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Influence on Dimensional Changes of Cotton Plain Single Jersey Weft Knitted Fabric at Different Relaxed States Due to the Variation of Knitting Parameters

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Abstract: *There are three knitting variables or parameters that determine the dimensional behavior of a knitted fabric. These variables are number of needles in the machine (generally expressed as machine gauge and diameter), yarn count & stitch length. So it is obvious that for a particular knitting machine & a particular wet processing route, yarn count and stitch length are the variables that determine the areal density, width & therefore shrinkage of a knitted fabric. Though the general influence of these two variables, i.e. yarn count and stitch length on the dimensional behavior of a knitted fabric is familiar to a knitter, the numerical expression of such behavior is still not well-known. In this work an attempt has been taken to establish the effect of yarn count and stitch length separately on the dimensional behavior of cotton plain weft knitted fabric at different relaxed states that may be observed in its processing history.*

Key words: *Shrinkage, Relaxed state, Fabric width, Yarn count, Stitch length.*

Introduction

Knitted fabrics are used to produce garments that cover every part of the human body, in a wide range of garment types from socks, caps, gloves and underwear to outerwear varying from T-shirts to formal jackets. The dramatic increase in the popularity of knit fabrics during the last three decades provides a vivid example of the interrelationships between lifestyle, technology and fashion [3]. Control over the knitting and finishing variables is most necessary to achieve the correct dimension and performance of a particular circular weft knitted fabric. Yarn count, stitch length and number of needles knitting are considered as the major knitting variables whereas wet processing route and finished width are recognized as key finishing variables [7]. So dimensionally stable cotton knitted fabric is a team effort of both knitter and finisher. In reality the finisher has no direct control on the supplied fabric from the knitter as the finishing performance targets (i.e. width, areal density and shrinkage) are often imposed by the customer or garments maker. Again the knitting machine and the wet processing routes for a particular factory are generally fixed and cannot be altered easily. So stitch length and yarn count are the key variables that should be dealt to control the dimensional behavior of a knitted fabric. It is obvious that their effects may be observed as completely independent of each other and therefore gives us a scope to study how the variation in one parameter influences the dimensional performance of the fabric at different states.

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Theoretical Background

Relaxed/Reference State

The reference state of a fabric is the dimensionally stable state of the substrate when it will not shrink any further [5]."Reference state" is also known as Relaxed state. There are different dimensionally stable states possible for a knitted structure. The most common for cotton knitted fabric are: i) Dry relaxed state, ii) Relaxed finished or Finished state, and iii) Fully relaxed state.

Dry relaxed state

If the fabric has been taken off from the knitting machine and in course of time attains a dimensionally stable condition called dry relaxed state [1].

Relaxed finished state / Finished state

If the finished fabric is conditioned at tensionless state, the relaxed finished state is attained. Generally this state is almost same as the finished state of the fabric [6].

Fully relaxed state

The fabrics (generally finished) are subjected to soaking and then tumble drying at 70^0 C for 1 hour with agitation. It may take several cycles of washing and drying to achieve fully relaxed dimensions, although one cycle may remove around 90% of the total shrinkage available [5].

Shrinkage

The term shrinkage can simply be defined as a change in the dimensions of a fabric or garment. This dimensional change may be in a positive (growth) or negative (shrinkage) direction for fabric length, width, and thickness. For a cotton fabric, shrinkage relates to the loss of the length and/or width dimensions [5].

Residual Shrinkage

By definition, residual is defined as "something that remains after a part is taken, a remnant, a remainder." Therefore, residual shrinkage will be the amount of shrinkage a fabric contains plus or minus what subsequent processing stresses apply to or remove from the fabric [5].

Methodology

The experimental part of this study was carried out at Mithun Knitting and Dyeing (CEPZ) Ltd., Chittagong, Bangladesh. The steps that were followed to execute the study are stated sequentially below-

1) Plain jersey fabric samples of different specifications were knitted on a circular single jersey knitting machine of 24 gauge and 24 inch diameter having 1800 needles. Among these samples 5 (five) fabric pieces were

knitted with same yarn count but different stitch lengths. The rest 5 (five) fabric pieces were knitted with same stitch length but different yarn counts. All these samples were conditioned (20°C Temp., 65% R.H., 48 hours) so that they reached the dry relaxed state.

2) The grey fabric pieces were then dyed and finished with a batch of bulk production. The wet processing route was like below:
[Scouring→ Bleaching→ Dyeing (Winch) → Compacting]
Shade (%) = 4.31 (o.w.f.)
The finished fabrics were then conditioned so that credible results can be obtained through different measurements at this state.
3) A reference relaxation procedure (Five wash and tumble dry) was applied to the finished fabric pieces so that they reached the fully relaxed state or reference state [4].
4) Measurements were taken for Courses per inch (CPI) and Wales per inch (WPI) values of those samples at different states. Also stitch length values were measured by HATRA course length tester. (As specified in BS 5441:1988)
5) Graphs were constructed by plotting the values of CPI and WPI against stitch length and regression analysis was carried out to observe the correlation.
6) Width (in open form), GSM (Grams per square meter, a measure of areal density of the fabric) and shrinkage values were calculated and their dependencies on yarn count and stitch length were separately judged.

Essential formula used for the study

- Fabric width (inch) open = no of needles / WPI [4]
- GSM = (T x L x C x W) /10 [2]
  Where, T= Yarn Count in Tex, L= Stitch Length in cm.
  C= Course per cm, W= Wales per cm.
- Length shrinkage= 100-{(100 x before relaxation CPI)/after relaxation CPI} [4]
- Widthwise shrinkage= 100- {(100 x before relaxation WPI)/after relaxation WPI} [4]

Data collection

Table 1 : CPI & WPI values for same yarn count (26/1 Ne) and different stitch lengths at dry relaxed, finished and fully relaxed states:

Actual S.L. (mm)	Actual S.L. (inch approx.)	Dry relaxed state		Finished state		Fully relaxed state	
		WPI	CPI	WPI	CPI	WPI	CPI
2.65	0.1043	31	54	38	50	39	50
2.74	0.1079	30	50	38	48	37	50
2.81	0.1106	30	46	36	46	36	48
2.95	0.1161	29	44	35	41	35	46
3.04	0.1197	28	42	34	38	33	45

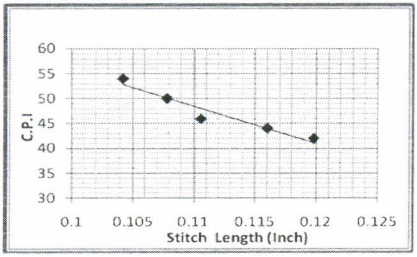
Table 2 : CPI & WPI values for same stitch length (2.85mm) and different yarn counts at dry relaxed, finished and fully relaxed states:

Yarn count (Ne)	Dry relaxed state		Finished relaxed state		Fully relaxed state	
	WPI	CPI	WPI	CPI	WPI	CPI
20	29	51	34	50	33	51
24	29	48	35	48	36	50
26	30	46	35	46	36	50
30	31	44	37	41	37	46
34	32	40	39	40	40	44

Data Analysis

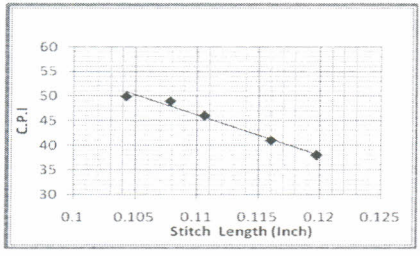
Data Analysis for Table 1:

Graphical representation and Regression summary of the obtained values for samples knitted with same yarn count, i.e. 26/1 Ne



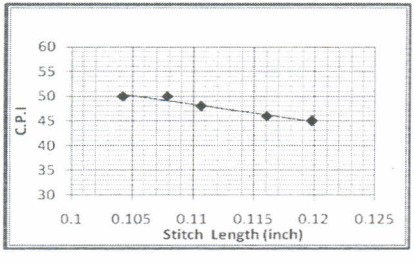
Regression Statistics	Values
Multiple R	0.965789
R Square	0.932749
Standard Error	1.442326
Intercept	-746.091
Coefficients	130.5434

Figure 1 : Stitch Length vs. CPI with trend line (at dry relaxed state)



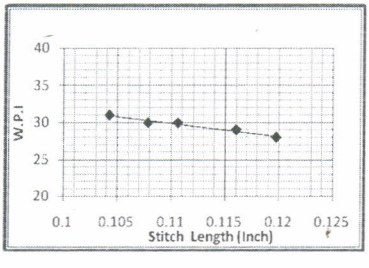
Regression Statistics	Values
Multiple R	0.990081
R Square	0.98026
Standard Error	0.838307
Intercept	-820.525
Coefficients	136.4582

Figure 2 : Stitch Length vs. CPI with trend line (at finished state)



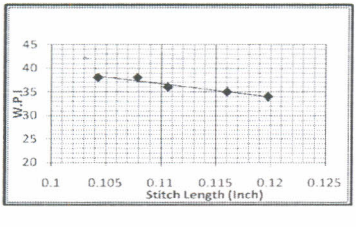
Regression Statistics	Values
Multiple R	0.975708
R Square	0.952007
Standard Error	0.576846
Intercept	-356.851
Coefficients	87.66271

Figure 3 : Stitch Length vs. CPI with trend line (at fully relaxed state)



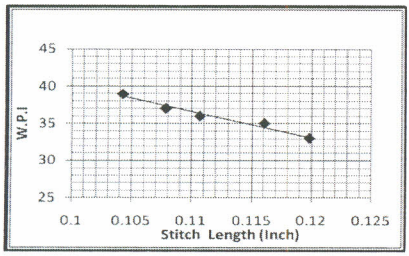
Regression Statistics	Values
Multiple R	0.982014
R Square	0.964351
Standard Error	0.248578
Intercept	-179.579
Coefficients	49.66016

Figure 4 : Stitch length vs. WPI with trend line (at dry relaxed state)



Regression Statistics	Values
Multiple R	0.965952
R Square	0.933062
Standard Error	0.534416
Intercept	-277.138
Coefficients	67.15818

Figure 5 : Stitch Length vs. WPI with trend line (at finished state)



Regression Statistics	Values
Multiple R	0.982063132
R Square	0.964447994
Standard Error	0.486840191
Intercept	-352.200411
Coefficients	75.34318082

Figure 6 : Stitch Length vs. WPI with trend line (at fully relaxed state)

Determining the influence of stitch length on knitted fabric width while the yarn count is constant.

Table 3 : Variation in width due to variation in stitch length at dry relaxed state:

Obs. No.	Yarn Count (Ne)	Stitch length (mm)	WPI	Width (inches)	Width differences / 0.01 mm
1	26/1	2.65	31	58.065	-
2		2.74	30	60	0.2151 (Obs. 1 to 2)
3		2.81	30	60	0 (Obs. 2 to 3)
4		2.95	29	62.069	0.1478 (Obs. 3 to 4)
5		3.04	28	64.286	0.2463 (Obs. 4 to 5)
					Average 0.1523

Table 4 : Variation in width due to variation in stitch length at finished state:

Obs. No.	Yarn Count (Ne)	Stitch length (mm)	WPI	Width (inches)	Width differences / 0.01 mm
1	26/1	2.65	38	47.368	-
2		2.74	38	47.368	0 (Obs. 1 to 2)
3		2.81	36	50	0.3759 (Obs. 2 to 3)
4		2.95	35	51.429	0.1020 (Obs. 3 to 4)
5		3.04	34	52.941	0.1681 (Obs. 4 to 5)
					Average 0.1615

Table 5 : Variation in width due to variation in stitch length at full relaxed state:

Obs. No.	Yarn Count (Ne)	Stitch length (mm)	WPI	Width (inches)	Width differences / 0.01 mm
1	26/1	2.65	39	46.154	-
2		2.74	37	48.649	0.2772 (Observation 1 to 2)
3		2.81	36	50	0.1931 (Observation 2 to 3)
4		2.95	35	51.429	0.1020 (Observation 3 to 4)
5		3.04	33	54.545	0.3463 (Observation 4 to 5)
					Average 0.2297

Determining the influence of stitch length on knitted fabric areal density (GSM) while the yarn count is constant.

Table 6 : Variation in GSM due to variation in stitch length at dry relaxed state:

Obs. No.	Yarn Count (Ne)	Stitch length (mm)	WPI	CPI	GSM	GSM differences / 0.01 mm
1	26/1	2.65	31	54	156.164	-
2		2.74	30	50	144.684	-1.2755 (Obs. 1 to 2)
3		2.81	30	46	136.510	-1.1677 (Obs. 2 to 3)
4		2.95	29	44	132.511	-0.2856 (Obs. 3 to 4)
5		3.04	28	42	125.852	-0.7398 (Obs. 4 to 5)
						Average -0.8672

Table 7 : Variation in GSM due to variation in stitch length at finished state:

Obs. No.	Yarn Count (Ne)	Stitch length (mm)	WPI	CPI	GSM	GSM differences / 0.01 mm
1	26/1	2.65	38	50	177.247	-
2		2.74	38	48	175.936	-0.1457 (Obs. 1 to 2)
3		2.81	36	46	163.812	-1.7320 (Obs. 2 to 3)
4		2.95	35	41	149.023	-1.0564 (Obs. 3 to 4)
5		3.04	34	38	138.266	-1.1952 (Obs. 4 to 5)
						Average -1.0323

Table 8 : Variation in GSM due to variation in stitch length at fully relaxed state

Obs. No.	Yarn Count (Ne)	Stitch length (mm)	WPI	CPI	GSM	GSM differences / 0.01 mm
1	26/1	2.65	39	50	181.911	-
2		2.74	37	50	178.444	-0.3853 (Obs. 1 to 2)
3		2.81	36	48	170.934	-1.0728 (Obs. 2 to 3)
4		2.95	35	46	167.196	-0.2670 (Obs. 3 to 4)
5		3.04	33	45	158.920	-0.9196 (Obs. 4 to 5)
						Average -0.6612

Determining the influence of stitch length on knitted fabric dimensional deformation while the yarn count is constant, i.e. 26/1Ne

Table 9 : Shrinkage occurred from dry relaxed state to finished state:

Obs. No.	Stitch length (mm)	Lengthwise shrinkage %	Lengthwise shrinkage difference / 0.01 mm	Widthwise shrinkage %	Widthwise shrinkage difference / 0.01 mm
1	2.65	-8	-	18.4210	-
2	2.74	-4.167	0.4189 (Obs. 1 to 2)	21.0526	0.2876 (Obs. 1 to 2)
3	2.81	0	0.5919 (Obs. 2 to 3)	16.6667	-0.6230 (Obs. 2 to 3)
4	2.95	-7.317	-0.5328 (Obs. 3 to 4)	17.1429	0.0347 (Obs. 3 to 4)
5	3.04	-10.526	-0.3373 (Obs. 4 to 5)	20.5882	0.3621 (Obs. 4 to 5)
			Range -0.5328~0.5919		**Range -0.6230~0.3621**

Table 10 : Shrinkage occurred from finished state to fully relaxed state:

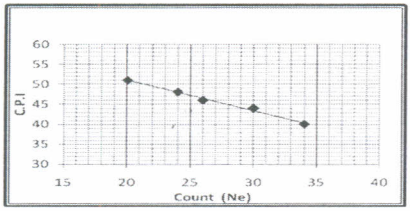
Obs. No.	Stitch length (mm)	Lengthwise shrinkage %	Lengthwise shrinkage difference / 0.01 mm	Widthwise shrinkage %	Widthwise shrinkage difference / 0.01 mm
1	2.65	0	-	2.5641	-
2	2.74	4	0.4372 (Obs. 1 to 2)	-2.7027	-0.5756 (Obs. 1 to 2)
3	2.81	4.167	0.0237 (Obs. 2 to 3)	0	0.3839 (Obs. 2 to 3)
4	2.95	10.870	0.4881 (Obs. 3 to 4)	0	0 (Obs. 3 to 4)
5	3.04	15.556	0.4925 (Obs. 4 to 5)	-3.0303	-0.3185 (Obs. 4 to 5)
			Range 0.0237~0.4925		**Range -0.5756~0.3839**

Table 11 : Residual shrinkage at dry relaxed state / grey fabric:

Obs. No.	Stitch length (mm)	Lengthwise shrinkage %	Lengthwise shrinkage difference / 0.01 mm	Widthwise shrinkage %	Widthwise shrinkage difference / 0.01 mm
1	2.65	-8	-	20.5128	-
2	2.74	0	0.8743 (Obs. 1 to 2)	18.9189	-0.1742 (Obs. 1 to 2)
3	2.81	4.167	0.5919 (Obs. 2 to 3)	16.6667	-0.3199 (Obs. 2 to 3)
4	2.95	4.348	0.0131 (Obs. 3 to 4)	17.14269	0.0347 (Obs. 3 to 4)
5	3.04	6.667	0.2437 (Obs. 4 to 5)	18.18181	0.1092 (Obs. 4 to 5)
			Range 0.0131~0.8743		**Range -0.3199~0.1092**

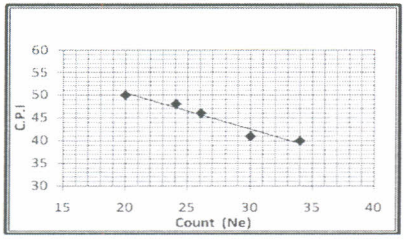
Data Analysis for Table 2 :

Graphical representation and Regression summary of the obtained values for samples knitted with same stitch length, i.e. loop length is 2.85 mm or 0.1122 inch (approx.)



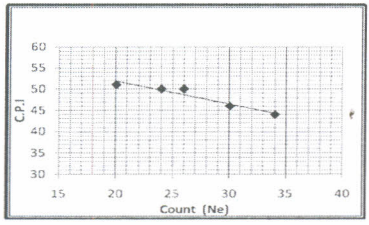
Regression Statistics	Values
Multiple R	0.99506
R Square	0.990144
Standard Error	0.475423
Intercept	- 0.7637
Coefficients	66.26712

Figure 7 : Yarn count vs. CPI with trend line (at dry relaxed state)



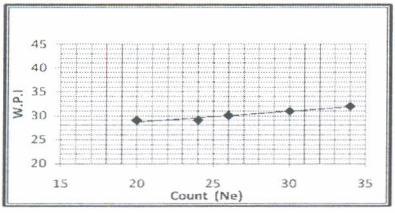
Regression Statistics	Values
Multiple R	0.976472
R Square	0.953497
Standard Error	1.085395
Intercept	-0.78767
Coefficients	66.10959

Figure 8 : Yarn count vs. CPI with trend line (at finished state)



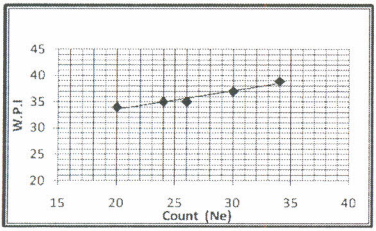
Regression Statistics	Values
Multiple R	0.957887
R Square	0.917548
Standard Error	1.005692
Intercept	-0.53767
Coefficients	62.60959

Figure 9 : Yarn count vs. CPI with trend line (at fully relaxed state)



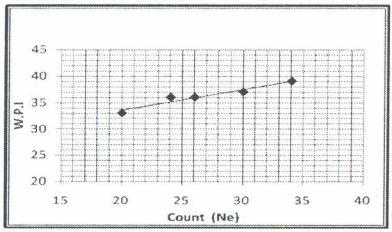
Regression Statistics	Values
Multiple R	0.965146
R Square	0.931507
Standard Error	0.394019
Intercept	0.232877
Coefficients	23.9589

Figure 10 : Yarn count vs. WPI with trend line (at dry relaxed state)



Regression Statistics	Values
Multiple R	0.971556
R Square	0.943921
Standard Error	0.546888
Intercept	0.359589
Coefficients	26.36301

Figure 11 : Yarn count vs. WPI with trend line (at finished state)



Regression Statistics	Values
Multiple R	0.96458
R Square	0.930414
Standard Error	0.660358
Intercept	0.386986
Coefficients	25.82877

Figure 12 : Yarn count vs. WPI with trend line (at fully relaxed state)

Determining the influence of Yarn count on knitted fabric width while the stitch length is constant

Table 12 : Variation in width due to variation in Yarn count at dry relaxed state:

Obs. No.	Yarn count (Ne)	WPI	Stitch length (mm)	Width (inches)	Width differences / 1 Ne
1	20	29	2.85	62.0690	-
2	24	29		62.0690	0 (Obs. 1 to 2)
3	26	30		60	-1.0345 (Obs. 2 to 3)
4	30	31		58.0645	-0.4839 (Obs. 3 to 4)
5	34	32		56.25	-0.4536 (Obs. 4 to 5)
					Average -0.4930

Table 13 : Variation in width due to variation in Yarn count at finished state:

Obs. No.	Yarn count (Ne)	WPI	Stitch length (mm)	Width (inches)	Width differences / 1 Ne
1	20	34	2.85	52.94118	-
2	24	35		51.42857	-0.3782 (Obs. 1 to 2)
3	26	35		51.42857	0 (Obs. 2 to 3)
4	30	37		48.64865	-0.6950 (Obs. 3 to 4)
5	34	39		46.15385	-0.6237 (Obs. 4 to 5)
					Average -0.4242

Table 14 : Variation in width due to variation in Yarn count at fully relaxed state:

Obs. No.	Yarn count (Ne)	WPI	Stitch length (mm)	Width (inches)	Width differences / 1 Ne
1	20	33	2.85	54.54545	-
2	24	36		50	-1.1364 (Obs. 1 to 2)
3	26	36		50	0 (Obs. 2 to 3)
4	30	37		48.64865	-0.3378 (Obs. 3 to 4)
5	34	40		45	-0.9122 (Obs. 4 to 5)
					Average -0.5966

Determining the influence of Yarn count on knitted fabric GSM while the stitch length is constant

Table 15 : Variation in GSM due to variation in Yarn count at dry relaxed state:

Obs. No.	Yarn count (Ne)	WPI	CPI	Stitch length (mm)	GSM	GSM differences / 1 Ne
1	20	29	51	2.85	193.5783	-
2	24	29	48		151.8261	-10.438 (Obs. 1 to 2)
3	26	30	46		138.9390	-6.4435 (Obs. 2 to 3)
4	30	31	44		119.0177	-4.9803 (Obs. 3 to 4)
5	34	32	40		98.5484	-5.1173 (Obs. 4 to 5)
						Average -6.7448

Table 16 : Variation in GSM due to variation in Yarn count at finished state:

Obs. No.	Yarn count (Ne)	WPI	CPI	Stitch length (mm)	GSM	GSM differences / 1 Ne
1	20	34	50	2.85	222.5038	-
2	24	35	48		183.2384	-9.8163 (Obs. 1 to 2)
3	26	35	46		162.0955	-10.571 (Obs. 2 to 3)
4	30	37	41		132.3679	-7.4319 (Obs. 3 to 4)
5	34	39	40		120.1059	-3.0655 (Obs. 4 to 5)
						Average -7.7213

Table 17 : Variation in GSM due to variation in Yarn count at fully relaxed state:

Obs. No.	Yarn count (Ne)	WPI	CPI	Stitch length (mm)	GSM	GSM differences / 1 Ne
1	20	33	51	2.85	220.2788	-
2	24	36	50		196.3269	-5.9880 (Obs. 1 to 2)
3	26	36	50		181.2248	-7.5510 (Obs. 2 to 3)
4	30	37	46		148.5104	-8.1786 (Obs. 3 to 4)
5	34	40	44		135.5040	-3.2516 (Obs. 4 to 5)
						Average -6.2423

Determining the influence of Yarn count on knitted fabric dimensional deformation while the stitch length is constant i.e. loop length is 2.85 mm or 0.1122 inch (approx.)

Table 18 : Shrinkage occurred from dry relaxed state to finished state:

Obs. No.	Yarn Count (Ne)	Lengthwise shrinkage %	Lengthwise shrinkage difference / 1Ne	Widthwise shrinkage %	Widthwise shrinkage difference / 1 Ne
1	20	-2	-	14.706	-
2	24	0	0.5 (Obs. 1 to 2)	17.143	0.6092 (Obs. 1 to 2)
3	26	0	0 (Obs. 2 to 3)	14.286	-1.4286 (Obs. 2 to 3)
4	30	-7.317	-1.8293 (Obs. 3 to 4)	16.216	0.4826 (Obs. 3 to 4)
5	34	0	1.8293 (Obs. 4 to 5)	17.949	0.4331 (Obs. 4 to 5)
			Range -1.8293~1.8293		**Range -1.4286~0.6092**

Table 19 : Shrinkage occurred from finished state to fully relaxed state:

Obs. No.	Yarn Count (Ne)	Lengthwise shrinkage %	Lengthwise shrinkage difference / 1Ne	Widthwise shrinkage %	Widthwise shrinkage difference / 1 Ne
1	20	1.961	-	-3.030	-
2	24	4	0.5098 (Obs. 1 to 2)	2.778	1.4520 (Obs. 1 to 2)
3	26	8	2 (Obs. 2 to 3)	2.778	0 (Obs. 2 to 3)
4	30	10.870	0.7174 (Obs. 3 to 4)	0	-0.6944 (Obs. 3 to 4)
5	34	9.091	-0.4447 (Obs. 4 to 5)	2.5	0.6250 (Obs. 4 to 5)
			Range -0.4447~2		**Range -0.6944~1.4520**

Table 20 : Residual Shrinkage at dry relaxed state / grey fabric:

Obs. No.	Yarn Count (Ne)	Lengthwise shrinkage %	Lengthwise shrinkage difference / 1Ne	Widthwise shrinkage %	Widthwise shrinkage difference / 1 Ne
1	20	0	-	12.121	-
2	24	4	1 (Obs. 1 to 2)	19.444	1.8308 (Obs. 1 to 2)
3	26	8	2 (Obs. 2 to 3)	16.667	-1.3889 (Obs. 2 to 3)
4	30	4.348	-0.9130 (Obs. 3 to 4)	16.216	-0.1126 (Obs. 3 to 4)
5	34	9.091	1.1858 (Obs. 4 to 5)	20	0.9459 (Obs. 4 to 5)
			Range -0.9130~2		**Range -1.3889~1.8308**

Result and Discussion

From the regression analysis it is clear that a strong correlation exist between Stitch Length and CPI or WPI (when the yarn count was constant).Such type of correlation was also found for yarn count and CPI or WPI (when the stitch length was constant).The linear regression model gives the R square value over 0.90 in each case indicating more than 90% of the variation in GSM or width can be explained by stitch length or yarn count. From the best fitting curves (Fig 1 to Fig 12) the unknown values of GSM or width for any definite value of stitch length and/or yarn count can also be predicted.

For per unit positive change in stitch length (say, 0.01mm) the following changes in the dimensional behavior of the cotton plain single jersey weft knitted fabric was observed at different states (from Table 3 to Table 8 and from Table 9 to Table 11).

For GSM and Width

Fabric States	Change in actual width (inch)	Change in actual GSM
Dry relaxed	0.1523	-0.8672
Finished	0.1615	-1.0323
Fully relaxed	0.2297	-0.6612

For Shrinkage

Changes in Fabric states	Change in lengthwise shrinkage %	Change in widthwise shrinkage %
Dry Relaxed to Finished	-0.5328 to 0.5919	-0.6230 to 0.3621
Finished to Fully relaxed	0.0237 to 0.4925	-0.5756 to 0.3839
Residual shrinkage for grey relaxed fabric	0.0131 to 0.8743	-0.3199 to 0.1092

For per unit positive change in yarn count (say, 1Ne) the following changes in the dimensional behavior of the cotton knitted fabric was observed at different states (from Table 12 to Table 17 and from Table 18 to Table 20).

For GSM and Width

Different relaxed states	Change in actual width (inch)	Change in actual GSM
Dry Relaxed	-0.4930	-6.7448
Finished	-0.4242	-7.7213
Fully Relaxed	-0.5966	-6.2423

For Shrinkage

Changes in Fabric states	Change in lengthwise shrinkage %	Change in widthwise shrinkage %
Dry Relaxed to Finished	-1.8293 to 1.8293	-1.4286 to 0.6092
Finished to Fully relaxed	-0.4447 to 2	-0.6944 to 1.4520
Residual shrinkage for grey relaxed fabric	-0.9130 to 2	-1.3889 to 1.8308

Analysis of such variation at different states of the fabric provides an strong idea about what type of numerical change has to be done with the two knitting variables, (i.e. yarn count and stitch length) to adjust the dimensional parameter (i.e. GSM, width & shrinkage) at any stage of processing that may be asked by the knitter or finisher.

Conclusion

This research work is an experimental attempt to explore the dimensional behavior of cotton weft knitted plain fabric at the different states of its processing history. The influences of two variables i.e. stitch length and yarn count on fabric characteristics were observed independently. The numerical findings of this work will help to engineer the grey fabric for a particular circular weft knitting machine so that any type of dimensional adjustments is possible at any stage of fabric processing. However the outcome of this research is applicable for plain single jersey or plain jersey fabric only. So, there are scopes for carrying out such study over other single jersey and double jersey weft knitted structures. Moreover, the influence of machine gauge and diameter (as the third major knitting variable) may also be studied over knitted fabric dimension and performance. Such attempts will definitely ensure the controlling capability of a knitter over manufacturing and quality assurance.

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