



CRC

for

Premium

Quality

Wool

Drafting Principles

Produced for the CRC for Premium Quality Wool undergraduate program by;
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Aims of Drafting

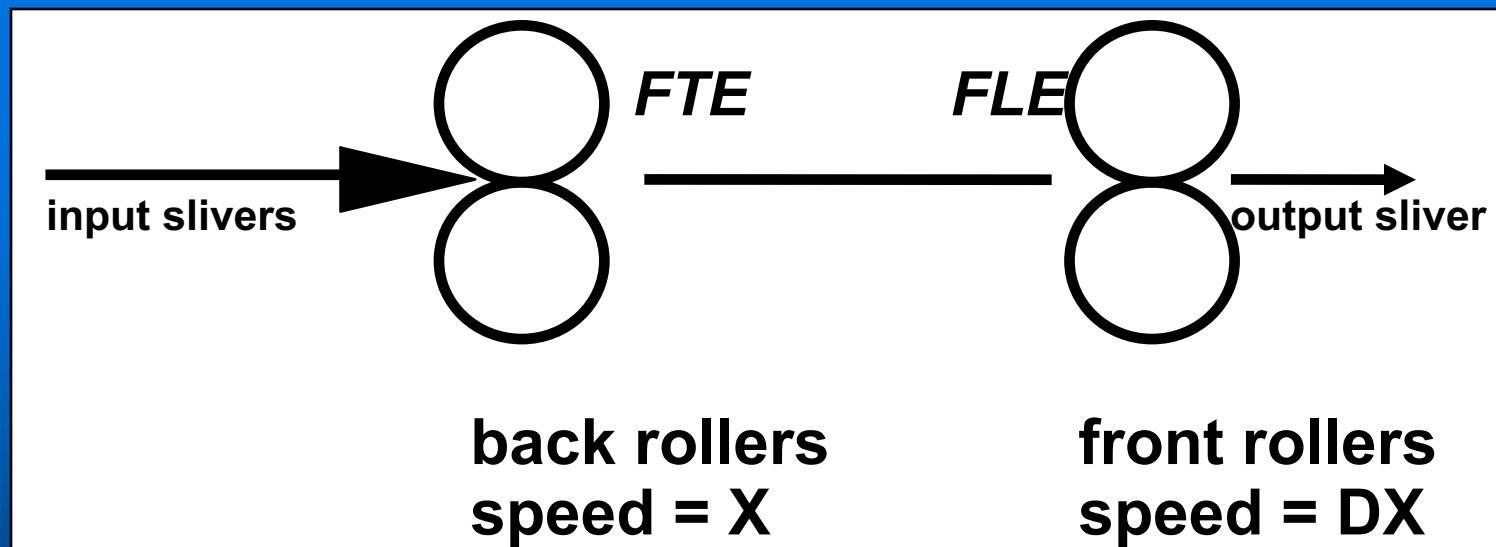
- attenuation of a fibre assembly
- fibre straightening
- Drafting & Drawing defined
- Types of Drafting
 - hand drafting
 - toothed drafting
 - Roller Drafting



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Basic Elements of Roller Drafting

- two sets of rollers
- drafting zone (ratch setting)
- Perfect Roller Drafting





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Draft Measurement

- **material draft**
 - input linear density / output linear density
 - material draft or “real draft”
- **mechanical draft**
 - FR surface speed / BR surface speed
 - ratio of the roller rotational speeds
 - “machine draft”
 - draft estimate
- **material draft < mechanical draft**



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Irregular Drafting

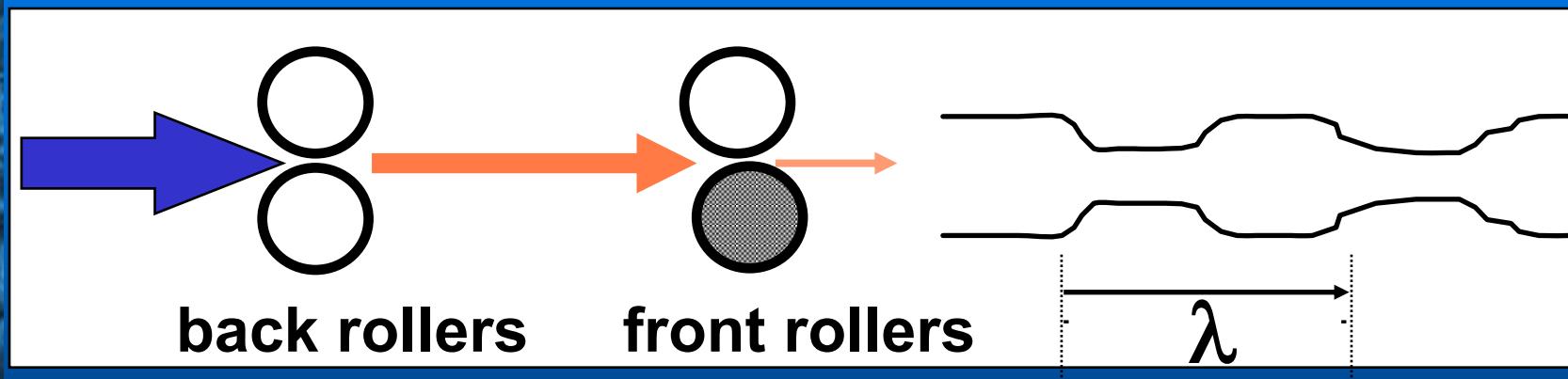
- Machine Factors
 - variation in nip position
 - roller speed variation
 - roller eccentricity
 - slippage between fibre and rollers
- Fibre Factors
 - length variation (short fibres)
 - fibre entanglement (poor alignment)
- Result
 - lack of evenness
 - strength variation



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Roller Eccentricity

- periodic irregularity (unevenness)
 - repeats every roller rotation
- wavelength (λ) is distance between repeats
- identified by evenness testing
 - Spectrographs





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Floating Fibre Effect

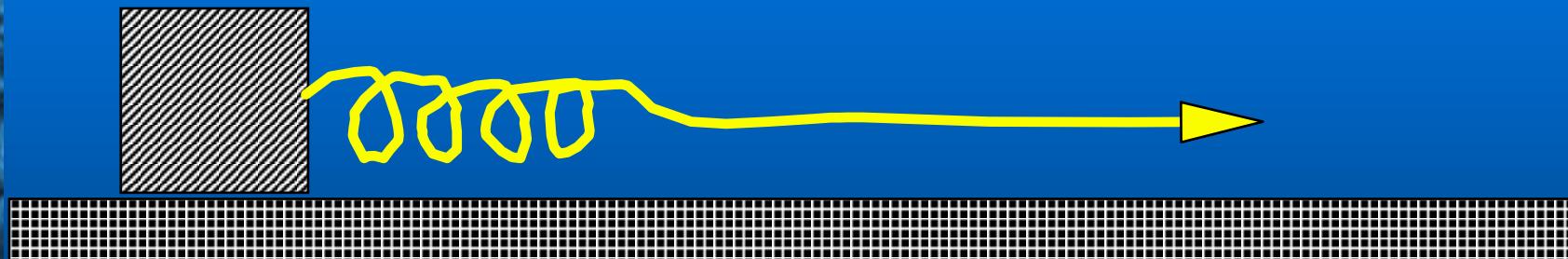
- Fibre length variation
 - long fibres
 - effectively controlled
 - shorter fibres
 - NOT under positive control
 - FLOATING fibres
 - interaction with other fibres
 - slow-moving (slow them down)
 - fast-moving (speed them up)
- Result
 - more fast contacts
 - thick spot, followed by a thin spot
- DRAFTING WAVES
 - approx. 2.5x m.f.l.



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Sliver Elasticity Effect

- Slivers are elastic over small strains
 - fibre crimp
 - fibre entanglement
 - poor fibre orientation
- “stick-slip” effect
- DRAFTING WAVES
 - approx. 2.5x m.f.l.





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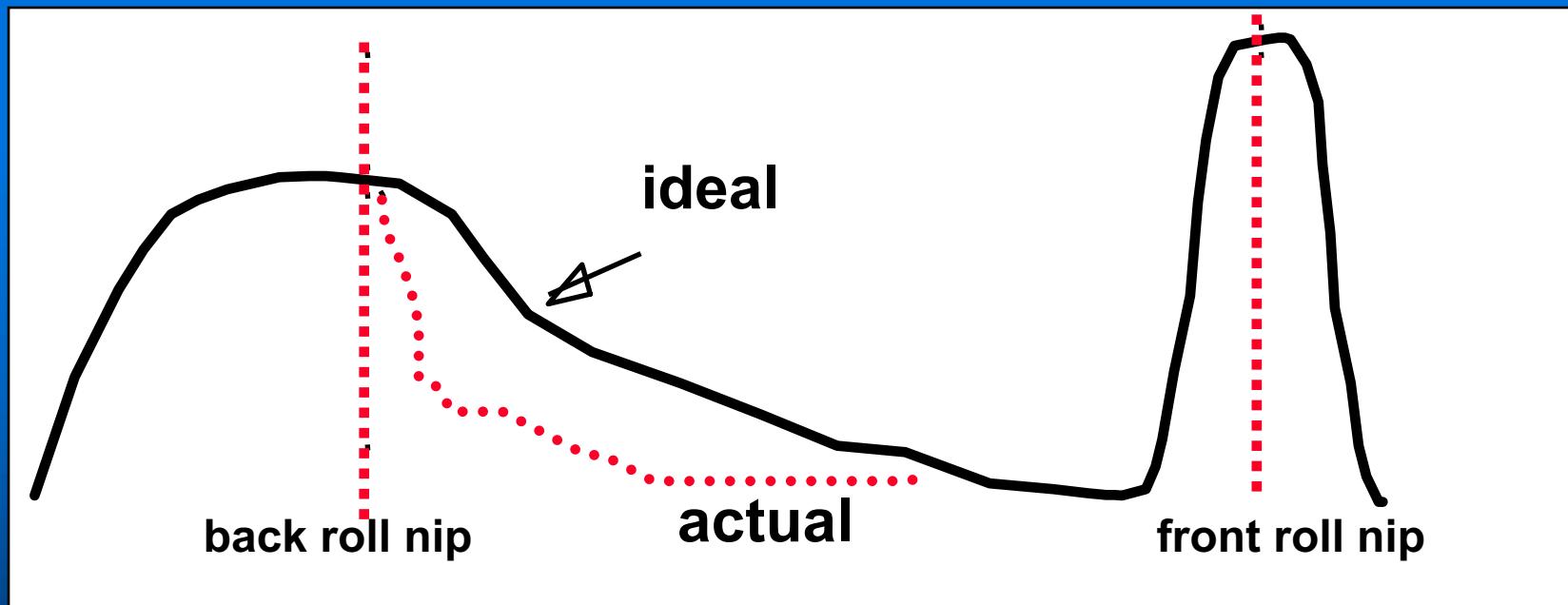
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Ideal Pressure Distribution

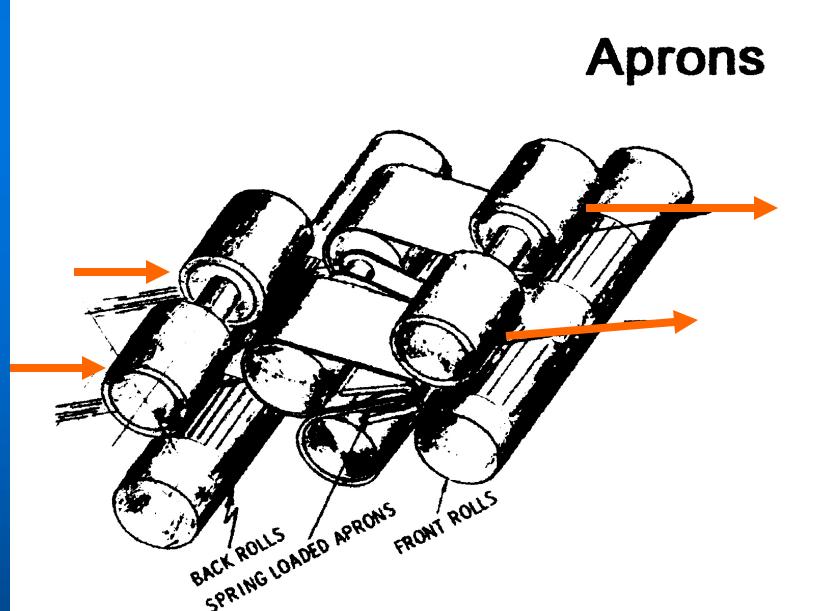
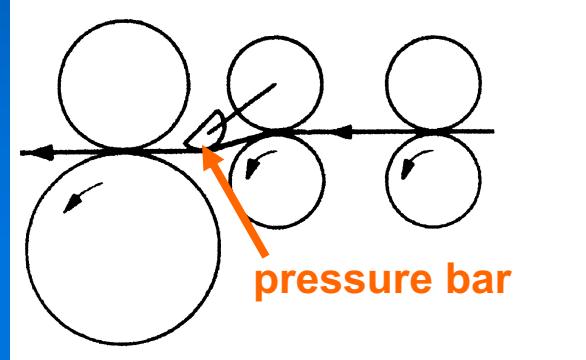
- back rollers (BR)
 - maintain pressure as long as possible
 - gradually decrease pressure near FR
- front rollers (FR)
 - more concentrated pressure





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Fibre Control in Roller Drafting

- Aims
 - minimise drafting waves
 - maximise control of short fibres
 - Mechanisms
 - pressure bars
 - cotton drawframe
 - pins
 - worsted gillboxes
 - aprons
 - worsted ring spinning
 - false twist
 - woollen ring spinning
- 
- The diagram illustrates a roller drafting system. It shows a series of cylindrical rollers arranged in a draft. Labels indicate the "BACK ROLLS", "FRONT ROLLS", and "SPRING LOADED APRONS". Orange arrows point to the "APRONS" and the "SPRING LOADED APRONS".

The diagram shows a schematic of a cotton drawframe mechanism. It consists of several circular rollers arranged in a line. A horizontal bar labeled "pressure bar" is positioned across the top, applying pressure to the fibers as they pass through the rollers. Arrows indicate the direction of fiber flow and the rotation of the rollers.

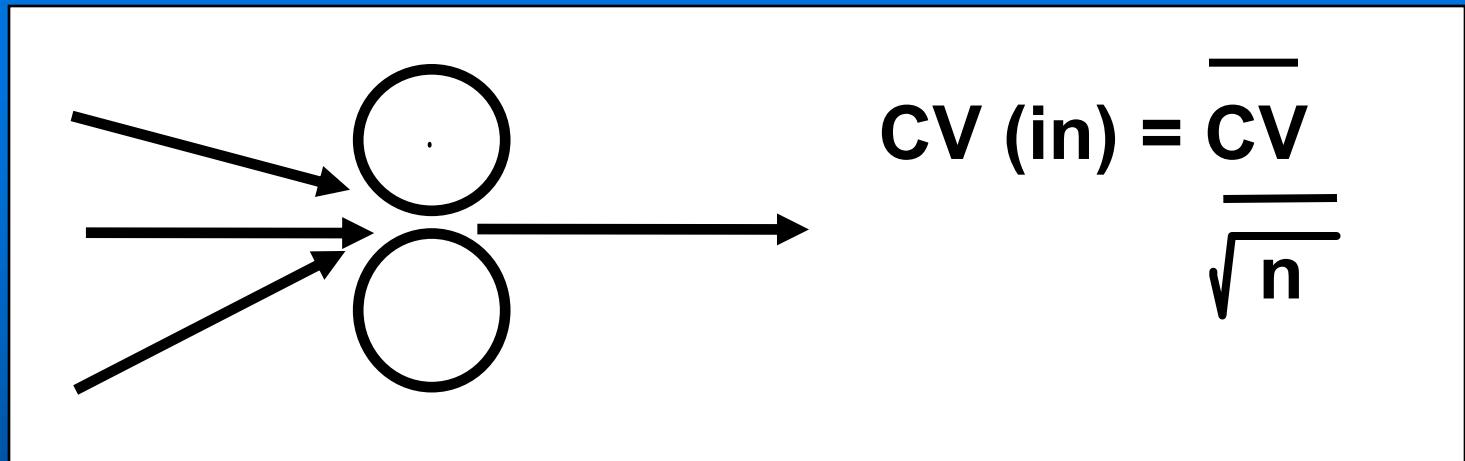


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Law of Doubling

- **multiple sliver input**
 - overall CV of input **decreased**
- **single sliver output**
 - increases the evenness





Law of Addition

- each machine adds a certain amount to the irregularity of the finished product
- processing adds unevenness
 - reduced fibre no, imperfect drafting

