

## Optimization of draw frame bottom roller setting on cotton yarn quality

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### Abstract

Present investigation determines the impact of draw frame bottom roller gauge setting on the performance 15 Tex (40's) yarn quality. In order to optimize the settings of draw frame the trials conducted on two passages of LRSB 851 draw frame by changing the draw frame (front and back zone) bottom roller setting at three level i.e. 41/45mm 40/44 mm & 42/46mm. obtained sliver were processed through speed frame and ring frame and 15Tex (40<sup>s</sup> Ne) combed cotton yarn were prepared .It was found that imperfection (thin, thick & neps), evenness (U%) , and strength of yarn were influenced by the changes in bottom roller gauge setting, adopted for large scale working in spinning department.

Key words: front and back bottom roller, draw frame, Imperfection, Evenness, Rkm Strength.

### I. INTRODUCTION

Material and Method-

High grade cotton was used in the study. For the trail LMW Blow room line was selected to produce 15 Tex (40<sup>s</sup>Ne) (H4 100% Mixing). Blow room to Ring frame material processed through same machinery conditions as well as settings .The specification of the cotton which was used in the study are given below.

### II. Raw Material Properties

Table- I

Machinery line	LMW
Mixing	H4 - 100%
Count	15 Tex (40 <sup>s</sup> Ne)
Cotton Variety	H4-A100%
Micronaire	3.51
Uniformity index	82.93
Elongation	5.3
Strength gm/tex	28.2

In this experiment, trials were conducted at finisher draw frame machine by changing bottom roller gauge setting on well-maintained finisher draw frame LRSB 851 and analyze the effect of bottom roller gauge setting on 40<sup>s</sup>cout .Short term evenness (U%), breaking force, strength of yarn were influenced.

### III. Results and Discussions

Table 1 Effect of draw frame bottom roller setting parameters on yarn properties

Sr.no	Parameter	Setting 1	Setting 2	Setting3
1	Bottom roller setting	41/45	40/44	42/46
2	Nominal count	40's	40's	40's
3	U%	9.51	9.31	9.4
4	Thin Place/km (-50%)	21	16	19
5	Thick Place/km (+50%)	68.8	40.8	57.56
6	Neps/km (+200%)	48.8	40.5	44.5
7	Total Imperfection/km	138.6	97.3	121.06
8	Hairiness	4.62	4.41	4.48
9	RKM	17.58	17.81	17.55
10	Elongation %	3.92	4.09	4.73

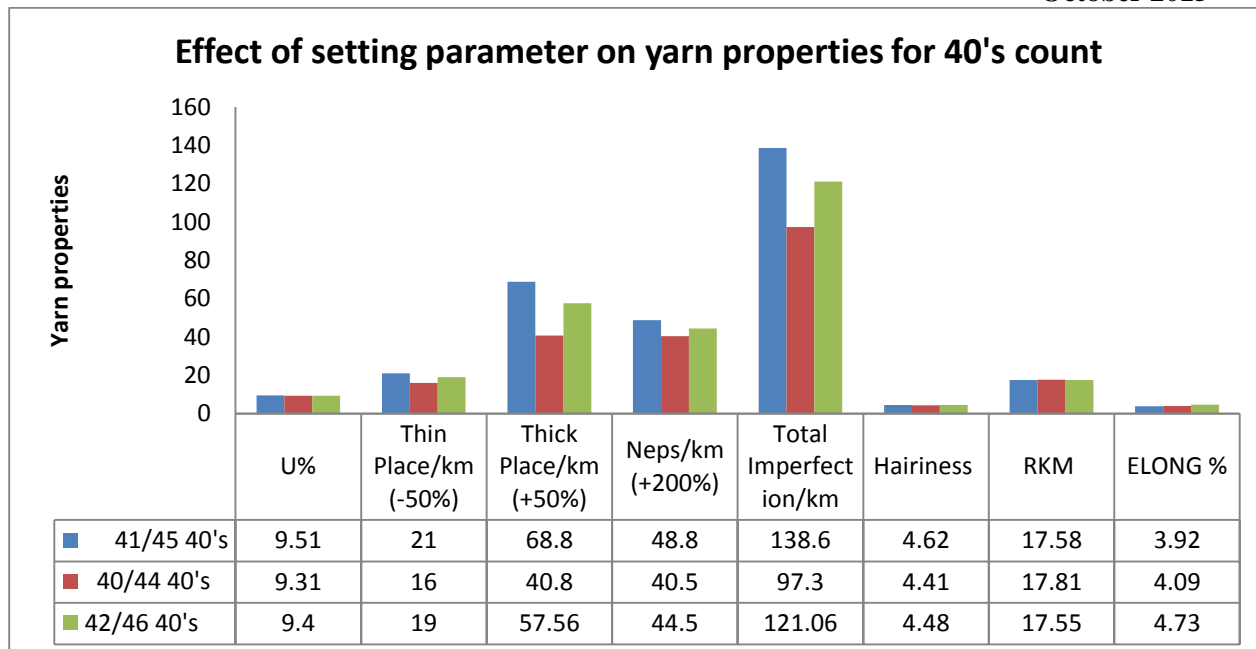


Figure 1 Optimize setting parameters from yarn properties

#### Unevenness (U% )

From Table 1 and figure 1 summarized that, among the three bottom roller setting, yarn obtained with setting 2 ,shows improvement in U% , RKM, IPI, of 40's count, because this happen due to the distance is less between front pair of drafting rolls and back pair of bottom rolls which optimize the break draft and main draft , resulting improvement in U% and yarn quality. The optimum Bottom roller gauge setting in draw frame (40/44mm) produced good quality of yarn.

The wider settings in break draft and main draft caused more breakages and leads to increase U% in given sliver in drafting zone , the draw frame feeding sliver comes from different card and the card sliver having weight variation due to leading and trailing hooks and number of fibers in cross sections. In order to remove hooks and reduce weight variation in drafting zone the draft were introduced. The optimum bottom roller gauge setting gives better draft control on yarn parameters.

#### Yarn strength Rkm

From Table 1 and figure 1,show that , yarn produced with setting 2 shows improvement in yarn strength because the distance is less between front pair of drafting rolls and back pair of bottom rolls. ie. the setting of break draft and main draft rollers is influence on yarn quality The optimum bottom roller gauge reduced ,the weight variation and more number of fibers were get straighten and contributing to yarn strength.

#### IPI value

From Table 1 and figure 1, show that, the optimum bottom roller gauge setting in draw frame drafting zone give a better result in IPI/KM. The wider settings in break draft and main draft caused more breakages and leads to increase IPI value in given sliver and drafting zone, In the draw frame process weight variation and removal leading and trailing hooks were minimized by drafting and doubling process which results more straightening of fibers and orientation of fibers were improved IPI value/Km of yarn found improved.

#### IV. CONCLUSIONS

Present investigation summarized that yarn quality (U%, IPI, CSP, RKM) with bottom roller gauge 40/44mm obtained better results as compare to regular setting 41/45 mm and another trial setting 42/46mm. The yarn produced using the optimum roller setting in draw frame machine show that percentage improvement in yarn quality. The wider settings in break draft and main draft caused more breakages and leads to increase U% RKM, IPI/Km in given sliver, In order obtained better yarn quality optimum setting parameter at draw frame rollers were concentrated.

#### Acknowledgement

The authors acknowledged valuable support received from The Director MPSTME,Shirpur and Associate Dean (Textile Technology) MPSTME, shirpur The Principal, Centre for textile functions, MPSTME Shirpur and Chief executive, Maral Overseas Khalghat, Nimrani, District - INDORE,M.P INDIA

#### REFERENCES

- [1]. Klein W., "Manual of Textile Technology", The Textile Institute. ISBN 0 900739 91 6
- [2]. Pattabhiram T. K., "Essential Elements of Practical Cotton Spinning", Somaiya Publications Pvt. Ltd. Mumbai, New Delhi.
- [3]. Lawrence, Ph.D. Carl A. "Fundamentals of Spun Yarn Technology".

- [4]. Mohammed Rubaiyat Chowdhury, "Effect of doubling numbers on sliver and yarn quality," The AUST Journal of Science and Technology, vol.-1, Issue-2, July, 2009, pp. 117–126
- [5] Akshay Kumar, S M Ishtiaque, "Impact of different stages of spinning process on fibre orientation and Properties of ring, rotor and air-jet yarns," Indian Journal of Fibre & Textile Research, vol.-33, December. 2008, pp. 451–467.
- [6].S.M. Istiaque, A. Mukhopadhyay & A. Kumar " Impact of high speed draw frame and its preparatory on packing and related characteristic of Ring spun yarn." J.T.I.Vol. 100,No.8 November 2009 ,P 657- 667.
- [7]. Shrivastav S. K., "Spinning handbook of quality control", Mahajan publication Ahmadabad, 1991.pp53 to79.
- [8]. Garde A.R., Subramanian T.A., "Process Control in spinning", ATIRA Ahmadabad Third Edition: 1987 pp 66 to 94
- [9]. Gilbert R. Merrill, Cotton Carding, Gilbert R. Merrill, (1955).
- [10].Plawat Dipali, "Spinning tablets carding,"( 1994).