www.csiro.au

A New Concept for Cotton Fibre Elongation

Drs Shouren Yang & Stuart Gordon, CSIRO Materials Science & Engineering

17 March 2014 ITMF ICCTM Bremen

Materials

- Ten international cottons:
  - 5 Australian upland cottons
  - 3 SJV cottons
  - 2 Xinjiang (XJ) long staple cottons

Fibre elongation measurement

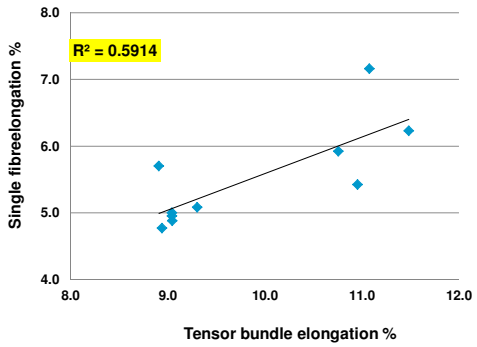
- Favimat single fibre tester gor154 1
  - 300 fibres per sample
  - Gauge length: 13 mm
  - Test speed: 13 mm/min
- Tensor bundle tester
  - 10 tests per sample
  - Gauge length: 4.3 mm
  - Test speed: 20 mm/min
- HVI bundle tester
  - HVI 1
  - HVI 2

SIROLAN-TENSOR

Folie 3

gor154 1 Need to know whethertensile values normalised on individual or average basis
Gordon, Stuart (CMSE, Geelong WP); 21.02.2014

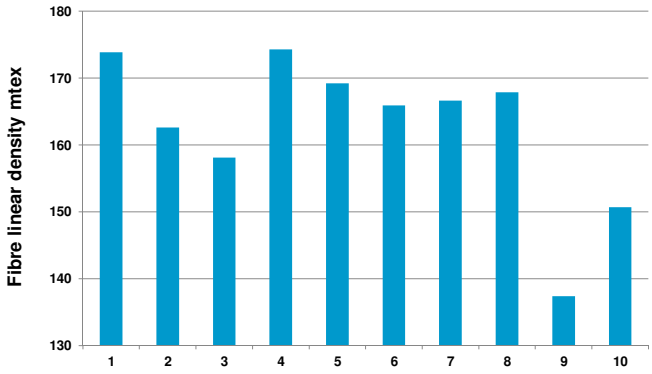
Favimat SFE vs. Tensor BE



- reasonably good correlation of Favimat SFE with Tensor BE go

gor154 3

Variations in fibre linear density for ten cottons



Folie 5

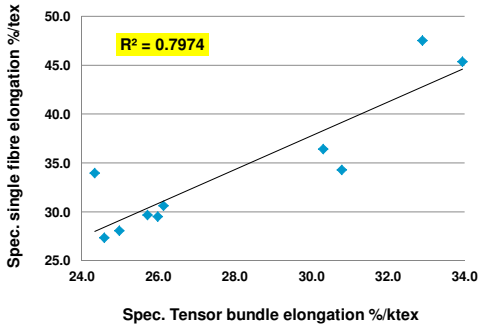
gor154 2 While it is not necessary to have a statement written on this slide you will need an explanation as to why Tensor elongation values are larger
Gordon, Stuart (CMSE, Geelong WP); 21.02.2014

Folie 6

gor154 3 Can you also normalise for maturity; we know that as crystallite dimensions increase with maturity. There is a thought that as maturity increases elongation decreases. Normalising with a ratio is better mathematically too.
Gordon, Stuart (CMSE, Geelong WP); 21.02.2014

Specific single fibre/bundle elongation

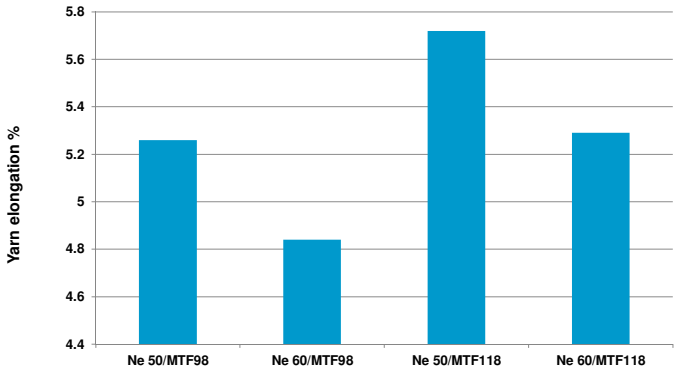
- The ratio of fibre (bundle) elongation to fibre (bundle) linear density. gor154 4



- A useful & logical concept for cotton elongation studies.

gor154 5

Yarn elongation vs. linear density



Folie 7

gor154 4 Normalise with maturity?
Gordon, Stuart (CMSE, Geelong WP); 21.02.2014

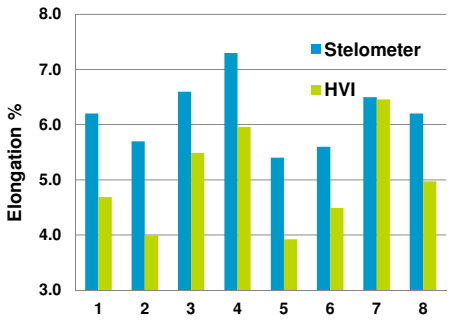
Folie 8

gor154 5 You are showing this as a model for normalising elongation by linear density
Gordon, Stuart (CMSE, Geelong WP); 21.02.2014

BE value is testing method dependent

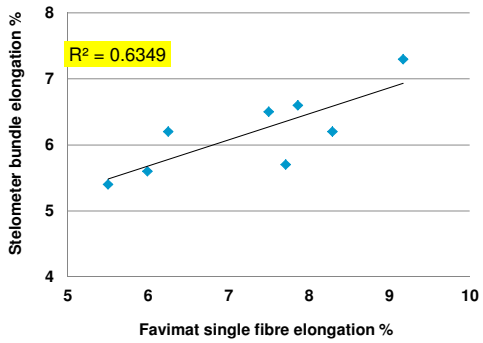
- Gauge length
- Testing speed
- Bundle configuration
- Bundle linear density

Stelometer vs. HVI for eight US cottons



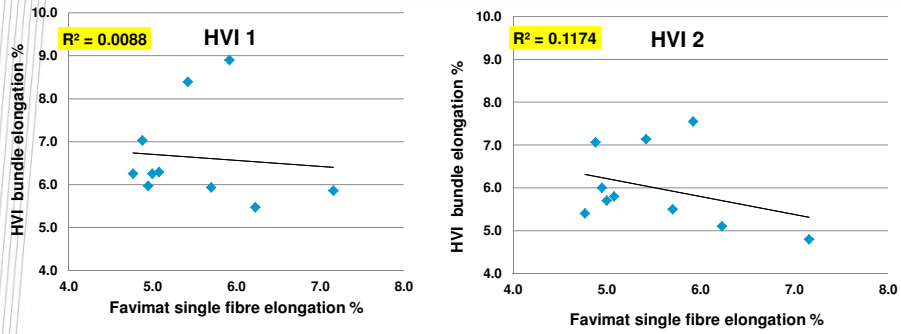
- Source: C.D. Delhom etc 2010 BWCC

Reasonably good correlation of Stelometer with Favimat for eight US cottons



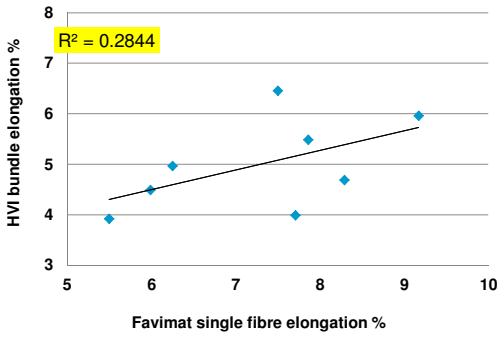
- Source: C.D. Delhom etc 2010 BWCC

HVI BE vs. Favimat SFE for ten cottons



- Poor correlation of HVI BE with Favimat SFE
- HVI does **NOT** provide adequate measurement for FE

Poor correlation of HVI with Favimat for eight US cottons



- Source: C.D. Delhom etc 2010 BWCC

Conclusions

- **Reasonably good correlation of Favimat SFE with Tensor BE,**
- **which is greatly improved with a new concept of Specific Elongation.**
- **HVI does NOT provide adequate measurement for FE.**
- **Further studies needed to confirm the findings.**
- **Collaborations with other organisations to investigate and improve HVI elongation measurement.**

Acknowledgement

- This work is financially supported by CRDC
- The careful technical work of Ms. Nicole Phair-Sorensen is gratefully acknowledged

CSIRO Materials Science Engineering
Dr Shouren Yang
Senior Principal Research Scientist
Phone: 61352464056
Email: shouren.yang@csiro.au
Web: www.csiro.au/group

www.csiro.au

THANKYOU !

Contact Us
Phone: 1300 363 400 or +61 3 9545 2176
Email: enquiries@csiro.au Web: www.csiro.au

CSIRO