Making Your Coating Process Lean

Lee A Ostness
Product Manager Coating & Drying Systems

Black Clawson
46 North First Street
Fulton, NY 13069
Phone (315) 598-7121
http://www.bc-egan.com
Introduction

- Lean Definition
- Coating formulations
- Coating defects
- Coating equipment
  - Gravure
  - Rod
  - Reverse
  - Smooth
  - Slot
  - Components
- Dryer technology
- Controls and drives
- Maintenance & training
- Customer support
- Conclusion
Lean

• Looking at ways of doing more with less
  - Faster speeds
  - Changing processes
  - Problems
Lean – What to do?

• Rebuilding existing lines
  - Faster speeds
  - Changing processes
  - Problems

• New lines
  - Replace old multiple lines
  - Reduce labor
  - Improve quality
Lean – Why?

- Chemistry
- Customer demands
- Increased profit
- Faster
- Quality
- Substrate
- SURVIVAL !!!
Evaluate Your Coating Formulations

- Chemistry
  - Viscosity
  - Solids
  - Surface energy
  - Solvent evaporation
Coating Defects

- Chatter
- De-wetting
- High-low coat weight
- Foam

- Ripple
- Splashing
- Streaking
- Voids
Coating Equipment

- Gravure
- Rod
- Reverse Roll
- Smooth Roll Transfer
- Slot Die
- Other coaters
Gravure Coaters

Direct Forward Gravure  Direct Reverse Gravure  Offset Gravure
Gravure Coaters

- Applicator design
  - Open pan
  - Enclosed chamber
  - Pressurized head

- Gravure roll design
  - Pattern
  - Chrome vs. ceramic

- Rubber roll design
  - Dedicated
  - Sleeved
Rod Coaters

- Roll fed single roll pan applicator
- Roll fed dual rod pan applicator
- Fountain fed rod
- Roll fed rod fountain applicator
Rod Coaters

- Application
  - Roll in pan
  - Multi roll
  - Fountain

- Rod design
  - Wire vs. engraved

- Rod holder design
  - V-groove
  - Snap-in poly
  - Blade retainer
Reverse Roll Coaters

- Nip Fed Reverse Roll
- Roll Fed Reverse Roll
- Fountain Fed Reverse Roll
- Flex Bar Reverse Roll
Reverse Roll Coaters

• Applicator
  – Pan fed
  – Pond fed
  – Roll fed
  – Fountain fed

• Roll material
  – Chrome vs. ceramic
Smooth Roll Coaters

- Primer
- Silicone
- Component
- 2-roll
- 3-roll
- 5-roll
- Other
Slot Die Coaters

- Slot die
  - Contact
  - Gap
  - Curtain
Slot Die Coaters

- Die design
  - Flex lip
  - Fixed lip
- Die positioning
- Die location
- Lip design
- Backup roll
  - Rubber vs. steel vs. kiss
- Single layer vs. multi layer
Coating Machinery

• Cartridge coaters
  – Quick change over
    • Cleanup
    • Process
  – Future processes

• Standardization
  – Standard “custom” lines
  – Shorter deliveries
  – Less errors
  – Reduced cost
Coating Components

- Enclosed applicators
  - Pressurized
  - Low volume
  - High speed

- Coating air separation
  - Remove air
Coating Components

• Coating supply systems
  – Viscosity control
  – Temperature control

• Moisturizing systems
  – Profile web
  – Closed loop
Drying Technology

- 100% solids
  - No drying
- Solventless
  - Environment
- Convection air
  - Most common method
- Ultraviolet
- Electron beam
- Infrared
Drying Technology

- Nozzle design
  - Efficiency
  - Versatility
- Maximum versatility
- Maximum efficiency
- Smallest space
Controls Technology

• Technology
  - Hardware/software
  - Communication
  - Faster process speeds
• Fully integrated into lines
  - Controls and drives mounted on-machine
Controls Technology

- Supervisory Control System
Controls Technology

- Supervisory control system

CUSTOMER’S PLANT

DEDICATED PHONE LINE

PHONE LINE

MACHINE LINE

CONTROLS LAB
PC

ENGINEER’S LAPTOP W / PLC
AND OPERATOR INTERFACE

INTEGRATOR II
STATION

CPU
Drives Technology

• AC Vector
  • Better speed regulation
  • Smaller hardware packaging
  • Fully integrated into line
    – Quicker installation
    – Lower total installed cost
    – Faster start-ups
Maintenance & Training

• Maintenance
  – Personnel
  – Financial cutbacks
  – More visits by OEM

• Training
  – Shrinking workforce
  – All lines have some type of training provided
Customer Support

• Spare Parts
  – Immediate needs
  – Inventory
  – Manufactured parts
  – Consignment programs

• Technical assistance
  – Always
  – Knowledgeable
  – Modem use
  – Internet option
  – Consultants
Conclusion

• How do I become “Lean”
• Rebuild
• Replace
• Return on investment
• Survival
Thank You

Lee A Ostness
Product Manager Coating & Drying Systems

Black Clawson
46 North First Street
Fulton, NY 13069
Phone (315) 593-0350
E-mail ostnessl@bc-egan.com