Web 101.86SM – Good Winding Starts

The First Five Seconds

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First Seconds are Important

- Tension challenged during
  - Roll change
  - Speed change
- Tension one of the TNT’s of winding
  - Becomes relatively *more* important due to low effectiveness of nip just above core
- Nip uniformity challenging near core
- Path upsets worse near core
- Many winding defects favor core area
Ideal Tension Sequencing

- Thread square and evenly taut
- Back/stall tension unwind or pretension windup
- Allow accel to begin *only after* load cell sees substantial tension
- Single Round-Ramp-Round ‘S’ Curve
- Typical: accels 5-40 mpm/sec, round 1-3 secs
Core & Splice Alignment Errors

- **Offset**
  - Easy to detect

- **Angular**
  - Insidious
  - Causes a decaying oscillation

- **Wrinkle in Web or on Core**
  - No-brainer no-no

- **Upstream slack**
  - Pull more web through
Core Deflection & Wrinkles

• Simple Centerwind
  – Acts like a bowed roller, pointing backwards
  – Fan or frown shaped wrinkling pattern

• With Layon Roller
  – Pinch on end, open at middle:
  – Fan or frown shaped wrinkling pattern
Other Core Issues

- Poor Cylindricity
- Excessive Deflection
- Eccentric Chucking
- ESPECIALLY with AIR SHAFTs
- Variability of winding tightness with Slipped Core Winding

- Weight and Torque Capacity (Telescoping I)
Core Crush

• Adjust Wound-in-Tension First
  I. Looser if crush during winding (e.g. film)
  II. Looser if crush due to material shrink (rare)
  III. Tighter if crush during handling (e.g. paper)

• Redesign Cores Next
  – Wall thickness increase (most powerful)
  – Core diameter decrease (if customer allows)
  – Core plugs (narrow rolls Cases II & III)
  – Stronger core (using better grade of fibers)
Wet Cores > Loose Cores II

- Wet cores will dry
- Dry cores shrink > get shorter
- Dry cores shrink > loose cores

- Best Practices
  - The best cores are uniformly kiln **dried** to user’s environment.
  - The best cores are stored in **conditioned** or hot room
  - The best operators **don’t pull cores out until needed**
Wet Cores or Loose Winding?

- **Wet cores**
  - Winding on *fiber cores* wetter than equilibrium with customer
  - Web is *stiff* in MD & ZD
  - *Seasonal complaints* peak
    - Dry climates
    - Dry seasons

- **Then**
  - Best core practices or
  - Waxed cores

- **Loose Winding**
  - Rolls are loose near the core right after winding

- **Then increase**
  - Tension
  - Nip
  - Torque
  - Speed (decrease)
Telescoping Ia&Ib - Diagnosis

- J-line interlayer slip near core during center wind / unwind
- Due to insufficient
  - Interlayer pressure
  - Web-Web friction coefficient
  - Core diameter
- to transmit center torque without slippage
- J-line check:
  - Does not J-line ever – then a different type of ‘telescope’
  - J-line motion during winding or unwinding. Rotate roll without applying torque and re-check J-line
    - If J-line slippage: due to weight induced nip above core
    - If no J-line slippage then, but does slip when torque applied: due to torque
Other Defects Favoring Core Area

- **Blocking** due to a combination of interlayer pressure, weight and surface chemistry of web
- **Looseness** near core due to mechanical vibration, air entrainment and radial stiffness that makes nip less effective
- **Core bursts** (crepe wrinkles near core)
- **Interweaving** (or tie-ups on two-drum winders)
- **Offsets** and rough roll edges
- **Telegraphing** (damage of lumpiness near core ruining layers above)
- **Wrinkles**
Questions?

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