

TAPPI LINERBOARD & MEDIUM MANUFACTURE

August 2 – 4, 2011

TAPPI Headquarters, Roswell, GA PRELIMINARY COURSE SCHEDULE

Optional Introductory Day

Monday, August 1

1:00 – 5:00

Separate Registration Required

Overview of Corrugating
Overview of Tests & Properties
Overview of Pulp Mill Operations & Recycling
Overview of Stock Preparation
Overview of Paper Machine Operations

Day 1 Tuesday, August 2

8:00 – 9:00

Welcome , Introductions,
Learning Objectives

9:00 – 10:30

The Corrugating Process

- Double-Wall Corrugator Wet End Summary
Identify main components of a Corrugated Web:
Liner, Medium, Adhesive
- Lay-out of Equipment (Numbering/Stations)
- Corrugator Terms and Variables
Single Face, Single , Double, Triple Wall Flutes
Flute Pitch, Flute Height
Types of Flutes
Quality checks
Materials
Heat Transfer
Construction of Box, Box Blank
Mechanics of Bond
Starch, Moisture, Heat, and Pressure
Application,
Wetting/Penetration,
Gelatinization, Green-Bond,
Drying/Fully Cured
Single-face Bond
Double-face Bond
- Starch
Basics, Caustic, Borax, Raw Pearl Starch
Quality Checks
Viscosity
Delivery Temp, Gel Temp - Procedure
Stein Hall Cup Procedure
Harper Love Cup Procedure
Elcometer
Applicator Roll – cell pattern, rider-roll,
contact bar

10:30 – 12:00

Developments in Corrugating & Demands on Linerboard & Medium

- Changes in end use markets
High graphic quality – shelf appeal
Impacts on linerboard & printing requirements
- Mini and Micro Flute Corrugated
- Lower Basis Weights
- Corrugating Adhesives and Applicators
Thin Film Applicator
High solids adhesives
Coated linerboard
High graphic quality boxes
Waxed corrugated
Recyclable barrier coatings

12:00 – 1:00 LUNCH

1:00 – 4:00

Linerboard & Medium Performance Properties & Tests

- What happens to the Linerboard & Medium in the Corrugating process
Sheet Structure & why it's important, MD/CD/Z, Formation
- Properties & Tests, what they are telling us, and what contributes to their values:
Stiffness, Ring Crush, Mullen, Concora
Edgewise Compression Test, STFI
Tensile, Modulus, Stretch
Liquid Absorption, Porosity, Adhesion
Sizing tests, Cobb, Water drop, etc.
Moisture & Humidity Effects on Performance
Properties
Causes of Curl, Warp, & Wash Boarding
Viscoelastic Creep Failure of Boxes
Runnability on the Corrugator

4:00 – 5:00

Printability, Developments in Printing & Demands on Linerboard & Medium

Preprint and Post Print
Linerboard surface requirements
Flexo process improvements
Photopolymer plates and packing materials
High definition halftones
Staccato screening
More colors
Digital printing of corrugated
High speed pigmented ink jet
Surface quality requirements

5:00 - Adjournment

Day 2 Wednesday, August 3

8:00 – 10:00

Improving Performance I : Fiber Raw Materials, Pulp Properties

- Fiber Properties & Effects on Sheet Structure
- Pulping Processes for Liner & Medium

10:00 – 11:00

Improving Performance II: Recycling

- Recycled Fiber Quality
- Stickies

11:00 – 12:00

Improving Performance III: Stock Prep Refining

- Refining mechanism
- Effects on sheet and properties
- Refining Measurements and Variables
- Improving Refining for Linerboard & Medium

12:00 – 1:00 LUNCH

1:00 – 4:00

Improving Performance III: Chemical Additives

- pH control
- Dry & Wet Strength
- Sizing
- Fillers
- Formation Aids, Retention
- Wet End Chemistry Improvement

4:00 – 5:00

Case Studies

- Chemical Additives & Effects
- Refining

5:00 Adjournment

Day 3 Thursday, August 4

8:00 - 11:00

Improving Performance IV: Paper Machine Wet End Operations

- Approach system
- Headbox operations
 - Pressure/Hydraulic
 - Importance of and Variables affecting Microturbulence Strategies
 - Jet/Wire & MD/CD Orientation
 - Structure CD, MD, Z Variations
 - Headbox Crossflows & BW profile control
 - TSI / TSO Analyses & Case Studies
- Sheet forming
 - Dewatering
 - Formation Improvement & Microturbulence
 - Top Sheet Forming
 - Twin Wire Gap Formers, Hybrid Formers

11:00 – 12:00

Improving Performance V : Machine Clothing

- Forming Fabrics
- Wet Press Fabrics
- Drying Fabrics

12:00 – 1:00 LUNCH

1:00 – 2:30

Improving Performance VI: Pressing, Drying, Calendering

- Pressing Mechanism of Water Removal; Effect on Sheet Properties
 - Shoe Pressing & other developments
- Effects of Drying and Shrinkage & Moisture profile on Liner & Medium sheet & properties
- Types of calenders & variables affecting calendering
 - Calender box surface treatments
 - Winding

2:30 -3:45

Paper Machine Operations VI : Size Press & Other Surface Treatments

- Variables affecting pick up
- Developments in Size Press
- Surface Treatment Chemicals & Coatings to Improve Linerboard

3:45 Wrap up, evaluations
Adjournment