OPTIMATION
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Nip Roller Workshop

Optimation Media Conveyance Facility (MCF)
1600 Lexington Ave., Rochester NY 14606

Abstract

Nipped rollers are the most common method to create high pressure in many value-adding web processing operations, 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.

One goal of this workshop is to show how to improve your nipped roller process and equipment through a better understanding of the underlying engineering principles and design considerations of nipped rollers.

Unlike any other option in web handling education, the Optimation MCF 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 primary 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?

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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/feed variations and nip loads (rubber roller design, wrap)

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.

Workshop Instructor

The workshop will be presented by Dr. Kevin A. Cole of Optimation Technology, Inc.

- Dr. Cole, a Senior Web Handling Development Engineer with Optimation 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. Kevin has a rare combination of excellent problem solving and modeling skills, allowing him to comfortably move between production and developmental work.

About the Workshop Facility

The Optimation Media Conveyance Facility (MCF) is a 5000 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 workshop.

Workshop Fees:

	Registration Fees	Early Registration Discount (3 weeks advance)
First registration:	$1449	$1379
Second registration:	$1379	$1313
Third registration:	$1313	$1249

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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.

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.

Some '*test your web*' work can be accommodated during the two day workshop, but for more thorough or confidential testing, additional trials can be arranged for another time (earlier in the workshop week or at a later date). Participants interested in the 'test your web' option should see the table below 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 traction, 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
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 length each side, by 1.378 diameter (+0.001,-0.001 inch) live shaft, 2 inch length each side with a bearing OD of 1.378 (+0.000, -0.001 inch)