

Web Wrinkling and Spreading Workshop
Rochester, NY - April 20-22, 2010
Tues-Wed, 8am – 5pm, Thurs. 8am – 12noon

Abstract

Many paper, film, and foil webs are prone to buckling and wrinkling during handling from even slight machine imperfections, such as roller misalignment, deflection, and diameter variations, especially as products substrates are thinner, wider, or stiffer.

This workshop will present the process knowledge needed to eliminate buckling defects in spans between rollers (troughing) or on rollers (wrinkling). Wrinkling and troughing will be eliminated by root cause analysis and by strategic application of special anti-wrinkle or spreader rollers.

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 wrinkling and spreading. 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.

Wrinkling / Spreading / Traction 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:

- Definitions – traction, troughing, spreading, wrinkling, taxonomy, etc.
- Web properties influencing troughing and wrinkling
- Machine factors influencing troughing and wrinkling
- Factors influencing traction and relationships to troughing and wrinkling
- Web spreading devices – theory and practice
- Traction, wrinkling, spreading measurement methods
- Wrinkling elimination action plan

Wrinkling / Spreading / Traction Demonstrations

Lab #1 – Learn The Sign Language of Wrinkles.

Characterize buckling in web spans (troughing) by direct observation or magnified with the “zebra-light.” Learn how troughs change with tension, web thickness, and root cause.

Lab #2 – Creating Shear Wrinkles From Misaligned Rollers.

This is the classic experiment for defining a web’s wrinkle sensitivity. What misalignment or roller diameter variations will create a wrinkled, creased web? The lab will also show how wrinkle sensitivity changes in web thickness, web width, web modulus, tension, span length, wrap angle, and web-roller coefficient traction.

Lab #3 – Full Speed Measurement of Web-Roller Coefficient of Traction.

See how loss of traction is measured as speeds increase and tension drop and what roller surfaces do the best job of preventing lubrication.

Lab #4 – Spreader and Anti-Wrinkle Roller Comparison of Effectiveness

Two classic experiments will be performed at full production widths (60-in) measuring both anti-wrinkle and spreading performance of the most widely used ‘special’ rollers, including 1) bowed-axis roller, 2) flexible biased-groove rubber roller, 3) expanding surface roller, 4) machined and taped concave rollers, and 5) spiral ridged chevron roller.

Lab #5 – Bowed and Concave Roller Optimization

Learn how to best apply these two popular and effective anti-wrinkle rollers. See how bow roller depth, wrap angle, traction, and span lengths improve or degrade their effectiveness. See how concave roller profile and surface must be matched to the web strain and traction conditions.

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).