INTRODUCTION TO YARNSPEC

MARTIN PRINS

YARNSPEC

Yarnspec aims to predict what a good modern mill can expect to achieve using a particular wool top for a given yarn under the specified spinning conditions.

YARNSPEC

This is a powerful and necessary tool for a closed quality control system that enables ongoing improvement and reduces error margins on cost and performance.

YARNSPEC

Currently, Yarnspec only applies to pure wool worsted yarns.

It was particularly developed for ecru weaving yarns and here it has been most extensively validated.

However, it is designed to handle the full range of dyed and un-dyed worsted knitting and weaving yarns.

YARNSPEC

- based on the premise that “best commercial practice”, in terms of spinning performance and yarn quality, is indeed predictable
- assumes that the wool top has been scoured and combed to appropriate standards and seeks to quantify the effect of wool fibre properties of the top on spinning performance

YARNSPEC

- enables the effect of different fibre properties to be explored
- enables a mill to explore whether different top specifications may meet its needs at a cheaper price

SOME KEY MESSAGES

- mean diameter is overwhelmingly the most important top fibre property
- mean fibre length is the next most important fibre property
- fibre strength is possibly the third most important factor

SOME KEY MESSAGES

- the importance of diameter distribution – CVD – is as expected
- importance of CVH, on yarn properties and spinning performance, is over-rated

YARNSPEC PREDICTION

SIROLAN – Yarnspec CSIRO Textile and Fibre Technology			
Mill	Geelong	**Date**	07-07-2004
Yarn code	External client	**Description**	Solospun yarn
Wool Properties			
Wool lot	External client	**Description**	CSIRO top
Fibre diameter	20.7 µm	**CV-D**	20.8 %
		Curvature	57.8 °/mm
Hauteur	93.5 mm	**CV-H**	46.0%
		% < 30 mm	7.0
Fibre tenacity	10.51 cN/Tex	**Tensor calibration**	1.0
Shrink proofed	no	**Dyed**	no
		Backwashed	no

YARNSPEC PREDICTION

Processing Details			
Spinning draft	19.6	**Ring size (mm)**	55
Spinning (rpm)	9000	**Traveller number**	23
Re-combed	No	**Traveller wt (mg)**	112
Yarn Properties			
Singles			
Tex	40.16	**Nm**	24.9
Twist	429 tpm	**Metric twist factor**	86.0

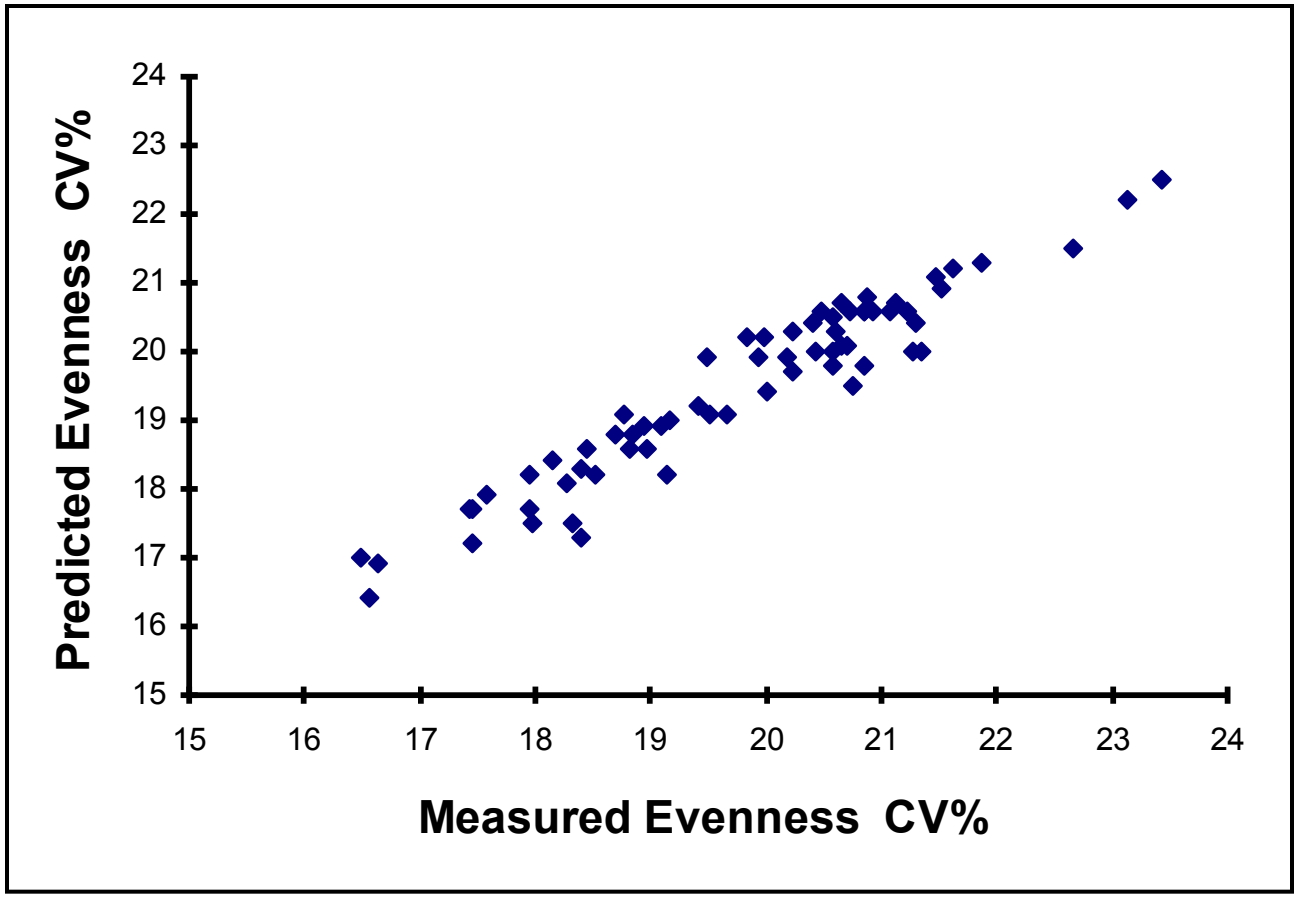
YARNSPEC PREDICTION

Evenness	Predicted	Measured
I	1.13	
CV %	13.1	
U %	10.5	
Thin Places / km	7	
Thick Places / km	1	
Neps / km	11	
Hairiness	5.12	

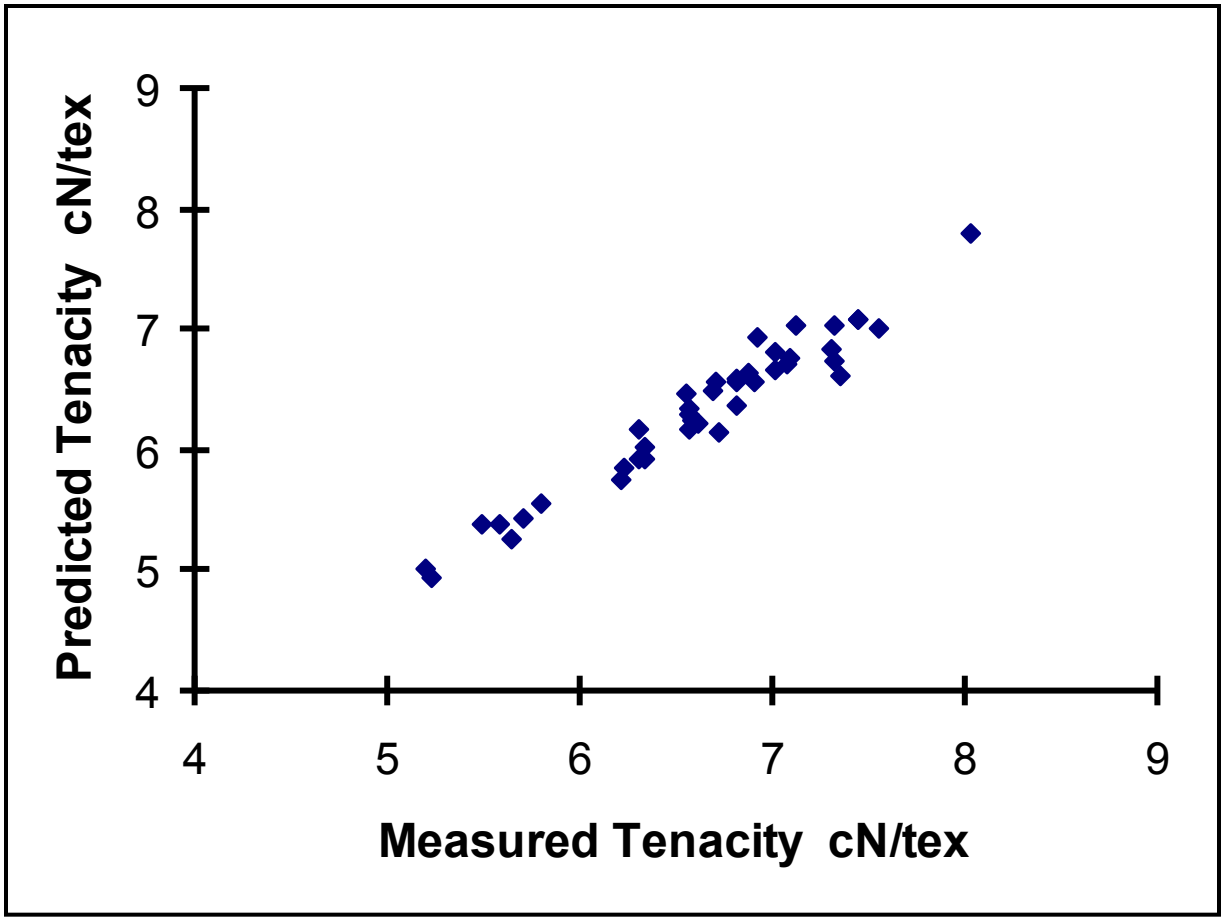
YARNSPEC PREDICTION

	Predicted	Measured
Tenacity (cN/Tex)		
@ 5 m/min	8.03	
Elongation (%)		
@ 5 m/min	22.4	
Breaking Load (gF)		
@ 5 m/min	329.1	
Ends down / 1000 sp.hr	6	

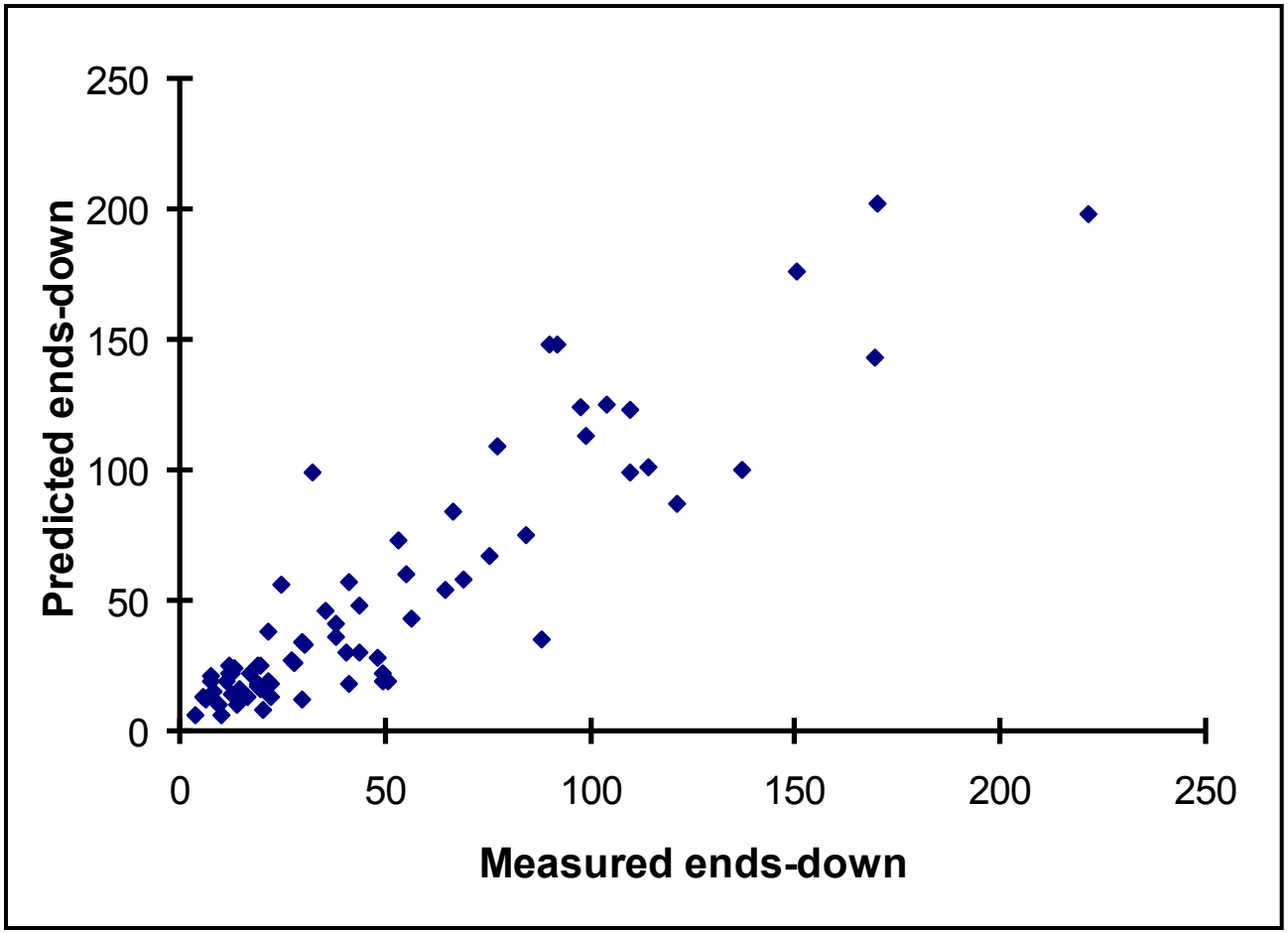
YARNSPEC – EVENNESS



YARNSPEC – TENACITY



YARNSPEC – ENDS DOWN



FIBRE DIAMETER

Diameter	20	21	22	23	24
No. of Fibres	46	42	38	35	32
Evenness (CV %)	18.7	19.5	20.4	21.2	22.2
EDMSH	15	26	49	98	215

Using: Nm 50, 20 Tex, 636 tpm, CVD=23%, H=70 mm, fibre tenacity = 11.12cN/tex, re-combed, spun at 9 000 rpm with #27 traveller on 55 mm rings.

HAUTEUR

Hauteur (mm)	50	60	70	80	90
Evenness (CV %)	21.1	20.7	20.4	20.0	19.7
EDMSH	228	92	49	29	19

Using: Nm 50, 20 Tex, 636 tpm, CVD=23%, H=70 mm, fibre tenacity = 11.12cN/tex, re-combed, spun at 9 000 rpm with #27 traveller on 55 mm rings.

BUNDLE TENACITY

Bundle Tenacity	9	10	11.12	12.24
EDMSH	123	73	49	37

Using: Nm 50, 20 Tex, 636 tpm, CVD=23%, H=70 mm, fibre tenacity = 11.12cN/tex, re-combed, spun at 9 000 rpm with #27 traveller on 55 mm rings.

CV-DIAMETER

CV-D %	18	20.5	23	25.5	28
Evenness (CV %)	19.5	19.9	20.4	20.9	21.5
EDMSH	26	35	49	72	112

Using: Nm 50, 20 Tex, 636 tpm, CVD=23%, H=70 mm, fibre tenacity = 11.12cN/tex, re-combed, spun at 9 000 rpm with #27 traveller on 55 mm rings.

SIROLAN YARNSPEC

- A quality control tool
- Predict yarn properties and spinning performance
- Improve communication between topmaker and spinner
- Tailor top properties and price to meet spinner’s needs

INDUSTRY COMMENT

"By adopting the spinning prediction technology, the quality control system at the mill has changed from 'Experience Based System' to 'Scientific Pre-Known & Pre-Control System', which has resulted in a significant improvement in yarn quality."

Ms Jiang Hui, General Manager, Ruyi Group, 70th IWTO Shanghai Conference 2001

INDUSTRY COMMENT

"Lanzhou Sanmao and most Chinese worsted spinning mills have established internal quality control and quality assurance systems. … These companies have abandoned the old experience–based quality control concept and adopted a new system, which is based on scientific objective measurement and processing prediction. … We are confident to say that the Chinese wool industry is definitely moving from the traditional experience-based management towards the scientific know-how new system."

Ms Wang Wei, Vice General Manager, Lanzhou Sanmao, 2004 IWTO Shanghai Conference

INDUSTRY COMMENT

"Practice in the last few years has demonstrated that Yarnspec is a useful quality control tool for the wool industry. It plays a key part in diagnosing quality problems from wool fibres to yarn. For Australian wool processing, in particular, it enables mills to compare their yarn quality with the world best practice and know exactly where they stand."

Open letter to AWI from eight leading Chinese mills
February 2005