

# **APPLICATION OF PRDN RING VER 2.1 TO SPINNING MILLS**

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## 1-Introduction

Prdn Ring ver 2.1 has been developed through many years of mill work carried out in spinning mills. The Effect of System factors of Knowledge Based Quality Management upon production volumes has been taken into consideration as a whole in Prdn Ring ver 2.1 so that the building of main corner stones of Knowledge Based System have been succeeded.

The purpose of pc-program is to increase production volumes at each stage of ring spinning processes and achieve real production and efficiency values close to actual values .In actual mill practice the factors influencing the production volumes are being able to analysed more scientifically and production volumes could be increased systematically with the guidance of pc-program.

There are many similar programs for computing the production and efficiencies in spinning mills . But in most of the cases yarn contraction due to twist has not been taken into consideration . We have developed Prdn ver 2.1 for controlling ,analysing and improving the production and efficiencies . Prdn ver 2.1 is the excellent software that runs on windows platform and easiest and simplest to for users.

The pc-program has been designed mainly to analyse and able to observe the factors affecting the production volume so that production volumes could be increased to an higher level .For this purpose excellent and safest data base driver has been chosen .In any ring spinning mill there could be more than 125 ring frames and data entry for these complete machinery could take a very long time .However , with this pc-program Data Entry for 125 machines takes only 10 mins.

There could be many software for production control in ring spinning the main distinction with this pc-program is to solve problems rather than analysing .

In order to increase production volumes in ring spinning frames following points should be analysed in terms of logical functions such as (>,<, <>, =, and ,or , ( ) ) for filtering applications as well as sorting for Pareto Analyses and charting of single and average values.

- Machine number
- Lot Number
- Shift date
- Shift
- Rpm
- Number of Spindles
- Yarn Count
- Yarn twist

For example (dtos( Shiftdate) >="20171129" and dtos(Shiftdate) <= "20171229" and Machineno=30 or Machineno=45 and lotno="01-45" and Tpi>=20 ) and Ne=30 is such an example for a filtering application:.

There is a Technical Analyses form in the program to interpret the results.

### Benefits

- Systematically controlling of production and efficiencies
- Systematically improving production and efficiency levels
- Complete control on labor productivity
- Analysing performance of machines , lot and any type of combination of key parameters
- Minimizing out of production hours and improving mill maintenance

- Prdn-2.1 also provides technical information for Spin-Cost 1.0 pc-program to minimize manufacturing costs

## 2- Machine Card Index

Prdn Ring ver 2.1 has been developed through a research project carried in textile mills. It has been intended to increase efficiency and production volumes and also assist to reduce time of manufacturing cost calculations to minimum based upon Ne, Lot, Tpi criteria. The cost of any any Yarn depends upon Ne, Lot, Rpm and TPI with this Pc-Program monthly cost calculations time reduced and could be better estimated.

For a program to be successfully used all Machine Card Input Data must be fed regularly for each day.

Machine Card Index menu consists of following sub-menu items.

New-Adds a new record to the data base

Add-Adds a selected record to the data base.

Edit-Edits selected record in the data base.

Delete-Deletes selected record from the data base.

Close- Close the application.

This system is for 3 shift working mills which are A, B and C . The yarn fed by front roller in meters recorded in counters for each shift . However, the actual yarn is made is shorter than counter readings due to twist construction in yarn and entering the TPI to the system actual yarn production is calculated.

Before make use of the program all the counters should be checked and all the machine speed rpm and delivery of front roller meter per minute should be checked at the same time to find the correct twist TPI for each machine running in the same when the ring rail as at straight section of cops building i.e when the machine runs at constant spindle speed.

Machine Card Input data consists of following items to be inserted to the data base.

### ***Index Parameters Descriptions***

Machine Number Integer value

Lot Number String

Shift Date Date

Machinery Type Type of machinery

Ne Yarn count in Nec

Ring Diameter in mm

Tpi Turns per inch

Rpm Spindle Speed rpm

Number of spindles per machine

SA1 Start of counter reading for shift A

SA2 End of counter reading for shift A

SB1 Start of counter reading for shift B

SB2 End of counter reading for shift B

SC1 Start of counter reading for shift C

SC2 End of counter reading for shift C

Counter Factor: Converting factor for counter readings to meters

It would take a lot of time for entering all the records so Filter Box is used for copying records for the same date. For this purpose the copying records in Filter Box is used. With the help of Filter Box and Copying Record button the last day of Machine Card Index Data is completely copied to the new Data .So the operator only enters the end of Counter Readings of

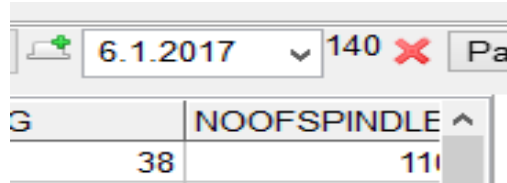
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each shifts.

Press Apply Button which loads dates worked

Select the Last Date from Combobox

Press Filter Selected Date Tool bar button which is on the left of date string Button loads the selected date which is the last day of production.



Load DBF loads data base table Default table prdnringe.dbf

Save DBF saves data base table

Pack Table Purge Deleted : Removes the Deleted the deleted records from the database

Delete :Deletes the records on the grid. Therefore be careful

Undelete : Undelete deleted record

Apply : Filter the records according to database parameters.

Lotlist : Make lists for date,lot,machine type and date.

And all the records for that day are listed and when Copy Record button is pressed all the record is copied and operator only enters the end of counter readings of SA2, SB2 and SC2 . For 125 machine this takes about maximum 15 mins.

Select the date shift date is copied and enter the ending counter readings.

Alternatively you can write on filter box “yearmonthday “ dtos(shiftdate)”=”20170106” and press Apply button does the same filtering.

### 3- Machine Card Output Data

Machine Card output data consists of following items that are tabulated in the grid bar :

- Machine Number:Integer value
- Lot Number:String
- Shift Date:Date
- Machinery Type:Type of machinery
- Ne:Yarn count in Nec
- Ring Diameter
- Tpi:Turns per inch
- Rpm:Spindle Speed rpm
- Mmin:Front roller delivery speed m/min
- Gram/spindle-hour
- Traveler speed m/sec
- Eff A :Actual Efficiency % for shift A
- Eff B :Actual Efficiency % for shift B
- Eff C :Actual Efficiency % for shift C
- Eff Ave :Actual Efficiency % for shift A +B+C
- KgA,kgB,KgC:Productions per shifts A,B and C respectively
- Total kg Production Per Day Per Machine**
- Average Kg/per shift**

With filter box you can filter records Apply button applies filtering command such Machine No=1

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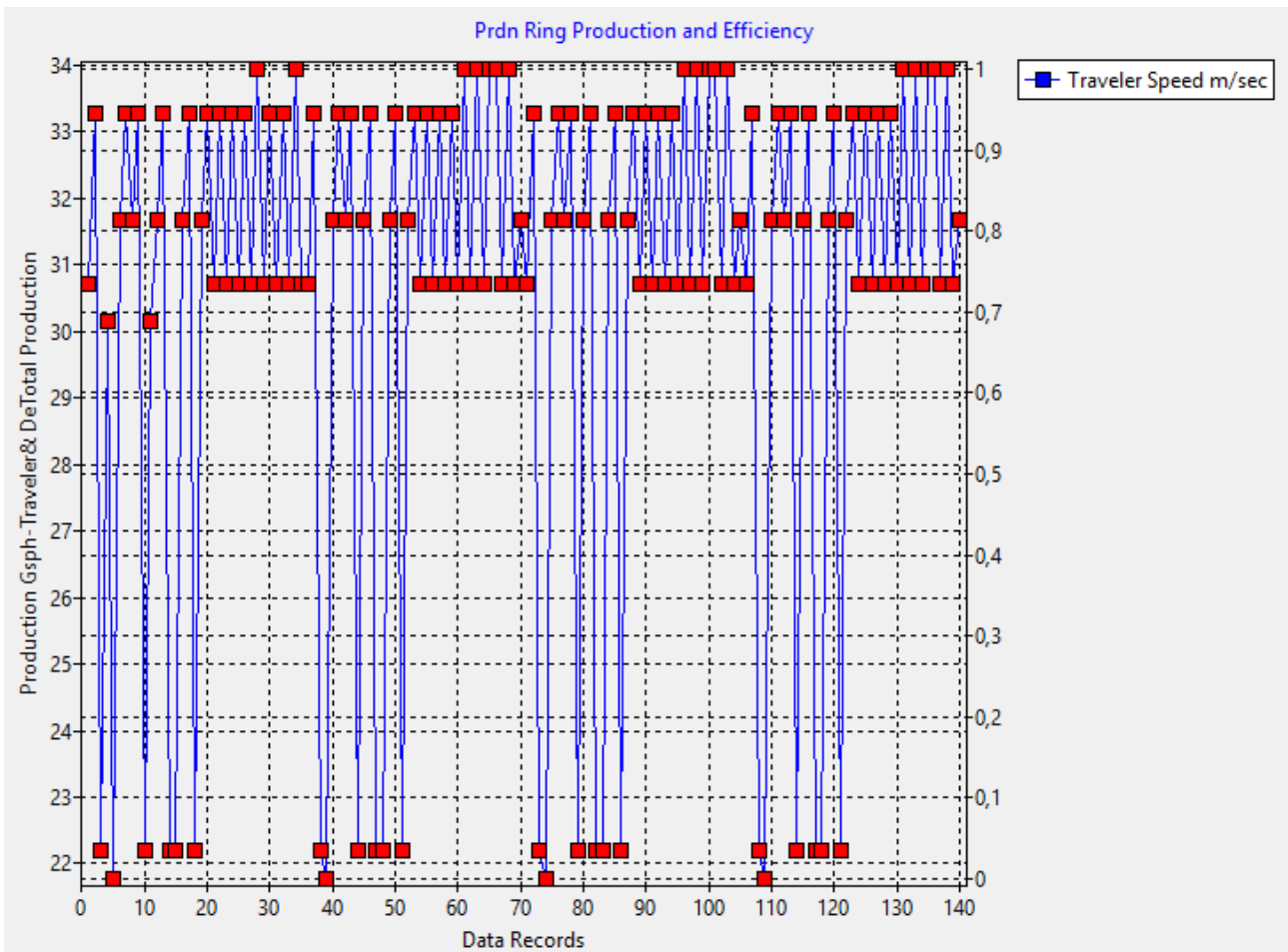
and Lotno='A-25' filters the records with Machine no=1 and Lotno=A-25

Copy command copies the selected records. Use the same date of record when copying otherwise you will damage the date base. After copying the records end counter readings will become start counter readings automatically so user only enters the end counter readings . Usually the records entered after one day . If there is a holiday change the date time from computer so that correct date is entered. There are also many filtering logic are available i.e and , or , >> , <= , ( , ) <> etc. . One can use any combinations of these

With the Output Data one can do any thing that is required by make use of Filter Box. Long Time Trends are for each shift can be analysed by Efficiency Graph of Each Shift. Any FilterdData can be seen on the chart for tracing the trend of any required lot or machine type .

Prdn 2.1 Chart for each records Filtered or Non Filtered Data

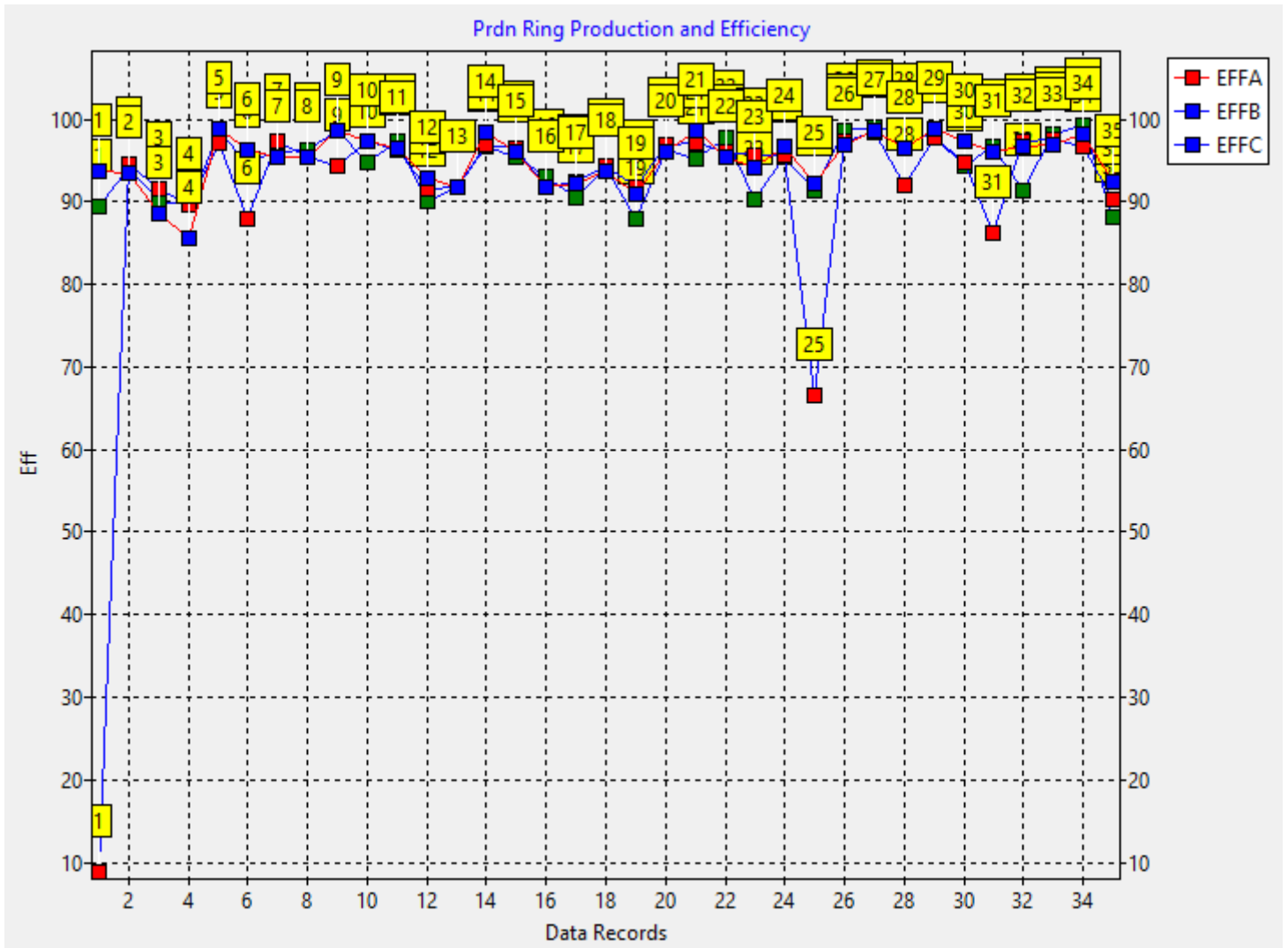
How to Increase Production



Select Chart Page and Press Chart Button

You can see traveler speed m/sec of all the machines run.as shown on the diagram. With low traveler speed change the rpm to increase the production.

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From Efficiency Chart find the machines that are running out efficiency. You can see Machine Number 1 and 25 should be checked. You can also check low efficiency machines from Report Page

Mach	Lot No	Mc Type	Date	Ne	Tpi	RPM	effA%	effB%	effC	effAve	kgA	kgB	kgC	Totalkg
1:	P2:	as:	6.1.2017:	30,00:	20,30:	15440:	93,72:	8,84:	89,42:	63,99:	179,33:	16,92:	171,10:	367,35
25:	17-A61:	sa:	6.1.2017:	30,00:	17,80:	15440:	92,31:	66,52:	91,31:	83,38:	203,98:	147,00:	201,77:	552,75
35:	.....	.....	.....	28,80:	19,34:	15163:	95,13:	91,23:	94,46:	93,61:	6885:	6616:	6835:	20335

You can also see the effects of Ne,Tpi on efficiency from Ne/Tpi/Lot Summary

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Mach:-Lot No	Mc Type	Date	Ne	Tpi	RPM	effA%	effB%	effC	effAve	kgA	kgB	kgC	Totalkg
12:	P1:		20,00:	15,90:	10033:	90,12:	89,89:	91,52:	90,51:	2361:	2355:	2398:	7114
12:	81-A1:		16,00:	17,60:	10100:	92,55:	82,90:	92,07:	89,17:	2692:	2411:	2678:	7781
5:	17-A6:		30,00:	17,80:	15537:	95,11:	95,23:	92,90:	94,41:	1057:	1058:	1033:	3148
23:	17-A61:		30,00:	17,80:	15482:	95,90:	93,33:	93,46:	94,23:	4887:	4756:	4762:	14406
6:	12-E1:		30,00:	20,30:	17062:	96,54:	93,73:	97,27:	95,85:	1225:	1189:	1234:	3648
24:	P2:		30,00:	20,30:	15843:	95,43:	91,71:	94,53:	93,89:	4497:	4326:	4455:	13278
37:	P3:		30,00:	20,40:	16730:	95,56:	90,02:	95,99:	93,86:	7291:	6868:	7324:	21483
12:	P3:		40,00:	23,40:	17005:	97,14:	96,07:	97,61:	96,94:	1599:	1581:	1606:	4786
Mach:-Lot No	Mc Type	Date	Ne	Tpi	RPM	effA%	effB%	effC	effAve	kgA	kgB	kgC	Totalkg
140:			28,94:	19,37:	15094:	94,89:	90,99:	94,37:	93,41:	27142:	26026:	26980:	80148

It could be seen that doffing time reduces the efficiency of coarse counts. Spinning Geometry pc-Program could be used to check spinning cops formation in order to increase production levels.

These reports can be copied to excel or open office document and for parsing “:” could be use. Right click on the mouse and select all and press copy and goto excel or open office and paste and use parser as “:”

Daily Production Summary and Details Can be reported

Mach:-Lot No	Mc Type	Date	Ne	Tpi	RPM	effA%	effB%	effC	effAve	kgA	kgB	kgC	Totalkg
35:		3.1.2017:	29,37:	19,47:	14887:	94,65:	90,95:	94,66:	93,42:	6520:	6263:	6524:	19307
35:		4.1.2017:	28,80:	19,34:	15163:	94,48:	91,95:	93,26:	93,23:	6842:	6648:	6746:	20235
35:		5.1.2017:	28,80:	19,34:	15163:	95,31:	89,81:	95,08:	93,40:	6895:	6500:	6875:	20270
35:		6.1.2017:	28,80:	19,34:	15163:	95,13:	91,23:	94,46:	93,61:	6885:	6616:	6835:	20335
140:			28,94:	19,37:	15094:	94,89:	90,99:	94,37:	93,41:	27142:	26026:	26980:	80148

Reports are

SumGeneral

Ne

Lot

Lot & Ne

NeSum

LotSum

Lot&Nesum

Daily Production

Summary Per Day

Lot & Ne per Day

Ne/Lot/Tpi

Ne/lot/Tpi-Sum

And Summary Report

Total Production can be given between any dates.





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The screenshot shows the 'Prdn Ring ver 2.1' application window. The interface includes a menu bar (File, Data, View, Database, Help), a toolbar with options like 'Data Input', 'Reports', 'Charts', 'Spread Sheet', 'Load Data Base', 'WorksheetAdd', 'WorksheetDelete', 'Rename..', 'Cut', 'Copy', 'Paste', 'Clear', 'Collns', 'Coldel', 'Rowins', and 'Rowdel'. Below the toolbar is a spreadsheet with columns labeled A through SC. The data is organized into rows, with the first row (row 1) containing headers: A (MACHINENO), B (LOTNO), C (MACHINETYF), D (SHIFTDATE), E (NE), F (TPI), G (RPM), H (RING), I (NOOFSPINDL), J (COUNTERFA), K (SA1), L (SA2), M (SB1), N (SB2), and SC. The following rows (2-17) contain numerical and alphanumeric data for each of these parameters.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	SC
1	MACHINENO	LOTNO	MACHINETYF	SHIFTDATE	NE	TPI	RPM	RING	NOOFSPINDL	COUNTERFA	SA1	SA2	SB1	SB2	SC
2	1	P2	sa	3.1.2017	30	20,3	15440	38	1104	1	764225	772781	748757	757631	
3	2	P3	sua	3.1.2017	30	20,4	16721	38	1104	1	0	9369	0	9602	
4	3	81-A1	z	3.1.2017	16	17,6	10100	42	1008	100	5334	5395	7327	7389	
5	4	1A	z	3.1.2017	40	21,4	12000	48	464	100	7714	7777	1834	1876	
6	5	P1	z	3.1.2017	20	15,9	9900	42	1008	100	3783	3854	4644	4710	
7	6	P2	sa	3.1.2017	30	20,3	15923	38	1104	1	778841	788178	757907	767350	
8	7	P3	sua	3.1.2017	30	20,4	16721	38	1104	1	0	9521	0	9695	
9	8	P2	sa	3.1.2017	30	20,3	15923	38	1104	1	771562	780346	751310	760439	
10	9	P3	sua	3.1.2017	30	20,4	16721	38	1104	1	0	9489	0	9309	
11	10	81-A1	z	3.1.2017	16	17,6	10100	42	1008	100	76	143	1045	1049	
12	11	1QA	k2	3.1.2017	40	21,4	12000	48	464	100	908	971	4534	4599	
13	12	P2	sa	3.1.2017	30	20,3	15923	38	1104	1	744979	754253	716313	725773	
14	13	P3	sua	3.1.2017	30	20,4	16721	38	1104	1	0	9626	0	9726	
15	14	81-A1	z	3.1.2017	16	17,6	10100	42	1008	100	9879	9943	7848	7909	
16	15	P1	z	3.1.2017	20	15,9	10100	42	1008	100	1118	1188	2008	2078	
17	16	P2	sa	3.1.2017	30	20,3	15923	38	1104	1	768447	777286	754062	762606	

And can be saved as excel or open-office file and can be loaded.

To check the performance of the mill one can use the total kgxne parameter which gives better estimation of the production. And Ave Ne is calculated from this.

And productivity of the mill Total operative

### 4- Practical Procedures for Applications of Prdn Ring Ver 2.1 Pc-Program

In order to have full functional benefits of the Pc-Programs

- a) All the machine counters should be checked
  - b) All the machine spindle speed and delivery of front rollers should be measured and corrective measures should be taken to check the machine main motors or frequency converters that adjust the variable speed.
  - c) The program should be applied for a week period and efficiencies of each machine should be traced which will give information about main out of production hours and doffing time.
- 2- Apply Ring Spinning Geometry Pc-Program to minimize Doffing Time for each machine
  - 3- Apply Ring Spinning Performance Test Pc-Program to increase the production volumes of each machine and each spinners and improve quality related to end break rate and use Spin Plan Pc- Program to correct the main process defects
  - 4- Apply Card Fibre Transfer Test and Comber Data Pc-Program along with QC-Ring Pc-Program to increase production , reduce waste and improve all over yarn quality
  - 5- Carry out Spinning Performance Test by Itru Fibre /Fabric Tester to improve your quality, reduce your material costs from bale to ring frame delivery.