Building Leadership Excellence

Measurement and correction of baggy edges on paper machines

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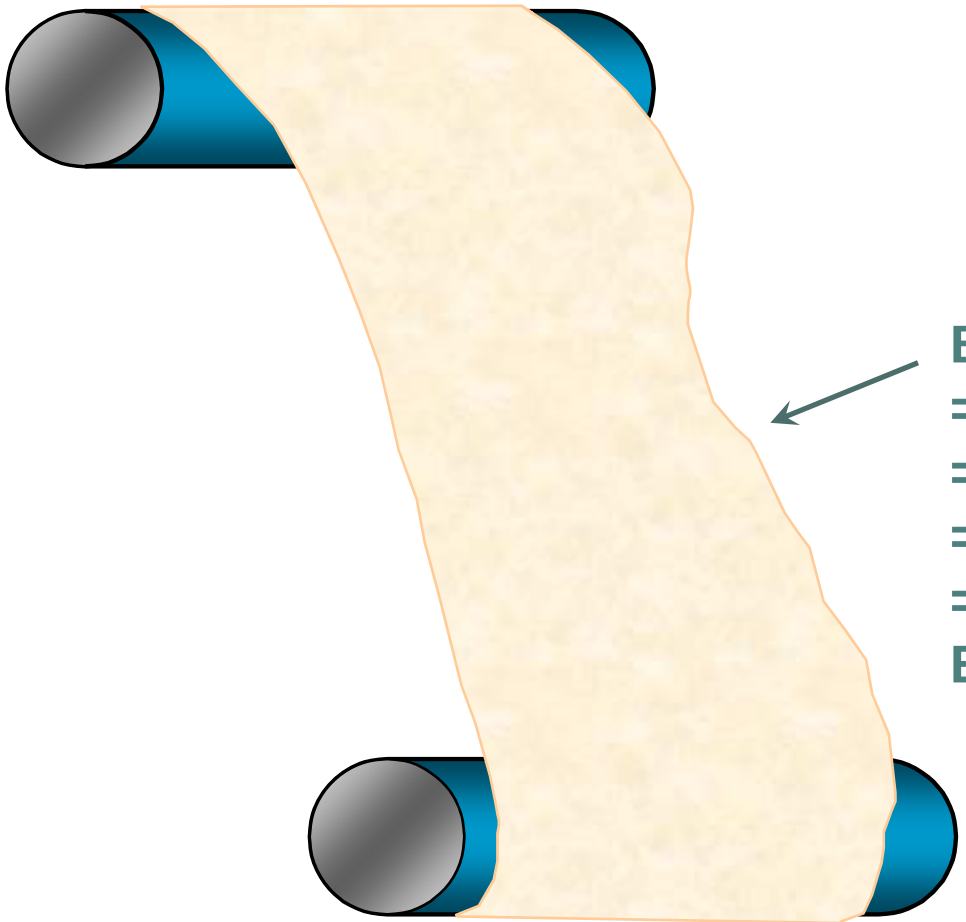
RETHINK PAPER:
Lean and Green

Outlines

- A few words on baggy edges
- Available tools to evaluate baggy edge
- Case studies: correction of baggy edges
- Conclusions

A few words on baggy edges

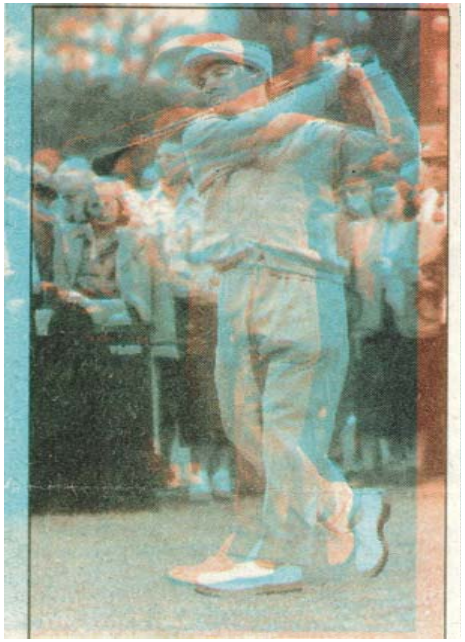
What is web tension non-uniformity in CD?



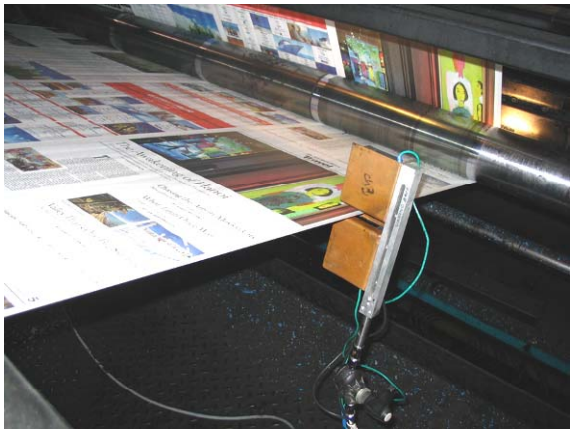
Baggy edge
= lack of tension
= tension drop
= longer web
= slack edge
Etc.

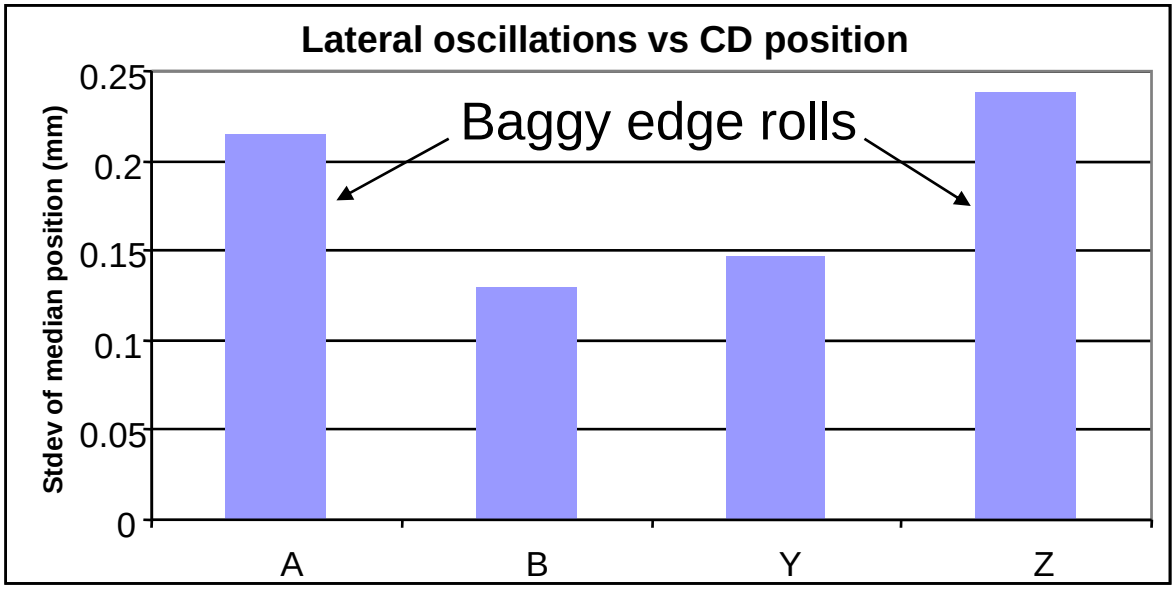
Issues related to baggy edges

- Print quality problems
- Misregistration
- Wrinkles/crepe wrinkles
- Web breaks
- Poor splicing
- Poor winding
- Web defects such as calender cuts, crepe wrinkles, etc.

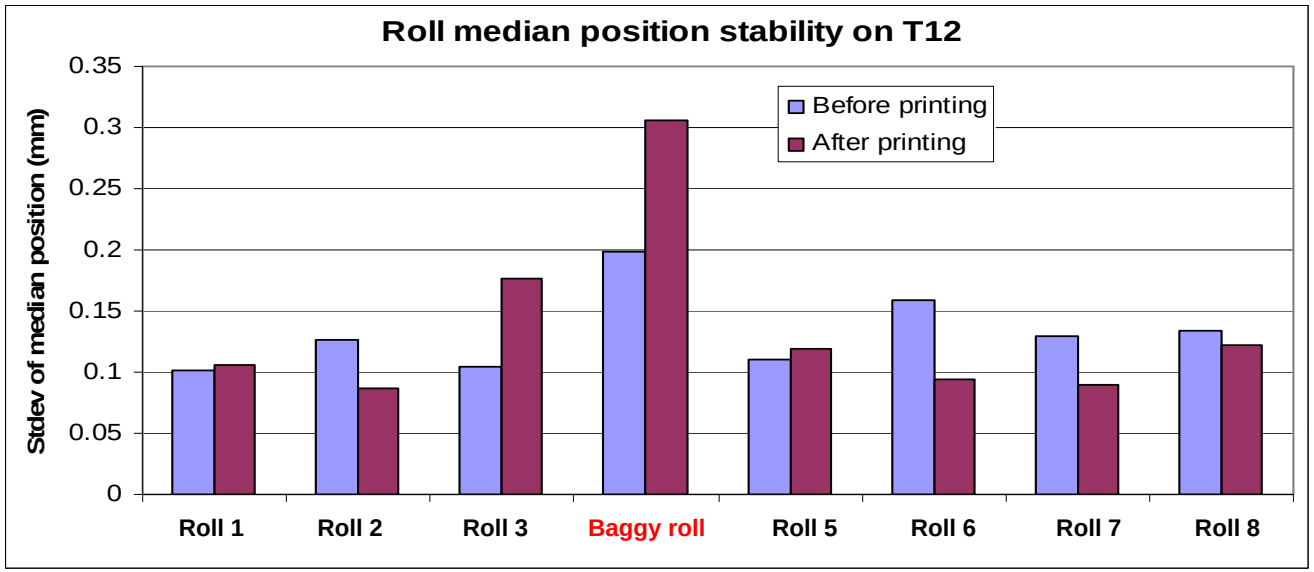


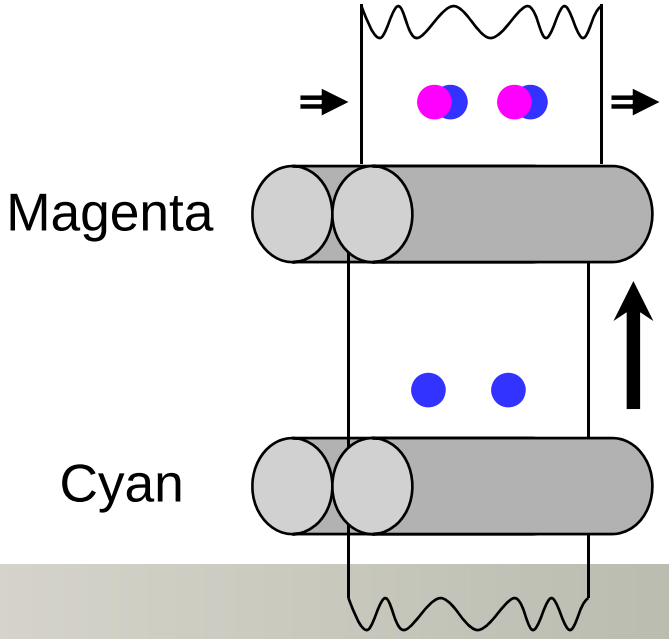
Baggy edge rolls cause web weaving



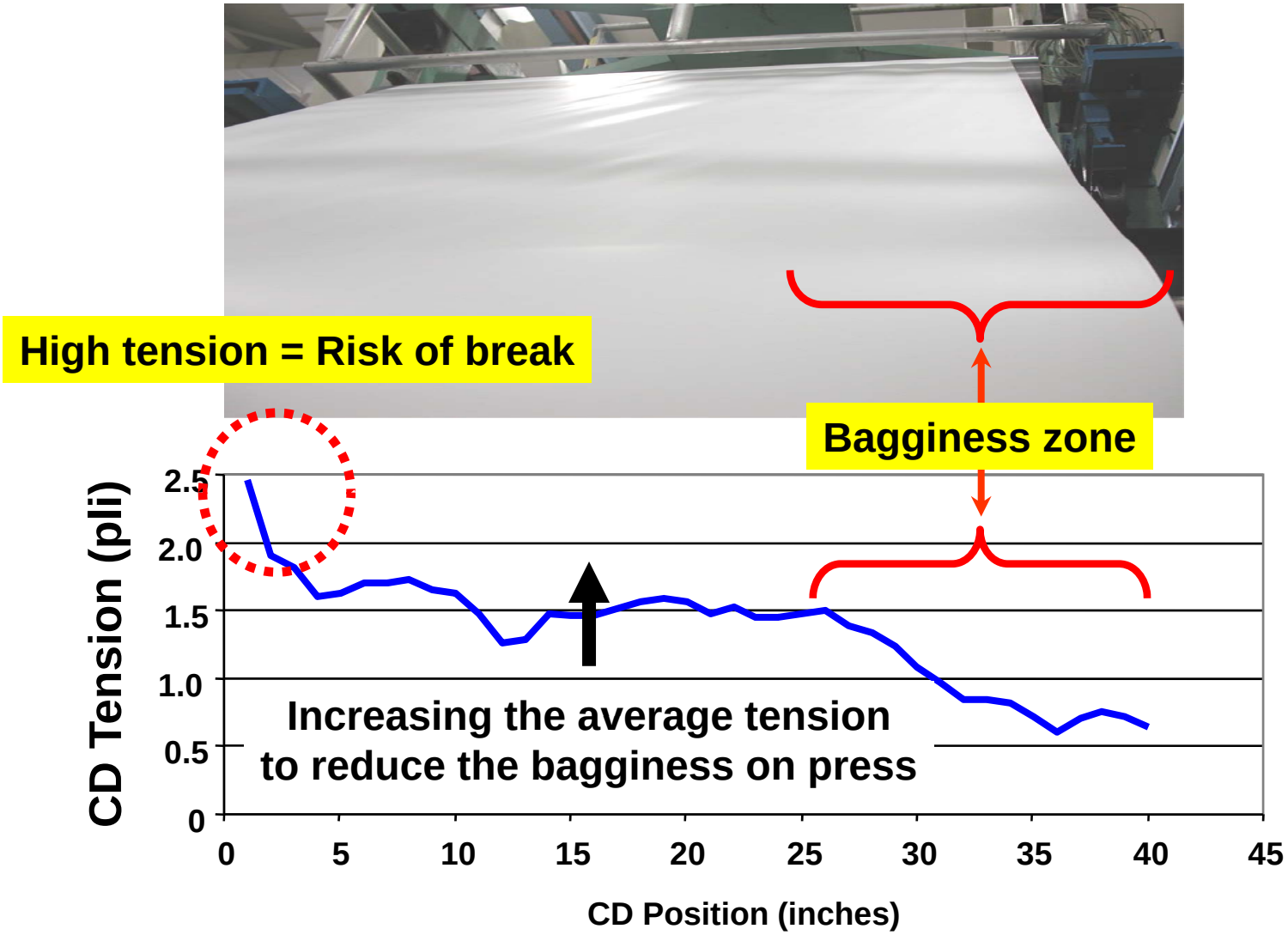


Baggy edge rolls also cause misregistration

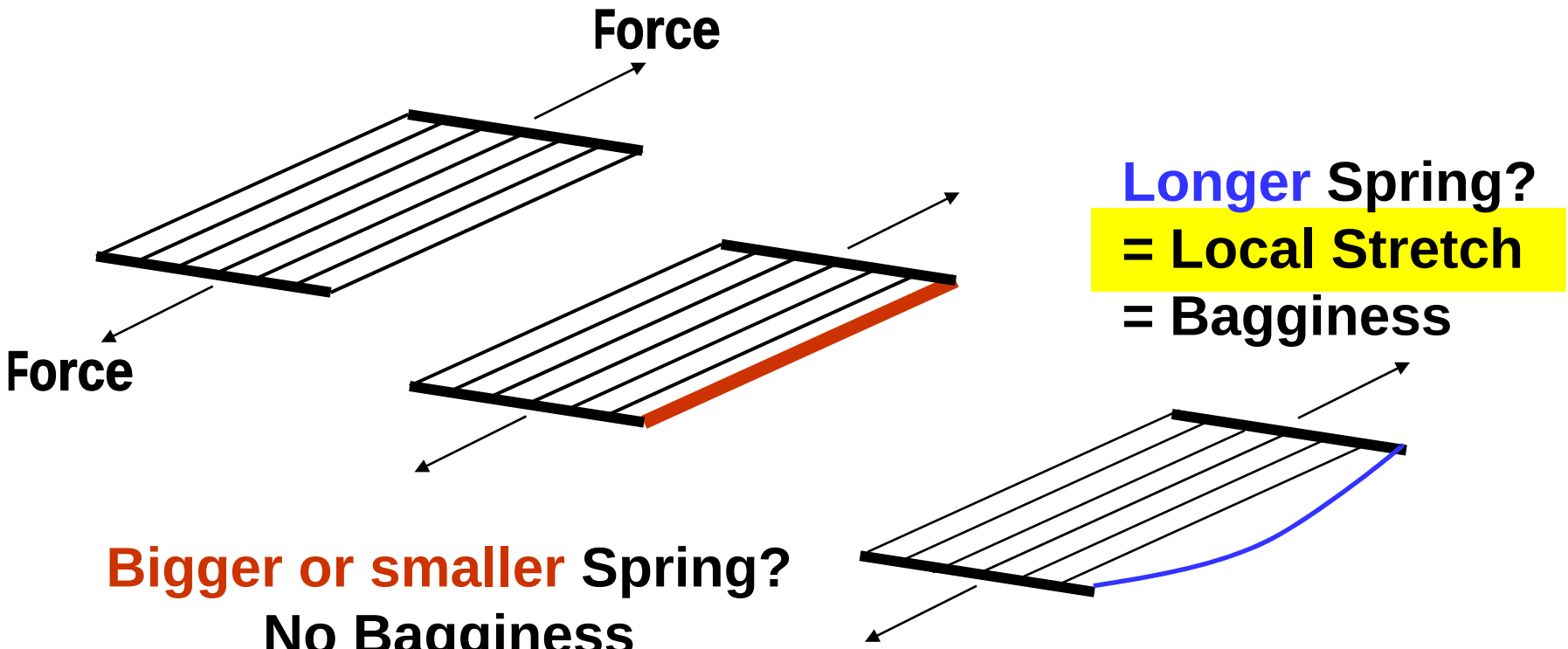




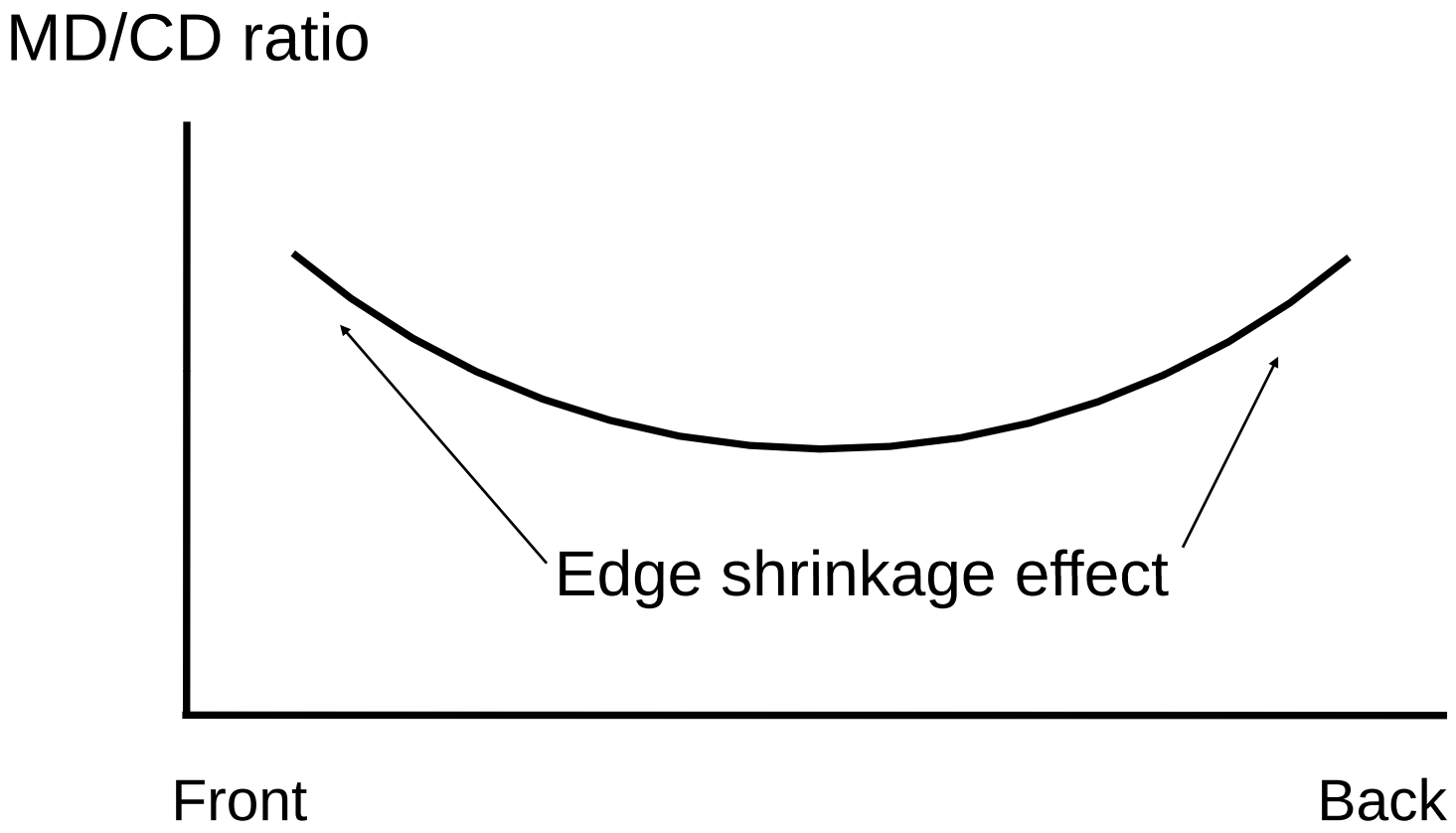
Baggy edge rolls even cause web breaks!



Origin of bagginess



MD/CD ratio profile

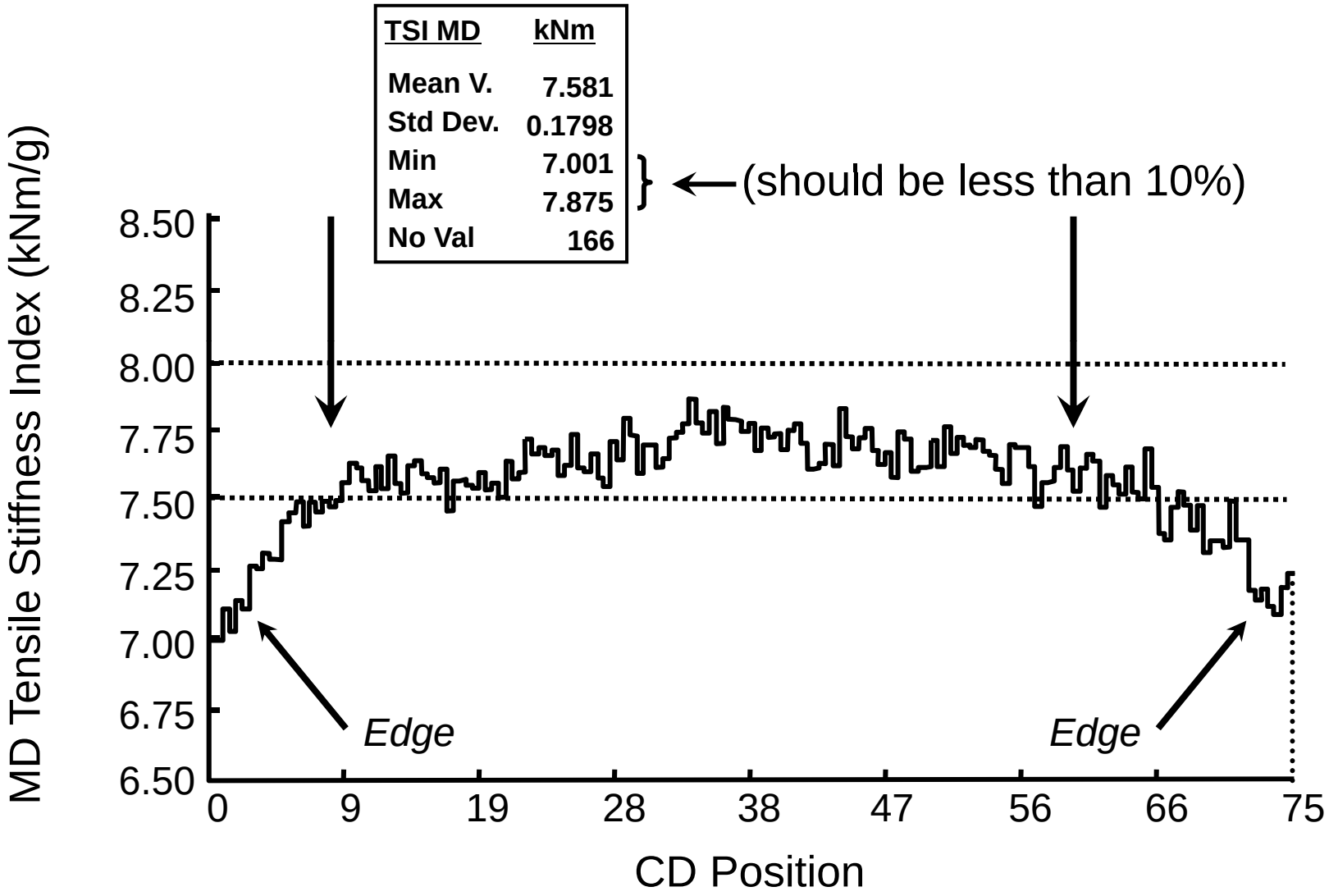


Edge rolls usually have more expansion or shrinkage, leading to web elongation and bagginess at the edges

Existing tools to evaluate baggy edge

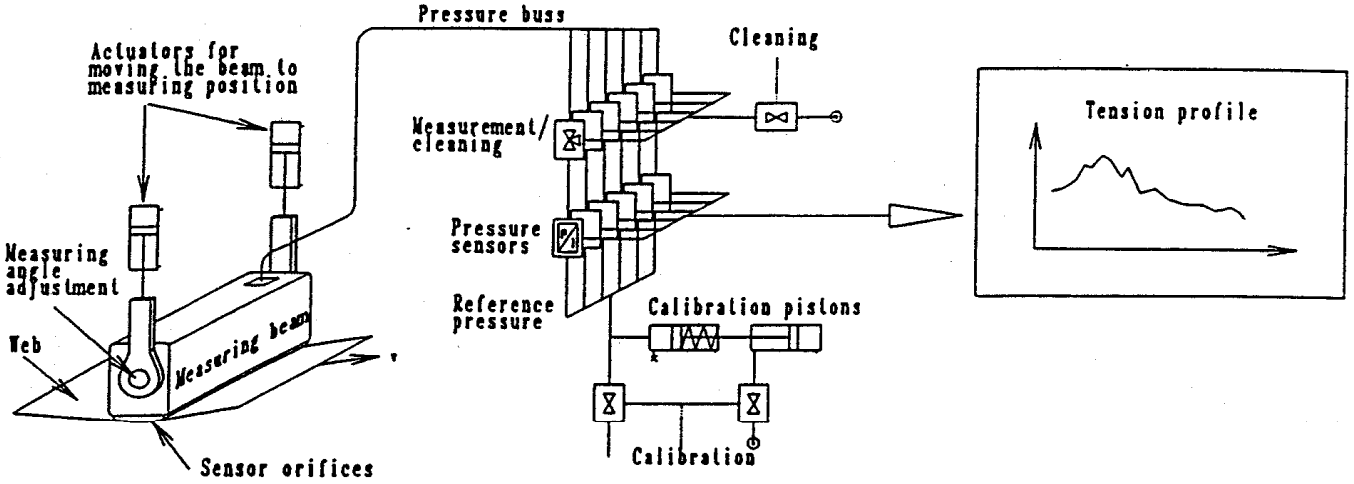
Some mills try to relate baggy edge to roll hardness

Other mills try to relate baggy edge to TSI MD



Existing tools to quantified baggy edge on machine

Beam with air pressure sensors that measure air pressure between paper and beam

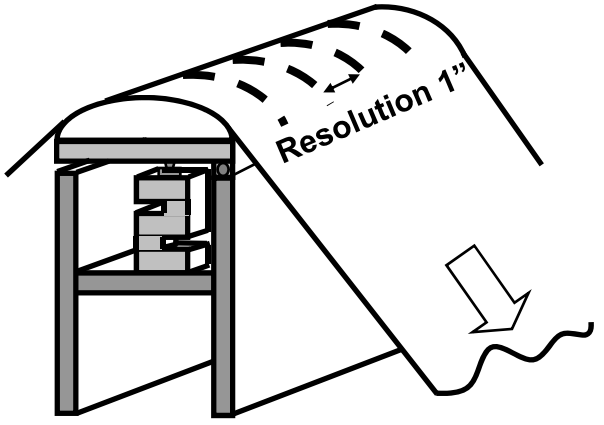


Roll with a film force sensors mounted on it in a helical arrangement

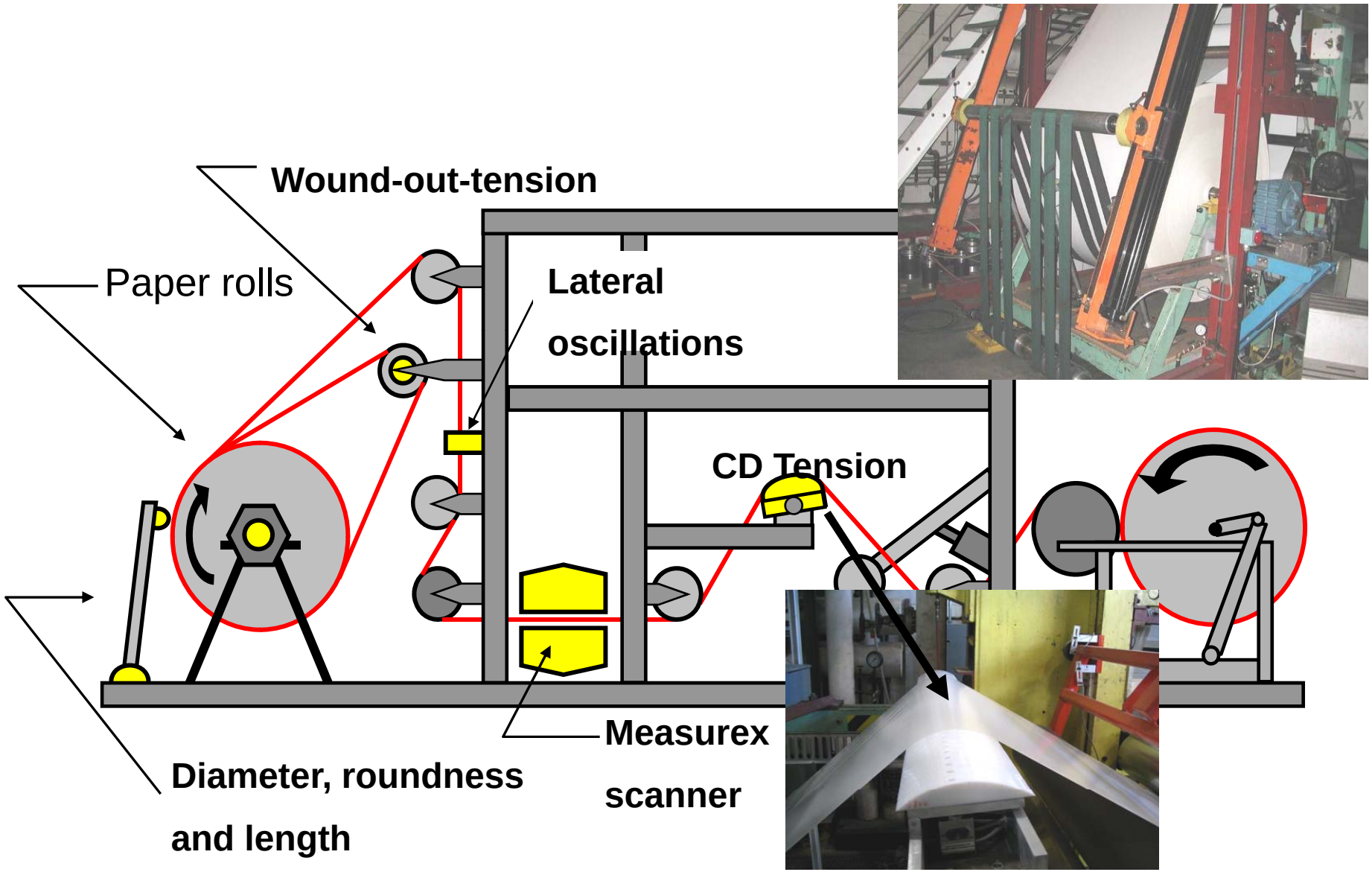
Both pictures have been taken from Metso publications and internet site

Off-line tension beam to quantify baggy edges

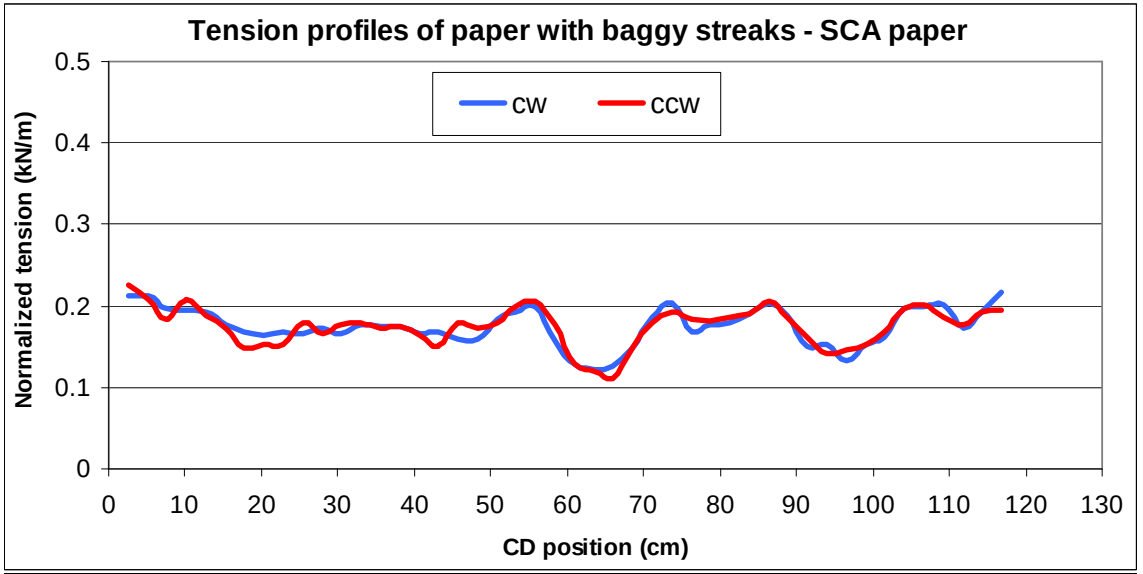
- High accuracy (5% error)
- High resolution in CD (every 1”)
- Width 50”

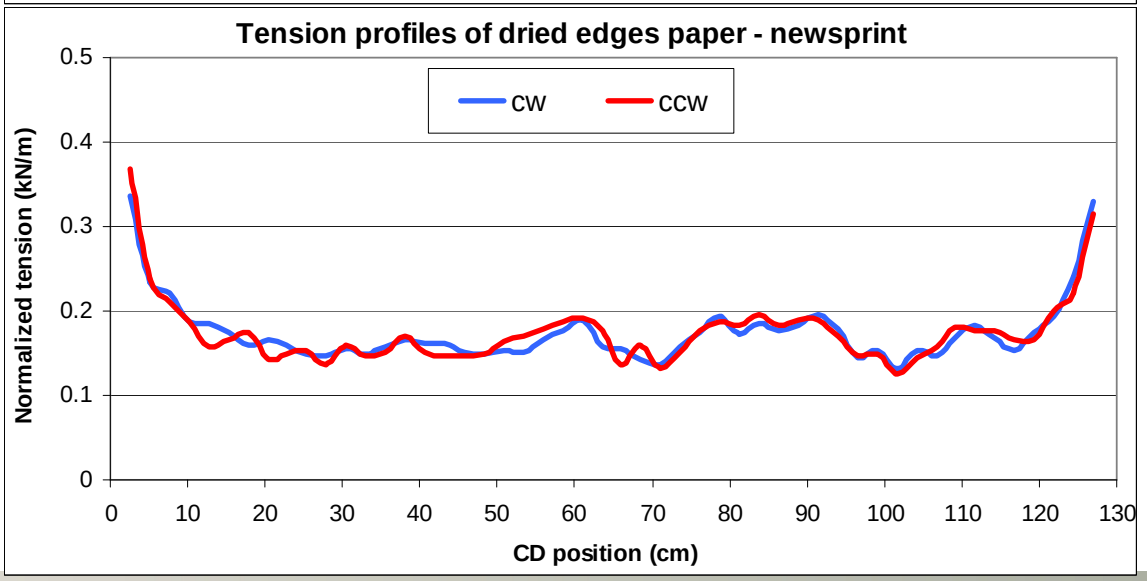


Beam installation on roll tester equipment

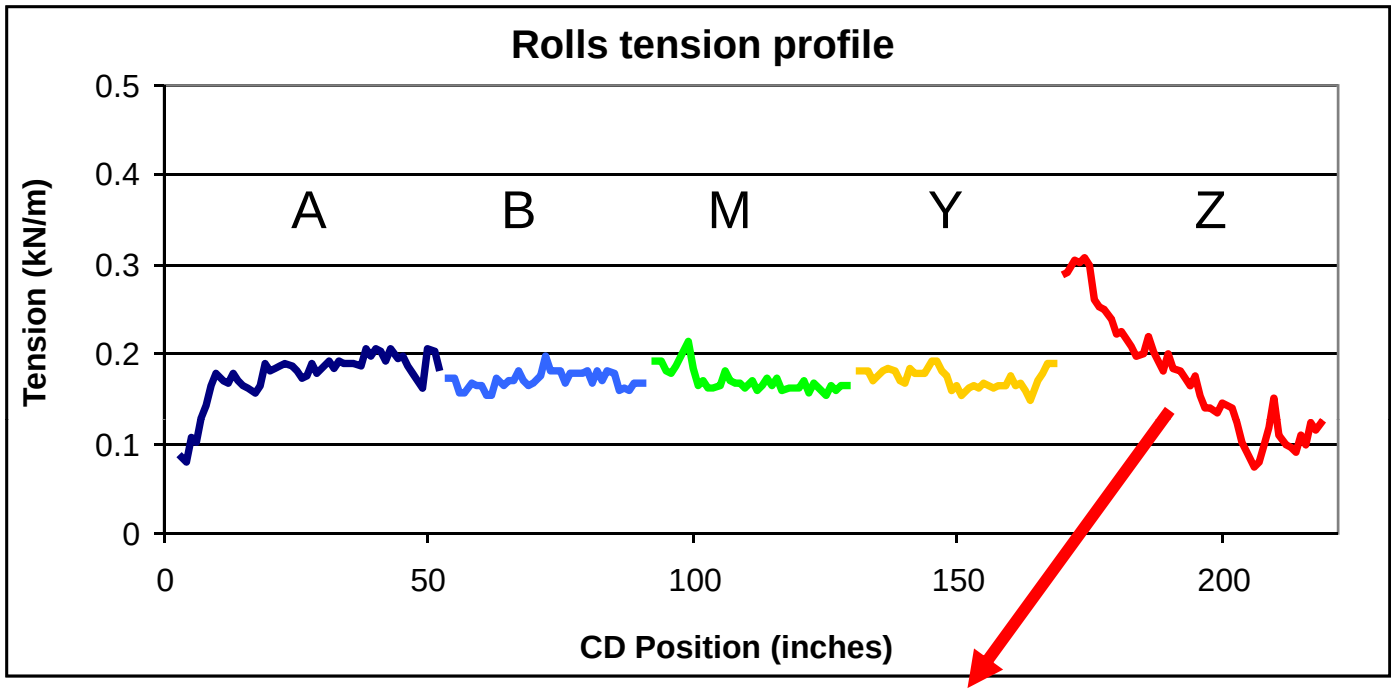


High resolution measurements in CD



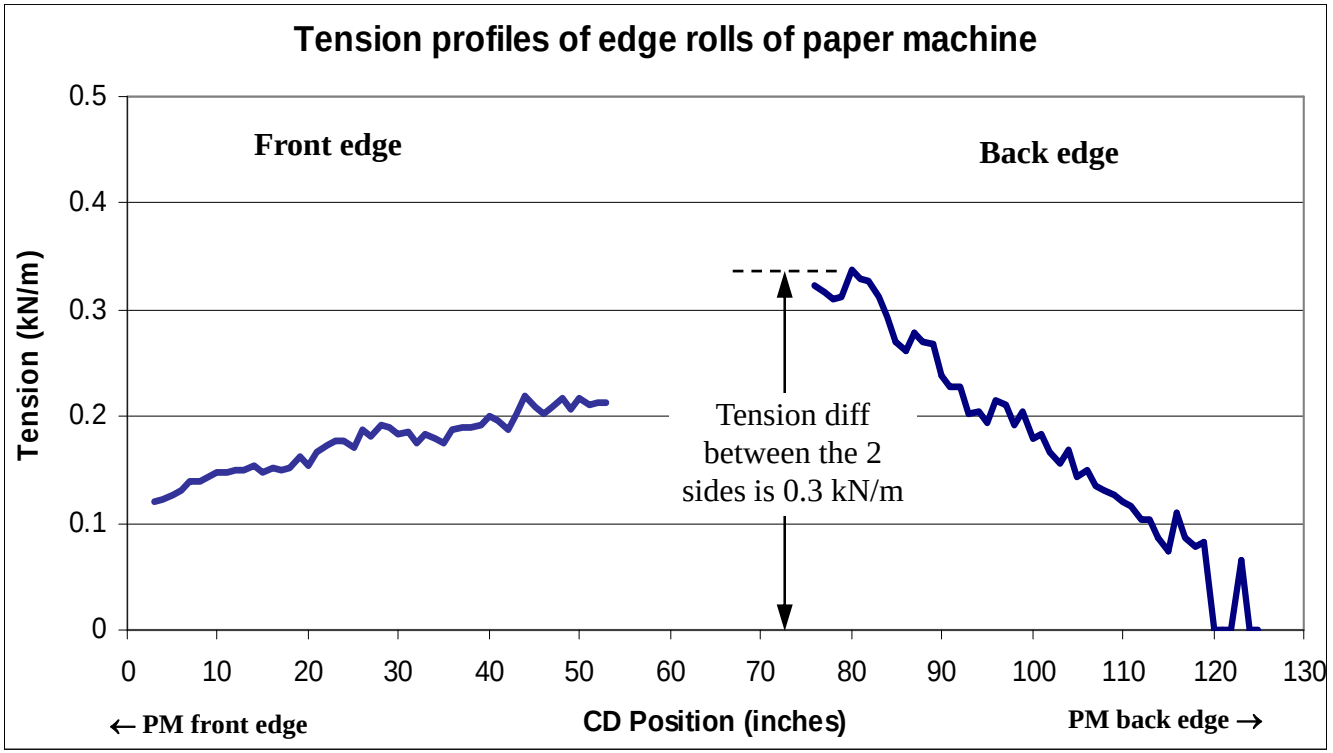


Roll comparison from different CD positions



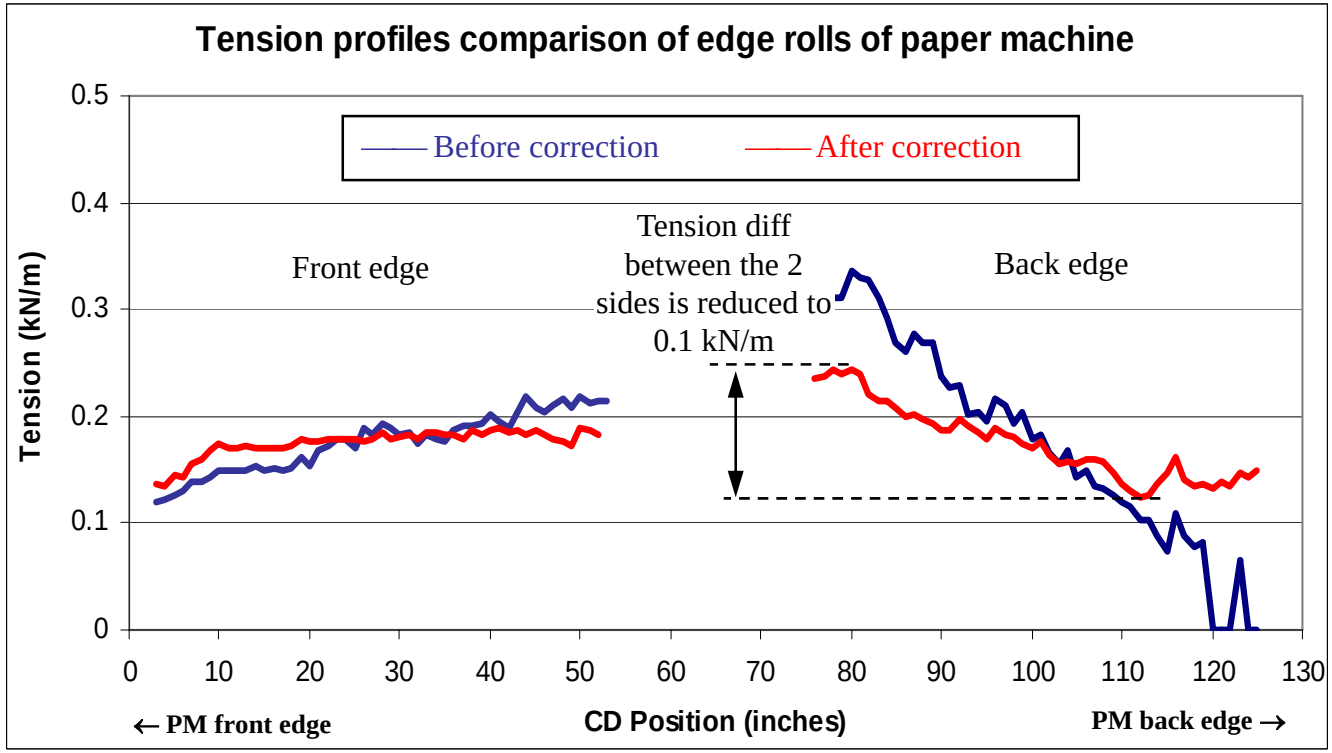
Case studies: correction of baggy edges

Case study #1: Baggy edge (newsprint)



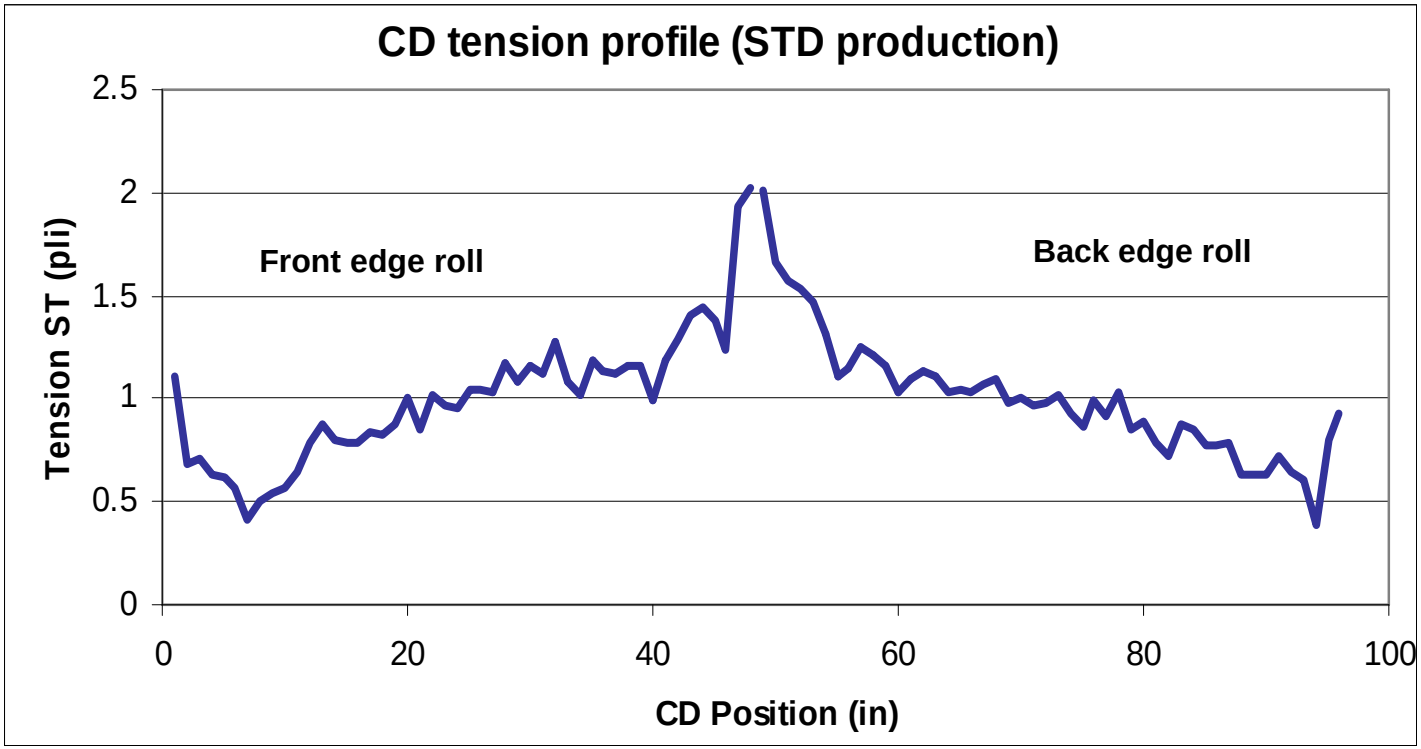
Significant baggy edge at the back of the machine

Case study #1: Correcting the drying history



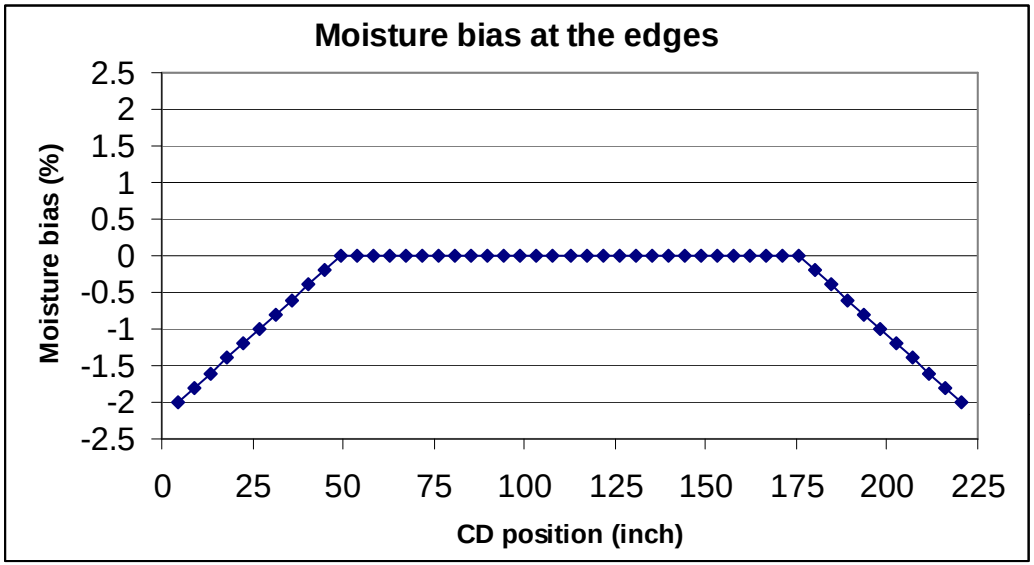
Changing the drying history (press + dryers) allowed to reduce the tension non-uniformity at the back edge

Case study #2: Baggy edge (directory grade)



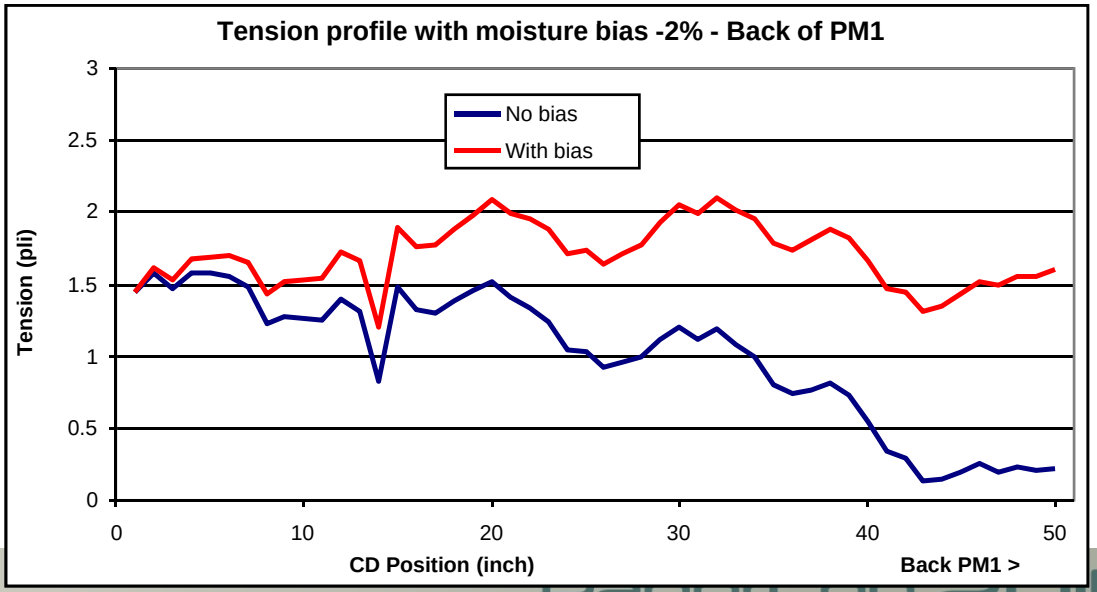
Significant baggy edge at both edges of the machine

Case study #2: Application of moisture bias



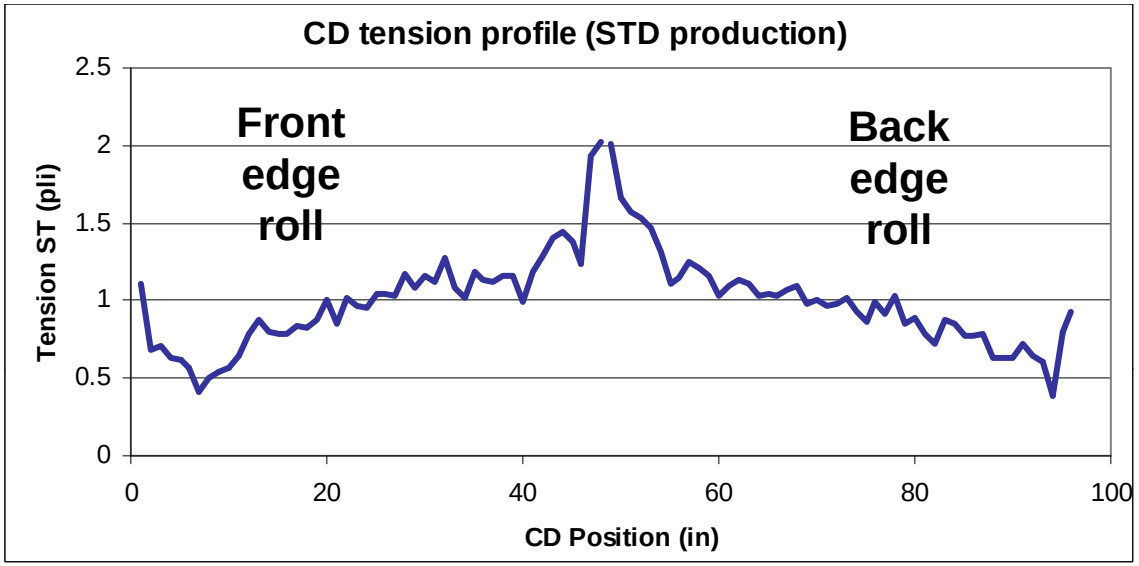
← Moisture bias (-2% gradual bias over 50” wide)

Tension profile in CD increases at the edges →

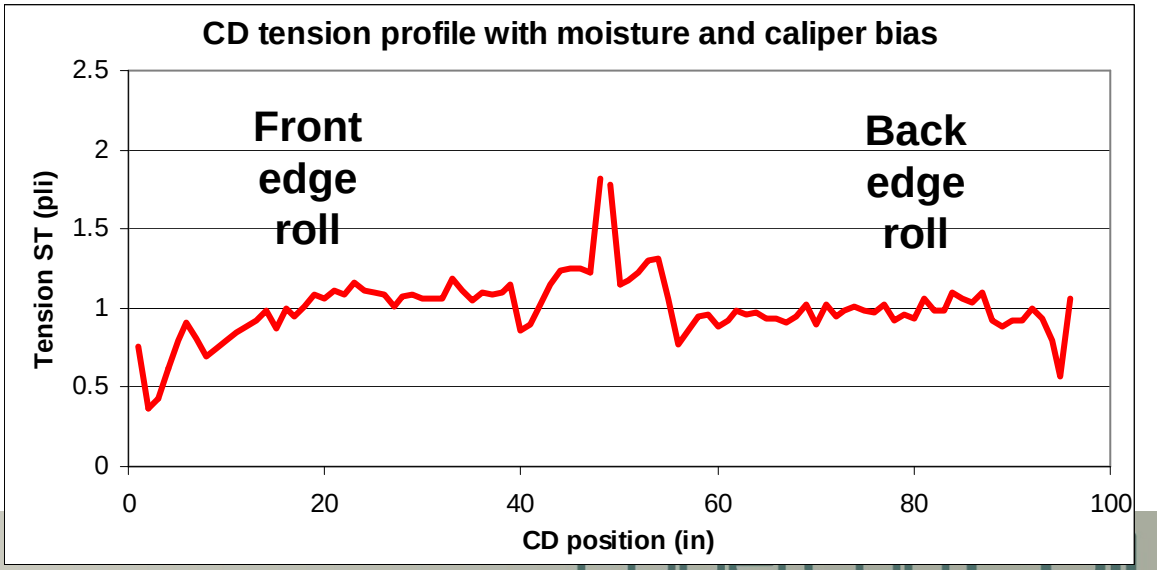


Case study #2: Correcting the tension profile with moisture bias

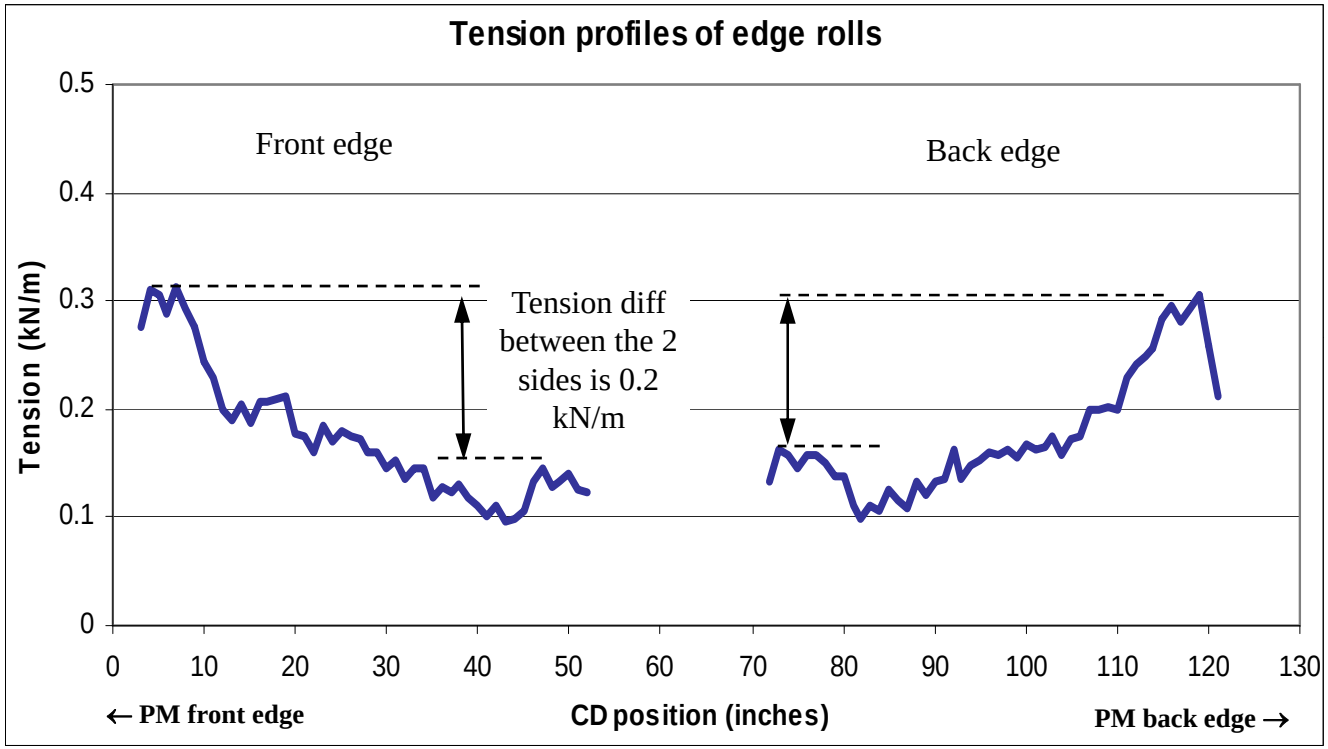
- No bias
  - The tension profiles were not uniform at the edges



- With bias
  - Tension profiles are improved, especially at the back

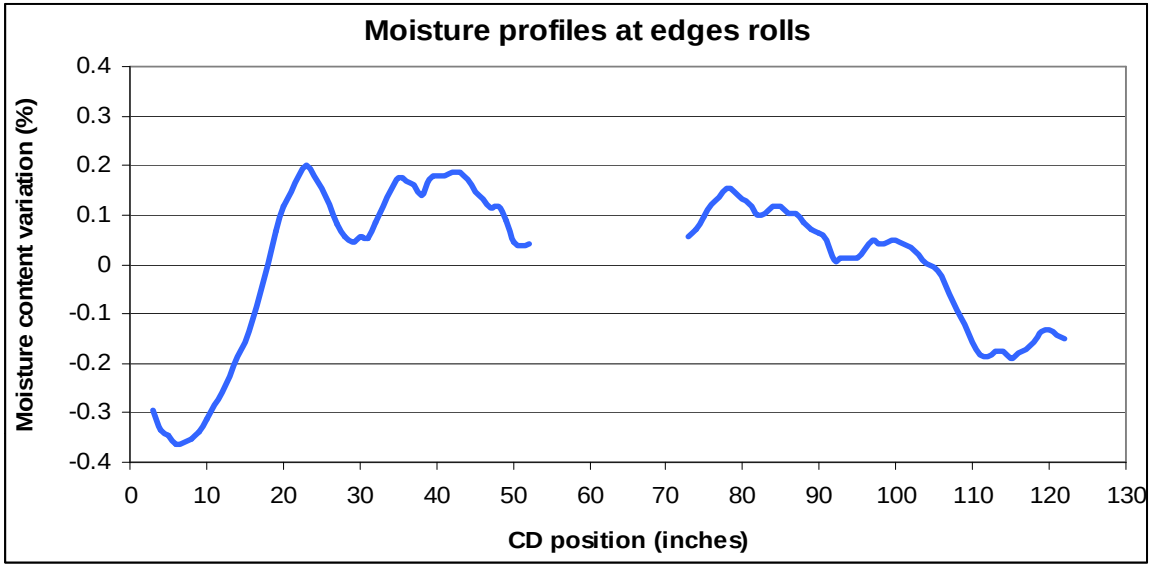


Case study #3: Inverse baggy edge (fine paper)



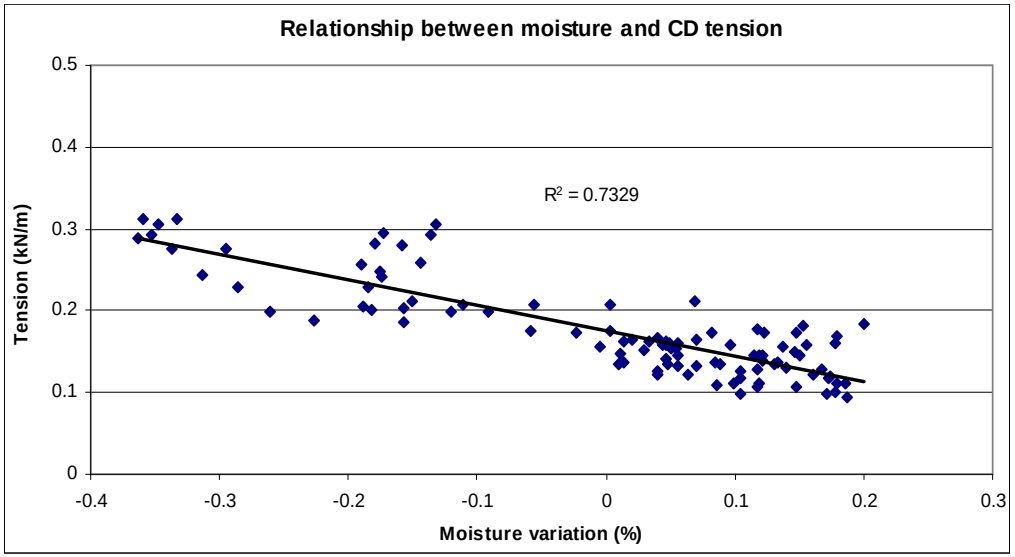
Inverse baggy edges at each edge of the machine
The customers see baggy edges

Case study #3: Correcting CD moisture profiles



Inverse correlation between CD tension and CD moisture profiles (higher moisture = lower tension)

Correction of CD moisture profiles is underway



What can be achieved

- ✓ Measurements on any grade of paper
  - ➢ Base sheet/coated/laminated
  - ➢ After conversion/print
  - ➢ Different CD positions and sets on paper machines
- ✓ Quantification of CD tension profile
  - ➢ Quantify how severe is actual bagginess
  - ➢ Comparison with database
- ✓ Corrections suggested
- ✓ Analysis and follow-up of machine changes

Conclusions

- A tension beam was developed to quantify CD tension profile of paper web
  - high accuracy (<5% error)
  - high resolution (50 units over 127 cm width)
- This new tool was successful in measuring the tension non-uniformity of different types of paper grades.
- Bagginess and baggy edge can now be quantified at low cost
- Corrections can be made by changing the drying history of the web from the press section to the reel.
- The tension beam can be used to monitor the tension profiles corrections and later to ensure the uniformity of the profiles with time.