Nipped Roller Systems Workshop
Rochester, NY – February 16-18, 2010
Tues-Wed, 8am – 5pm, Thurs. 8am – 12noon

Abstract

Nipped rollers are the most common method to create high pressure many value-adding web processing, including coating, printing, laminating, winding, and embossing. Nipped rollers are also commonly used to prevent air lubrication in heating, cooling, corona treating, and tension control driven rollers.

In most cases, the goal of a nipped roller system is to provide uniform pressure across the web's width, but diameter variations, hardness variations, misalignment, deflection, web thickness variations, and uneven loading can all lead to undesired pressure distributions and a variety of defects. Understanding the root causes of these defects and their common remedies can quickly improve your profitability.

The goal of this workshop is to show how to improve your roll and web quality through a better understanding of the winding process, winder design, and roll measurements.

Unlike any other option in web handling education, the AIMCAL series of web handling 'workshops' are one-of-a-kind training that combines classroom seminars with on-machine demonstrations.

Who Will Benefit from this Workshop?

This workshop is directed towards technical employees of any level with a need to understand the fundamentals of nipped roller systems. Though the seminar will include some engineering theory and equations, the workshop's goal is to show how theory and experiment lead to practical solutions to common problems.

Seminar Outline

The workshop will aim for a 50-50 split between seminar and lab demonstration time. Seminar topics will include all the background needed to understand the lab demonstrations and more, including:

- ◆ Nipping system design – How do you choose the right compound and geometry for your process? What are the best ways to align nip rollers? What is the best way to control nip load?
- ◆ Nip roller pressure – What is the pressure between nipped rollers? How is it measured? What are the most common causes of pressure variations? What are problem caused by pressure variations?
- ◆ Wrinkling and lateral control – Can uneven nip loading cause lateral shifting of the web? Why do so many wrinkles occur at nipped rollers? What are the most common remedies by root cause?
- ◆ Driving and tensioning – What is the best practices in driving nipped rollers? How does nipped roller load affect tension control?
- ◆ Laminating and curl – What causes curl in laminates? What how does nipped roller system design and geometry affect curl?

Lab Demonstrations

Lab #1 – Measuring nip footprint and pressure uniformity

Learn both simple and advance methods for measuring nip uniformity.

Lab #2 – Measuring lateral motion and creating wrinkles from uneven nipping

See how uneven nipping will shift the web laterally and create wrinkles. Spreading and adjustable rollers will be demonstrated and evaluated for their ability to compensate for uneven nipping.

Lab #3 – Baggy webs and nips

See how baggy web and nipped roller create wrinkles. Tension, spreading, and adjustable roller will be demonstrated and evaluated for their ability to compensate for baggy web and nips.

Lab #4 – Process speed variations and nip loads

Measure the web speed variations as a function of nip roller design and load.

Lab #5 – Curl induced by nip roller systems

In simple dry lamination, see how curl is a function of material properties, pre-laminating tension, and web path geometry.

About the Workshop Instructors

The workshop will be presented by Timothy J. Walker of TJWalker & Associates, Inc. and Dr. Kevin A. Cole of Optimization Technology, Inc.

- Mr. Walker is President of TJWalker & Associates and has worked as an independent web handling consulting engineer since 1999. Tim is an internationally recognized leader in web handling and has worked with over 90 companies in a variety of industries. Tim worked for 3M Co. for seventeen years, working first in polyester film manufacturing before joining the corporate web handling process development lab. While at 3M, Tim served as their representative to the Oklahoma State University Web Handling Research Center (OSU WHRC) and as Corporate Web Handling Technology Leader. Tim writes a monthly column, *Web Lines*, for Paper, Film, and Foil Converter magazine and has taught web handling to over 4000 students. Tim has a BS in Mechanical Engineering from the University of Iowa and a MS in Management of Technology from the University of Minnesota.
- Dr. Cole, a Senior Web Handling Development Engineer with Optimization Technology Incorporated, has a PhD in Mechanical Engineering from the University of Rochester. Kevin developed his expertise in web handling over his 20+ years working for Eastman Kodak Company and led their internal training program on winding and conveyance process fundamentals. He was also an active participant in the OSU WHRC, including chairing their Industrial Advisory Board for four years.

About the Workshop Facility

Located in the Eastman Business Park (formerly Kodak Park), the Optimization Media Conveyance Facility (MCF) is a 8000 sq. ft. space featuring experimental, analytical, and limited production web handling capabilities for narrow and wide applications. The MCF, acquired in 2008 by OTI, has a 35-year history serving as an internal resource for Eastman Kodak Company, but is now available for commercial use, including serving as host for this AIMCAL Workshop.

Bonus: Test Your Web and Roller

If you are interested in testing your webs or rollers, there is a limited space to do so during the workshop; however, contact us directly if you are interested in customized and confidential testing on a contract basis.

Workshop Fees:

Three-day workshop, Nov. 2-5: \$1799

AIMCAL members 10% discount

Group discounts (10% discount for any second registrant from a company, 20% discount for a third registrant, negotiable rates for larger groups)

Test your web and roller options: Contact the instructors for details and costs based on your objectives.

Bonus: ‘Test Your Web’ and ‘Test Your Roller’ During or After the Workshop

We offer the ultimate hands-on experience – testing your webs or rollers in any of the lab demonstrations (wrinkling, spreading, or traction testing).

Some ‘test *your web*’ work can be accommodated during the three-day workshop, but for more thorough or confidential testing, additional trials can be arranged during the days following the workshop (Thursday and Friday of the workshop week or at a later date). Participants interested in the ‘test your web’ option should see the attached sheet for more information on input web, roll, and core specifications.

In addition to testing your web on our standard and special rollers (please request information of what rollers we have), we also offer the option to ‘test *your roller*’ if you wish to understand wrinkling and spreading in a simulation that will best represents your process.

Customer-Supplied Roll/Web/Roller Requirements

Material	plastic/paper/foil
Roll width	26 inch minimum, 56 inch maximum
Maximum roll diameter	26 inches (3-in ID rolls and cores can be down to 10-in)
Minimum web footage	500 feet
Core material	cardboard, plastic, metal
Core inside diameter	3.00, 6.00, or 8.00 inches
Core chucking	expandable
Core length	web width to 58.375 inches
Web thickness	0.00025 to 0.010 inches
Minimum product bending radius	2 inches (minimum conveyance roller radius)
Test roller length	face length minimum of 2 inches wider than web provided (59.5 inch preferred)
Test roller diameter	3.5 to 6.0 inches
Test roller mounting method	Dead shaft, 2 inch extension length each side of roller face with final shaft diameter of 1.378-in diameter (+0.001,-0.001 inch) to fit in our roller mount. (The dead shaft and bearing inner race can be larger than 1.378-in, but needs to be turned down to the target diameter at the shaft ends.) Live shaft, 2 inch length each side with a bearing OD of 1.378 (+0.000, -0.001 inch).