APPLICATION OF CARD FIBRE TESTING VER 2.0 TO SPINNING MILLS

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1.1 Description of the Pc-Program

Description
Laplace transfer functions were used effectively to check the performance of the carding machine. Carding is the heart of the spinning process and quality of yarns starts at carding . With this PC-program you can check all card clothing, fiber transfer ratios, quality of sliver and regulating power of carding machine and many more parameters. It is both useful for machinery manufacturers, card cloth manufacturers and mostly for spinning mills. Mill Performance Improvement and Benefits =- Blowroom and carding processes mainly determines yarn evenness and strength . With this program one can achieve better yarn quality and reduce carding waste as well as improving yarn quality. =- Card fibre transfer ratio determines to some extent yarn evenness and yarn strength . Therefore, faulty running carding machines could be identified in terms of high waste and irregularity in yarn. =- Card Setting diagrams and card setting information are also provided and can be optimized. =- Performance of card clothing could be tested according to card fibre transfer ratio and regulating power of carding cylinder. This PC-program is a must for a technology dependent companies and mill to achieve better yarn quality and reduce manufacturing costs. Card Fibre Transfer Test ver 2.0 Pc-Program has been effectively used in optimization in rotor spinning (material/spinning data) parameters to minimize costs as well as carded and combed cotton yarn manufacturing . The most important research finding was found to be Card Fibre Transfer Ratio % and yarn evenness correlation . Therefore ,improving of quality of yarn especially for knitted yarns this program contributes to improving of yarn evenness ,reducing carding waste , and correct maintenance of card clothing, settings . It can be used effectively in all short staple spinning systems i.e. cotton and man-made fibre carding systems.
Key Words:
Carding , transfer ratio,residual ratio,carding sliver,lap weight,spinning,fibre transfer , taker-in,cylinder,doffer,detaching roller,calender rollers , card fibre transfer test,knowledge based, Laplace Equations,Laplace Transfer ,card machine,card clothing,neps, sliver regularity ,carding power,card web,yarn tensile properties, yarn imperfections ,yarn evenness ,sliver evenness ,spectrograph ,wave lengths , amplitude ,projected sliver weight ,carding cycle ,carding sliver length

1.2 Card Fibre Transfer Test Data Sheet

Item #	***Item***	***Data***
1	MID	
1	Machine No	1

2	Machine Type	
2	Lot Number	A-12
3	Test Date	12/02/17
4	Number of Test	50
5	Lap Weight G/m	
6	Delivery Sliver G/M	
7	Delivery Speed M/min	
8	Cylinder RPM	
9	Dofffer RPM	
10	Detaching Roller RPM	
11	Cylinder Diameter in mm	
12	Dofffer Diameter in mm	
13	Detaching Roller Diameter in mm	
14	Calender Rollers Diameter in mm	
15	Card Feed Roller Diameter in mm	
16	Card Feed Roller RPM	
17	Taker-in Diameter in mm	
18	Taker-in RPM	
19	Test Data	

1.2.1 Test Data and Testing

Stop the carding machine. Measure the distance between Card Feed Roller and Chute Feed Roller . Take the fibres and Weigh.

Lap weight G/M = Weight of fibres between Chute feed Roller and Card Fibre Roller /Distance in meters

Run the card without feeding any material from calender rollers to front until all the fibres delivers on the floor.

Measure the sliver weight per 10 cm. until you reach end of the material.

This gives you total test data. Enter the lowest reading to highest reading to Grid.

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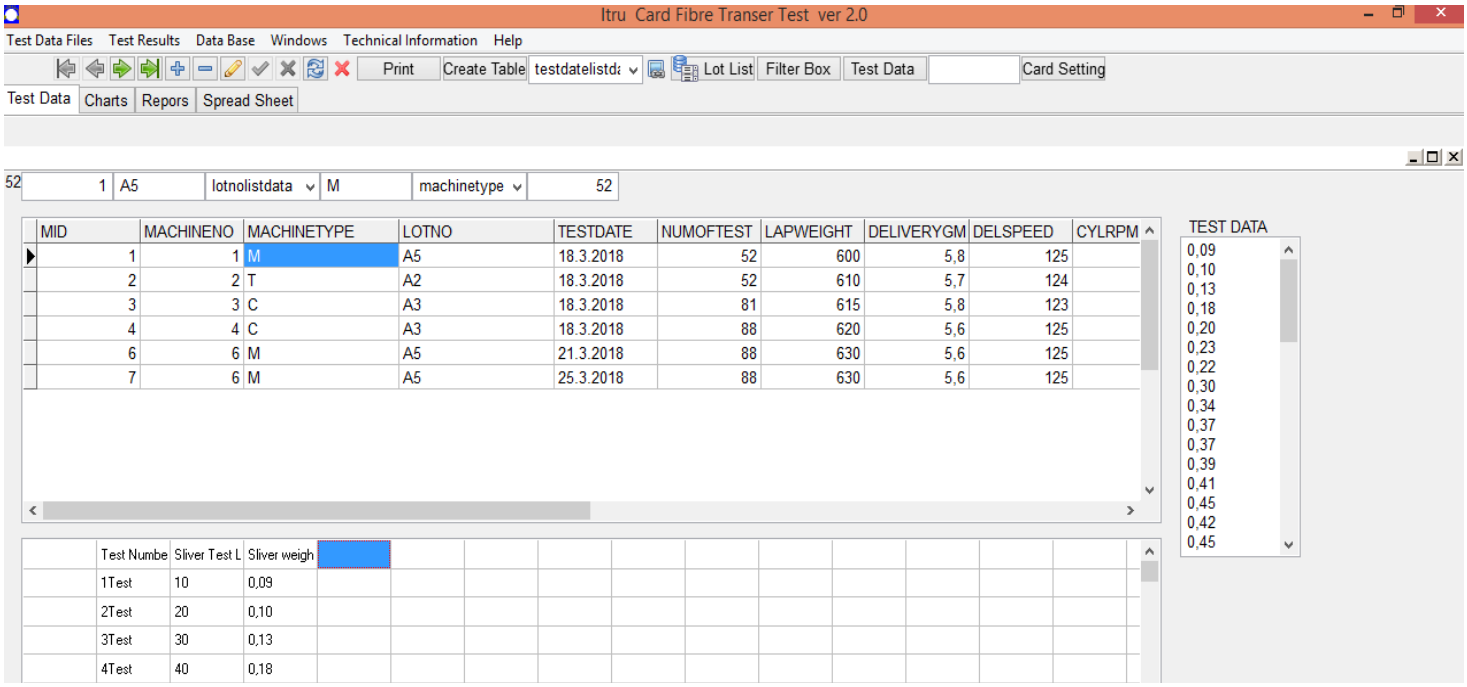


Enter The data to Test Data on the right on Sliver Weight Section on The Grid. If you enter the test results on the Grid and from Main Menu

Load From Grid Loads the test results to Test Data Memo a part of data base.
Load to Grid Loads test results from memo to Grid
Clear Grid Clear the Grid
Open Loads saved test results to Grid
Save Save test results to in a separate file if you need

Test Data is saved in data base so one does not need to save as file.

For Each Machine there is a MID index number which is related to Card Setting Data. MID Index Number connects the Card Test Data to Card Setting Data. When you Click on Card Setting you have Card Setting Parameters for each machine that is connected with MID number. Therefore there are two database files.

cardfibretest.dbf (Card Testing Parameters)
cardset.dbf (Card Setting Parameters)

these files are stored in data directory.

2. Reports

There are two reports Single and Summary

2.1 Single Reports

Machine no	::	6:			
LotNo	::	A5:			
Machine type	::	M:			
Date	::21.3.2018:				
No of total tests	:	87:			
Speeds and carding					
Feed cm/min	:	157,080:			
Taker-in rpm	:	900,000:			
Cylinder rpm	:	411,000:			
Doffer rpm	:	54,000:			
Doffer m/min	:	118,752:			
Detaching roller m/min	:	119,448:			
Delivery m/min	:	125,000:			
Taker-in blow /cm -feed	:	5,730:			
Carding/cm feed	:	2,617:			
Transfer functions parameters					
Doffer/Calender Draft	:	1,053:			
Weight of free fibres in g	:	4,107:			
Carding sliver weight in g	:	89,500:			
Carding time in sec	:	1,056:			
Sliver length/cylinder 1 turn	:	30,414:			
No of plies	:	7,234:			
Carding -Cylinder/Feed cm	:	2,617:			
Carding- Taker-in/Feed cm	:	5,730:			
Sliver Length cm	:	220,000:			
Residual Ratio %	:	72,737:			
Transfer ratio %	:	27,263:			

Sliver Regularity					
Nominal Count G/m Sliver	:	5,600:			
Min G/m	:	3,900:			
Max G/m	:	6,100:			
Mean deviation %	:	39,286:			
Standard deviation	:	0,559:			

A%	-5,357
CV%	10,549
Average G/m	5,300
Doffer lamda cm	231,481
Carding Power	0,723
Total k	22

Drafts

	Material:	Drafts:	Material G/m
Feed-Taker-in	:	457,200:	0,975:
Taker-in-Cylinder	:	2,319:	0,420:
Cylinder-Doffer	:	0,071:	5,895:
Doffer-Detaching	:	1,006:	5,860:
Detaching-Calender	:	1,046:	5,600:
Total Draft	:	79,577:	

	Material:	Drafts:	P %
Taker-in	:	457,200:	17,405:
Cylinder	:	2,319:	7,505:
Doffer	:	0,071:	105,261:
Detaching	:	1,006:	104,648:
Calender	:	1,046:	100,000:

Wave lengths

Feed:	Taker-in:	Cylinder	Doffer	Detaching	Calender
2500,00:	13,89:	30,41:	231,48:	56,05:	22,78
1250,00:	6,94:	15,21:	115,74:	28,03:	11,39
833,33:	4,63:	10,14:	77,16:	18,68:	7,59

Test L	Time s	g/m	aqsl	pqsl
10:	0,05:	1,100:	19,64:	12,75:
20:	0,10:	2,600:	46,43:	23,87:
30:	0,14:	2,600:	46,43:	33,57:
40:	0,19:	1,400:	25,00:	42,04:
50:	0,24:	2,400:	42,86:	49,43:
60:	0,29:	2,300:	41,07:	55,88:
70:	0,34:	4,000:	71,43:	61,50:
80:	0,38:	4,700:	83,93:	66,41:
90:	0,43:	4,300:	76,79:	70,69:
100:	0,48:	4,400:	78,57:	74,43:
110:	0,53:	4,800:	85,71:	77,69:
120:	0,58:	4,600:	82,14:	80,53:
130:	0,62:	4,900:	87,50:	83,01:
140:	0,67:	5,400:	96,43:	85,18:
150:	0,72:	5,100:	91,07:	87,07:
160:	0,77:	5,000:	89,29:	88,72:
170:	0,82:	4,700:	83,93:	90,15:
180:	0,86:	4,900:	87,50:	91,41:
190:	0,91:	4,900:	87,50:	92,50:
200:	0,96:	5,000:	89,29:	93,46:
210:	1,01:	5,300:	94,64:	94,29:
220:	1,06:	5,100:	91,07:	95,02:
230:	1,10:	5,400:	96,43:	95,66:
240:	1,15:	5,300:	94,64:	96,21:
250:	1,20:	5,300:	94,64:	96,69:
260:	1,25:	5,500:	98,21:	97,11:
270:	1,30:	5,500:	98,21:	97,48:
280:	1,34:	5,400:	96,43:	97,80:
290:	1,39:	5,300:	94,64:	98,08:

300:	1,44:	5,300:	94,64:	98,33:
310:	1,49:	5,600:	100,00:	98,54:
320:	1,54:	5,700:	101,79:	98,73:
330:	1,58:	5,600:	100,00:	98,89:
340:	1,63:	5,500:	98,21:	99,03:
350:	1,68:	5,600:	100,00:	99,15:
360:	1,73:	5,400:	96,43:	99,26:
370:	1,78:	5,800:	103,57:	99,36:
380:	1,82:	5,700:	101,79:	99,44:
390:	1,87:	5,900:	105,36:	99,51:
400:	1,92:	5,800:	103,57:	99,57:
410:	1,97:	5,800:	103,57:	99,63:
420:	2,02:	6,100:	108,93:	99,67:
430:	2,06:	6,000:	107,14:	99,72:
440:	2,11:	5,700:	101,79:	99,75:
450:	2,16:	5,800:	103,57:	99,78:
460:	2,21:	6,000:	107,14:	99,81:
470:	2,26:	5,800:	103,57:	99,84:
480:	2,30:	6,100:	108,93:	99,86:
490:	2,35:	5,900:	105,36:	99,87:
500:	2,40:	6,100:	108,93:	99,89:
510:	2,45:	6,100:	108,93:	99,90:
520:	2,50:	5,700:	101,79:	99,92:
530:	2,54:	5,700:	101,79:	99,93:
540:	2,59:	5,700:	101,79:	99,94:
550:	2,64:	5,700:	101,79:	99,94:
560:	2,69:	5,600:	100,00:	99,95:
570:	2,74:	5,400:	96,43:	99,96:
580:	2,78:	5,500:	98,21:	99,96:
590:	2,83:	5,400:	96,43:	99,97:
600:	2,88:	4,900:	87,50:	99,97:
610:	2,93:	5,100:	91,07:	99,98:
620:	2,98:	4,600:	82,14:	99,98:
630:	3,02:	4,300:	76,79:	99,98:
640:	3,07:	4,000:	71,43:	99,98:
650:	3,12:	3,900:	69,64:	99,99:
660:	3,17:	5,600:	100,00:	99,99:
670:	3,22:	5,500:	98,21:	99,99:
680:	3,26:	5,500:	98,21:	99,99:
690:	3,31:	5,300:	94,64:	99,99:
700:	3,36:	5,400:	96,43:	99,99:
710:	3,41:	5,400:	96,43:	99,99:
720:	3,46:	5,200:	92,86:	99,99:
730:	3,50:	5,000:	89,29:	100,00:
740:	3,55:	5,000:	89,29:	100,00:
750:	3,60:	4,800:	85,71:	100,00:
760:	3,65:	4,800:	85,71:	100,00:
770:	3,70:	4,600:	82,14:	100,00:
780:	3,74:	4,600:	82,14:	100,00:
790:	3,79:	4,400:	78,57:	100,00:
800:	3,84:	4,300:	76,79:	100,00:
810:	3,89:	4,100:	73,21:	100,00:
820:	3,94:	4,900:	87,50:	100,00:
830:	3,98:	5,500:	98,21:	100,00:
840:	4,03:	4,400:	78,57:	100,00:
850:	4,08:	4,800:	85,71:	100,00:
860:	4,13:	4,900:	87,50:	100,00:
870:	4,18:	4,200:	75,00:	100,00:

2.2 Summary Report for Fibre Transfer Data Parameters

Mach	Lot no	Type of Mc	Test Date	Card Fed	Delivery	Free Fib	Sliver W	CardingT	L/1cy-cm	C/Tak-cm	CylRPM	TransR%	CV %
1:	A5:	M:	18.3.2018:	600,00:	5,80:	5,03:	100,60:	1,25:	30,34:	5,09:	412,00:	23,56:	3,03
2:	A2:	T:	18.3.2018:	610,00:	5,70:	4,18:	79,30:	1,06:	30,17:	5,09:	411,00:	27,08:	3,98
3:	A3:	C:	18.3.2018:	615,00:	5,80:	11,21:	300,80:	2,83:	29,71:	5,73:	414,00:	11,13:	10,70
Mean:	........:	........:	........:	608,33:	5,77:	6,81:	160,23:	1,71:	30,07:	5,31:	412,33:	20,59:	5,90
Min:	........:	........:	........:	600,00:	5,70:	4,18:	79,30:	1,06:	29,71:	5,09:	411,00:	11,13:	3,03
Max:	........:	........:	........:	615,00:	5,80:	11,21:	300,80:	2,83:	30,34:	5,73:	414,00:	27,08:	10,70

3 Carding Process

3-1 Introduction to Carding Machine

Carding Machine in cotton and man made fibre spinning plays the most significant role in determining yarn quality in terms of evenness and strength.

Carding procedure is a repeating cycle of subsequent events these are
a) Lap feed by feed roll to taker-in then to cylinder
b)Carding by cylinder and flats and fixed flats
c)Web formation on doffer
d)Detaching of web by detaching roller
e)Feeding of sliver by card delivery roller

Although all the rotating parts run continuously sliver formation is realized by repetitive cycles and could be called as a Carding Cycle. Therefore variation in card sliver evenness could be analysed as
a) Variation within cycle
b) Variation between cycles

Therefore to check the evenness of Carding Sliver should be done after determining the length of card sliver per Carding Cycle which is defined as Carding Cycle Sliver Length .

Main function of carding machine is to form a sliver to spin a yarn . In addition to these carding machine should achieve following points

- Effectively removing of short fibres and non-lint materials
- Paralleling of fibres and straightening of hooks in fibres
- Opening of fibre tufts into fibres to form regular web
- Correcting and evening out in the chute feed lap weight variation along and across to get optimum sliver evenness.

It has been proven by many experimental results that Spectrograph CV values are related to short term regularity in card sliver does not affect yarn quality as much as variation values between and within Carding Cycle Sliver Length

3.2 Technical terms and definitions and their importance

3.2. 1 Fibre Transfer Curves

Fibers are taken up by doffer to cylinder reach to nominal count after certain numbers of cylinder rotations. Fibre transfer curve is determined as percentage of this nominal count in time or length of sliver. Therefore count gr/m of sliver is determined from the actual test results and feed into data input. If the all rotating parts of carding machine (feed roller, taker-in , cylinder, doffer, detaching roller and calender rollers) function correctly theoretical and practical (actual) fibre transfer curves are close to each other and actual fiber transfer curve shows minimum deviations as shown in the diagram below.

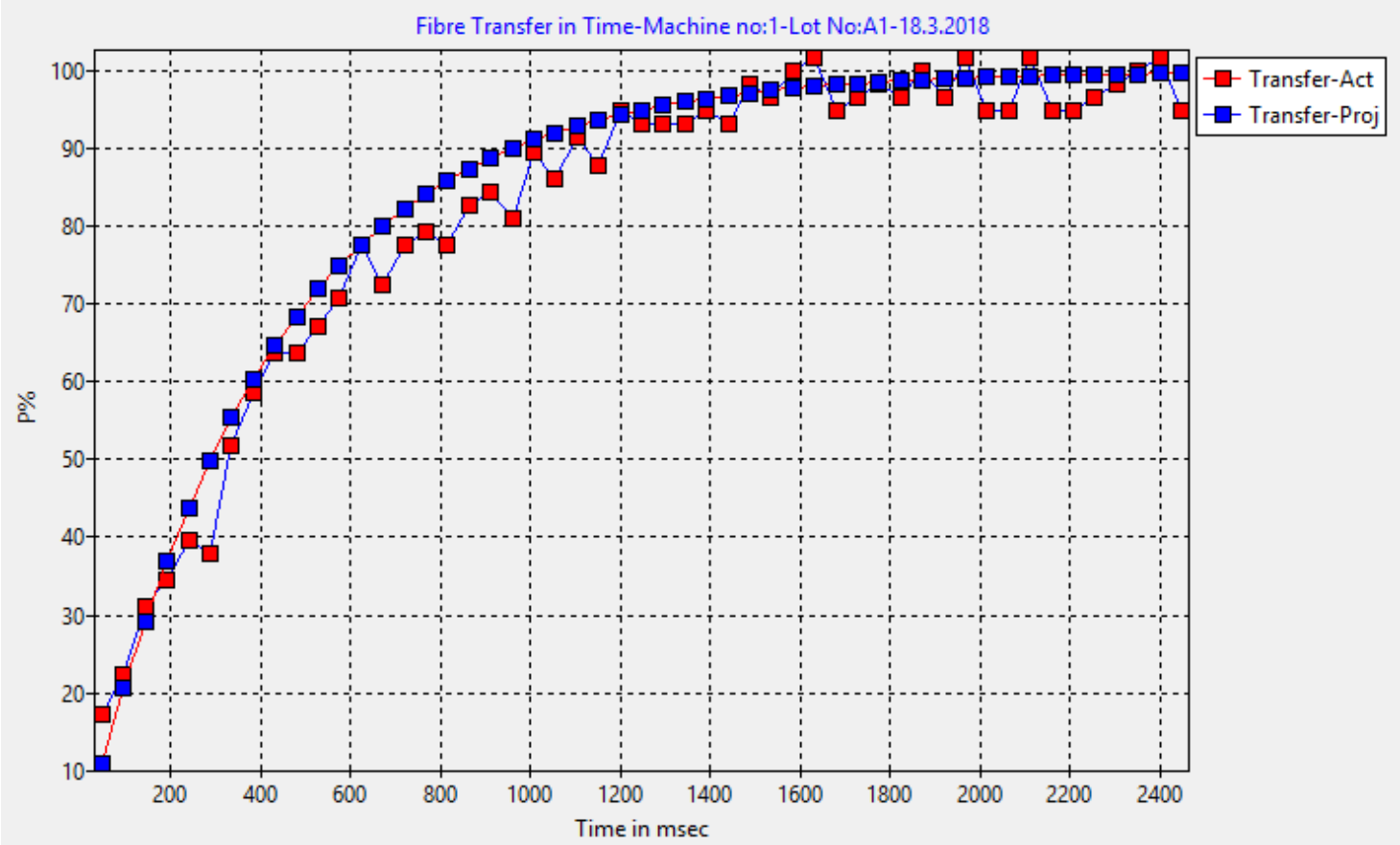
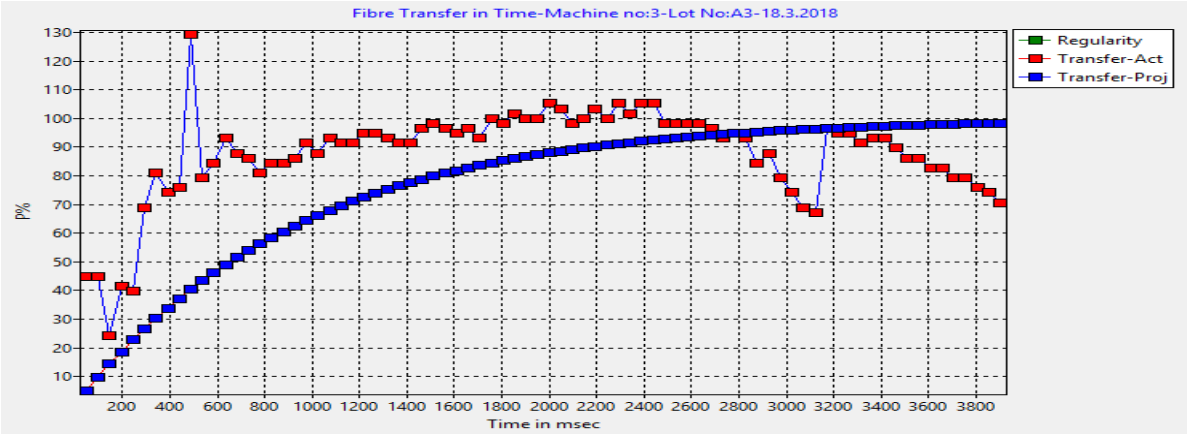


Figure: proper functioning of carding machine

As shown above fibre transfer curve diagram theoretical and actual fibre transfer curves are close to each other and deviations in the actual curve are reasonable level. Therefore we can say that this carding machine functioning correctly.

If the rotating parts of the carding machine are not functioning correctly then we come across with following points.

- Theoretical and actual curves are apart of each other.
- There is a high deviation in actual curve as some points as shown in the diagram below which is related to faulty transfer of fibers from cylinder to doffer.



Faulty Running Carding Machine

In this case fibre transfer curve is divided into two sections. First section involves actions of feed roller, taker-in, and cylinder. Second section consist of doffer, detaching roller and calender rollers. Second section is related to regularity of sliver. First section is related to the regularity of fibre transfer and power of carding cylinder to regulate the variation in chute feed (lap).

If fibre transfer from carding cylinder to doffer is regular and fibre transfer from doffer to detaching roller is even than one can get uniform carding sliver. That means that variation of amplitude in chute feed is reduced. Amount of reduction is determined by the Carding Power computed from PC-program. The higher carding power value is better the functioning of carding machine for in terms of reducing variation in amplitude of chute feed.

The carding power is related to the regulating power of carding cylinder but it is not enough to determine the quality of carding sliver and the performance of carding machine. The percentage of fibre transfer ratio should be taken into consideration.

The percentage of fibre transfer ratio is closely related to yarn evenness and strength. Transfer ratio is affected by following factors.

- Lap weight (gr/m)
- Relative speeds of feed roller, taker-in, cylinder and doffer
- Card setting parameters such as flats, plates, taker-in under casing, cylinder under casing and other settings
- Type of card clothing used

When transfer ratio is low usually neps in yarn reduces due to more carding time. But this increases taker-in and cylinder under casing waste as well as flats waste. Due to more carding action fibres may be cleaned better but this may cause fibre breakage and fatigue of fibres which lead to low yarn strength and unevenness and high imperfections in the yarn. Fibre transfer ratio for cotton fibres is about 8-12 percentage. Lower than this value makes cause high carding waste, low yarn strength and high imperfections in the yarn. So card fibre transfer test should be carried out together with

- card waste test
- card sliver count
- test card neps test
- card spectrograph test

- card fibre properties test (length, strength and etc.)
- card speed test (rotating parts rpm and delivery speed m/min)

Carding production kg per hour is determined by doffer speed. But as explain above doffer speed influences to fibre transfer ratio. Therefore delivery speed of carding machine should be determined with above tests. Hence it is possible to increase carding production kg per hour depending upon the test carried out above.

If transfer ratio is above 8 percentage and carding waste is high then card setting and card clothing should be checked for correction and repairing. If carding waste high and transfer ratio lower than 8 percentage that means transfer ratio is too low and should be increased by carrying out above test and carding delivery speed should be increased cylinder and taker-in speeds should be reduced. However all these tests should be followed up to the yarn and optimum quality must be decided upon the test results.

Fibre transfer ratio is divided in two section. Feed roller to doffer, doffer to delivery rollers. The regularity of sliver after doffer is closely related to the first section of fibre transfer curve. Therefore following factors affect transfer ratio also affect the sliver regularity and yarn quality parameters.

Feed Roll cm/min : 157,080:

As this value reduces opening of fibres in taker-in increases. Therefore this value should be check with **Weight of free fibres in g** on carding cylinder with the PC-programs. Higher this amount greater yarn strength and lower the unevenness is. **Feed Roll cm/min** , this value depend on the percentage of trash in the raw cotton and fiber strength. As the taker-in speed rpm divided by feed roller delivery per cm increases opening degree of

fibres increases and effective removable short fibers increases. Since carding time depends upon transfer ratio actual carding by taker-in depends upon the carding time of the cylinder. Higher carding time of cylinder lower the transfer ratio is hence more carding by taker-in roller. Therefore feed roller delivery speed should be adjusted according to taker-in roller rpm, cylinder rpm and doffer rpm. Hence to set the rotating parts of carding machine should be done with the process / quality control test as describe above. A change in one parameter of carding machine greatly influences to yarn quality parameter as well as carding waste hence manufacturing cost in spinning.

Taker-in blow /cm -feed : 5,093:

This value effects the opening and cleaning degree of material fed by feed roller. Higher this value greater the opening degree of material and better cleaning efficiency by taker-in and cylinder . This value also depends upon the setting between taker-in and feed roll and should be adjusted according to fibre length and opening density of material feed.

Determining of the speeds of taker-in,cylinder and doffer

In most carding machine doffer speed is adjusted independently from the taker-in and cylinder speed. Doffer speed m/min is related to delivery speed of calender rollers and coiler rollers. Doffer speed and consequently the taker-in and cylinder speed rpm depend upon the card fibre transfer ratio.

Delivery speed in other words production kg/hr depends upon mainly

- Delivery speed of doffer and draft between doffer and calender rollers
- Draft between calender rollers and coiler rollers
- Delivery sliver count gram per meter

When one set the delivery speed should set the taker-in speed and cylinder speed according to Card Fibre Transfer Ratio Test . Therefore , cylinder speed and taker-in speed depend upon doffer speed. Cylinder speed relies upon doffer speed more than taker-in speed. So keeping cylinder and taker-in speed constant and changing doffer speed may deteriorate sliver and as a result yarn quality. Carding machine could run at higher speed than as expected and may lead to better yarn quality than lower delivery speed. These all depend upon the feed material and transfer ratio. If feed material contains high number of neps than transfer ratio could be lowered slightly . Too low transfer ratio also may cause high neps due to more carding action .

Setting of Taker-in Speed and Feed Roller Delivery Speed.

Feed roller delivery speed cm/min depends upon the sliver count i.e. delivery speed . Total draft is determined by delivery speed divided by card feed roll feed speed. In this case too low feed roll delivery speed may cause too much carding action by taker-in and may lead to lower yarn strength. In order to avoid that **weight of free fibres in gram** (WFFG) should be taken into consideration . And this value depends upon following factors

- Transfer ratio
- Draft between taker-in and cylinder and taker in feed roller
- Carding per cm by taker-in
- Lap weight or card feed gram/meter

As the WFFG increases card sliver evenness gets better values. So as the transfer ratio % WFFG is also a key parameter in carding action.

Too close setting between card feed roll and taker-in may break fibres . Too heavy or too light lap may also cause fibre breakage and lower yarn strength. Therefore , process optimization of carding is a really
hard work and it is the heart of spinning process . After carding you can not improve much the sliver and hence yarn quality but you may even worsen it .

Taker-in rpm	800
Cylinder rpm	412
Doffer rpm	55
Doffer m/min	120,95
Detaching roller m/min	120,52
Delivery m/min	125
Taker-in blow /cm -feed	5,09
Carding/cm feed	2,62

3.2.2 Transfer Functions Parameters:

Doffer/Calender Draft	1,03
Weight of free fibres in g	5,22
Carding sliver weight in g	101,5
Carding time in sec	1,3
Sliver length/cylinder 1 turn	30,34
No of plies	8,9
Carding -Cylinder/Feed cm	2,62

Carding- Taker-in/Feed cm	5,09
Sliver Length cm	270
Residual Ratio %	77,2
Transfer ratio %	22,8

Doffer -Calender Draft: This draft value should be kept as small as possible. **Weight of**

Free fibres around Cylinder: Higher this value lower the CV% evenness **Carding**

Time in secs : Time taken for carding action .

No of plies **:**No of plies is related to number of turns of fibres around cylinder before they are actually transferred to doffer. This value is also closely related to transfer ratio.

Carding -Cylinder/Feed cm :Feed roll cm per min feed carding action done by cylinder is related to this parameter.

Carding- Taker-in/Feed cm :Feed roll cm per min feed carding action done by taker-in is related to this parameter.

Sliver Length cm :Sliver length after fibre transfer is achieved.

Residual Ratio % :% of remaining fibre on card cylinder.

Transfer ratio % : % of fibres transferred to doffer by cylinder

3.2.3 Spectrograph Analyses

Wave lengths

Feed -	-Taker-in-	Cylinder--	Doffer----	Detaching-	Calender -
2500	15,63	30,34	227,27	55,56	22,62
1250	7,81	15,17	113,64	27,78	11,31
833,33	5,21	10,11	75,76	18,52	7,54

In carding spectrograph analyses of sliver are carried out before and after coiler. Coiler may cause false chimneys on the spectrograph therefore to be sure Spectrograph analyses should be carried out before coiler.

In this PC program Wave Lengths are calculated before coiler. Therefore ,calender rollers delivery speed is as taken delivery speed meter per minute. The wave lengths refer to main rotating parts of the carding machine with harmonics of div by 2 and div by 3 . All these harmonics should be checked reverse as well.

All the false setting and damaged clothing also may cause faults in spectrograph

3.2.4 Sliver Regularity

Nominal Count G/m Sliver	5,8
Min G/m	5,4
Max G/m	5,9
Mean deviation %	8,62
Standard deviation	0,17
A%	-3,05
CV%	3,03
Average G/m	5,62
Doffer lamda cm	227,27
Carding Power	0,64
Total k	27

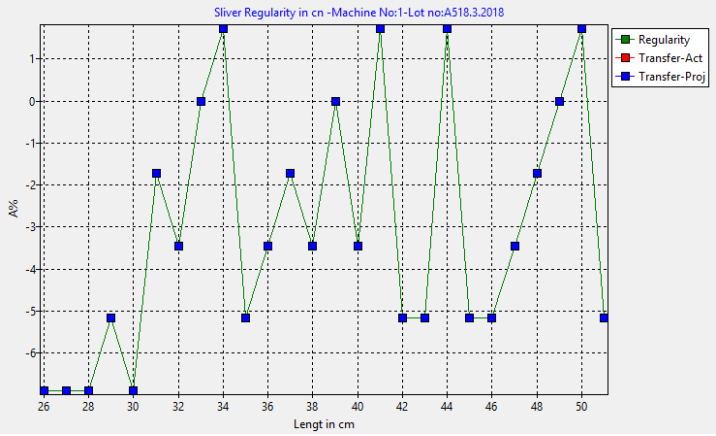
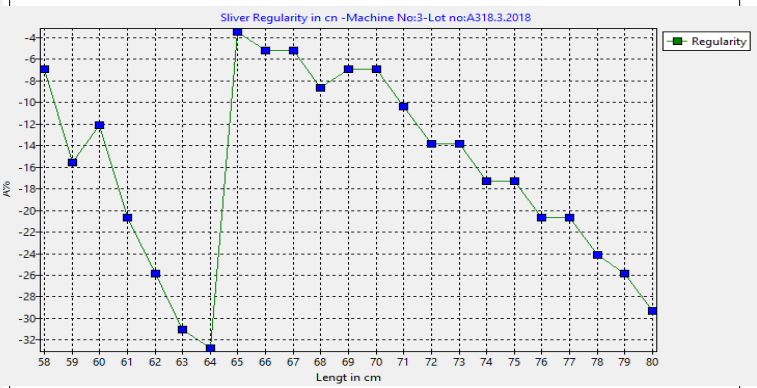
Nominal Count	Nominal count is determined from the horizontal line of the Fibre Transfer Curve which is the actual sliver count from calender rollers delivered.
Min count	Minimum value of card sliver gram per meter
Max count	Maximum values of card sliver gram per meter
Mean deviation %	% of deviation from average card sliver count gram per meters
A%	Percentage of deviation from nominal value
CV %	Coefficient of variation % of sliver

This PC-program could also be used as a evenness and count control instrument. Actual sliver is repeating cycle of sliver one gets in card fibre transfer ratio. CV% is closely related to evenness CV% of carding cylinder . Mean deviation % is also closely related to sliver count deviation percentage. In the chart 100% means the actual count sliver count and values are higher than this value is related to heavier sliver and less than 100 lighter sliver. The usual range 90-110 is normal for good sliver quality.

If CV % of sliver is high then weight of free fibres on cylinder is low.

Doffer lamda is related to wave length in cm of faulty running doffer.

Carding power is a performance of regularity functioning of carding machine. Higher this value better sliver regularity and amplitudes in chute feed variation is reduced by this factor. Therefore ,carding power could taken as a regulating power of carding cylinder.

Uniform Carding	Faulty Carding
	
CV %= 3	CV %=10,73

As Fibre Transfer Ratio from Card Cylinder to Doffer reduces irregularity CV of sliver increases.

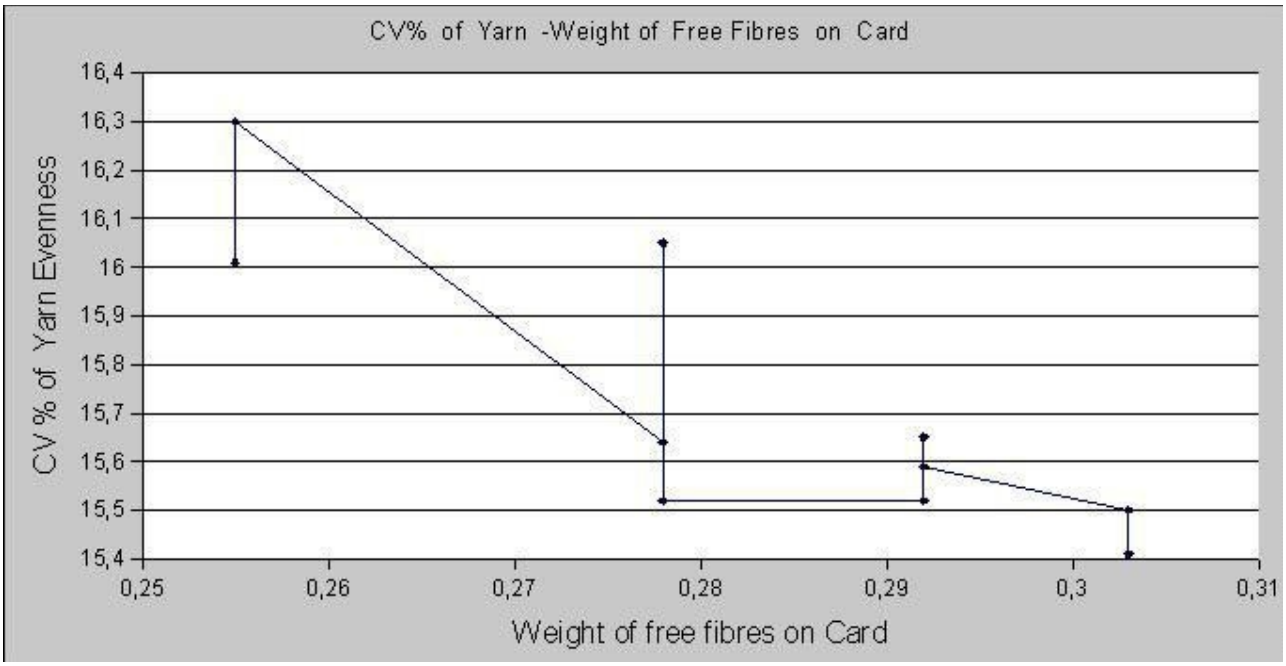
4.1 Process Optimization Experimental Works with Card Fibre Transfer Test in Carding

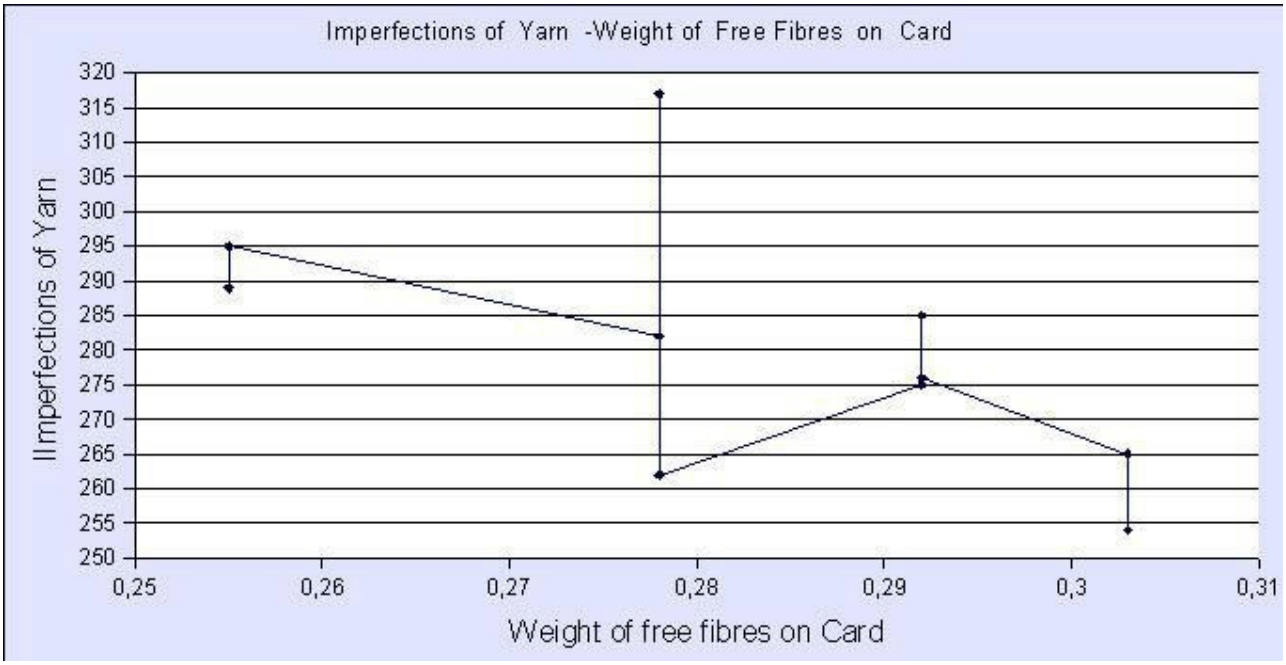
Number	*Tests*	*Control Points*
1	Lap feed weight (chute feed gram per meter)	Carding power
2	Optimization of speeds of taker-in ,cylinder and doffer	Transfer Ratio
3	Optimization of sliver count and total draft	CV%,A%
4	Flat waste	Waste%,Neps
5	Taker-in and cylinder under casing waste	Non-lint content%
6	Optimization of settings between tops combs and cylinder	Neps, Waste%
7	Optimization of draft between doffer and calender rollers	CV%,A%
8	Controlling of sliver and chute feed regularity	CV% ,A%
9	Optimization of card clothing used	Transfer Ratio

Machine No	CV	CV1m	CV3m	Waste %	Transfer Ratio %	Carding Power	CV % From Card Fibre Transfer Test
16	4,3	2,34	1,82	7,17	3,6	0,166	5,34
17	4,37	2,33	1,94	7,34	4,188	0,193	10,7
28	4,04	2,28	1,78	4,66	9,81	0,429	8,02

Machines having same running speeds of taker-in ,cylinder and doffer if show different waste % mainly related to different transfer ratio as shown in the Table above. This is related to card settings of the machine and can be found out from the Transfer Curves of these cards as well. Lower the transfer ratio is higher the waste % and CV3m of evenness measurement correlates better with CV% of Card Fibre Transfer Test

Yarn CV % and Weight of Free Fibres on Card





4.2 Process Optimization for Spinning from Card Fibre Transfer Test

All the tests carried out above should be followed up to yarn . For quality improvement and waste optimization following charts should be drawn out experimentally in any spinning mill.

Test No	*X-Value of the chart*	*Y-Values of the Chart*
1	Card Fibre Transfer Ratio	Waste % , Yarn evenness ,imperfections , yarn tensile properties.
2	Card Fibre Transfer Ratio	Card rotating elements speeds of taker-in and cylinder rpm
3	Card Fibre Transfer Ratio	Doffer Speed rpm
4	Doffer - Calender Draft	Spinning Performance Index

Draw X-Y charts according to above figures and optimize the yarn quality and spinning performance Index values.

Download Card Fibre Transfer Test ver 2.0 Pc-Program http://www.itru.net/ocard.htm

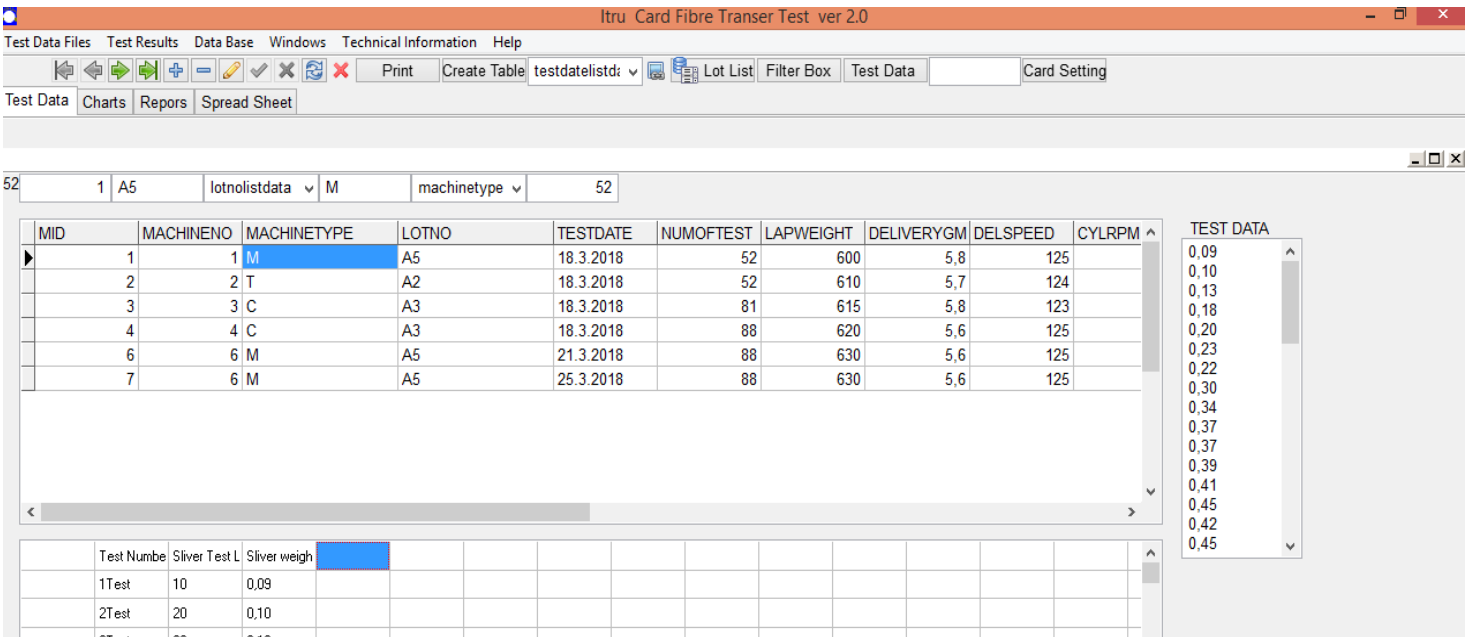
4.3 Mill Practice of Card Fibre Transfer Test Pc-Program

Card Fibre Transfer Test is carried out in carding machine after every lot change, waste control test, flat strip test ,maintenance ,card clothing change and spectrograph test .

Test	*Control*	*Check Points*
% Card Waste Control	Transfer Ratio	Card Settings and speeds
Card Clothing Change	Transfer ratio,Card waste %	Card Clothing specifications
Spectrograph Test	Periodic main item faults	Card Setting and eccentricity

5 Pc-program Structure

5.1 Machine Card Index -Test Data



Click on the Test Data to activate Machine Test Data

Machine Card Index Data) . Insert Button (+) copies to records that are added. f you double click on the Data

Grid you maximize the window same as Filter Box (on Caption)

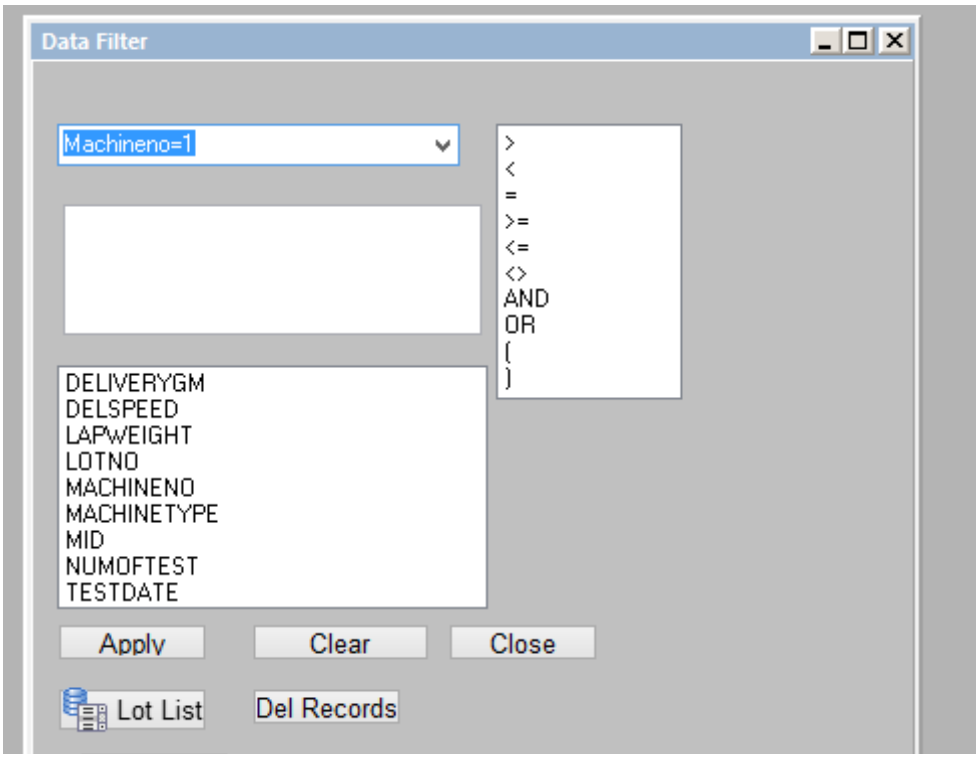
New-Adds a new record to the data base
Add-Adds a selected record to the data base.
Edit-Edits selected record in the data base.
Delete-Deletes selected record from the data base.

Load DBF loads data base table Default table carddibretest.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
Empty : Clears the table
Create Table : Creates new empty table
Export : Exports test data to Spread sheet

5.2 Fiter Box

Click on Fiilter Box :

Apply : Filter the records according to database parameters.
Lotlist : Make lists for date,lot,machine type and date.



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

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

Insert (+) command copies the selected record. Use the same date of record when copying otherwise you will damage the date base. . 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

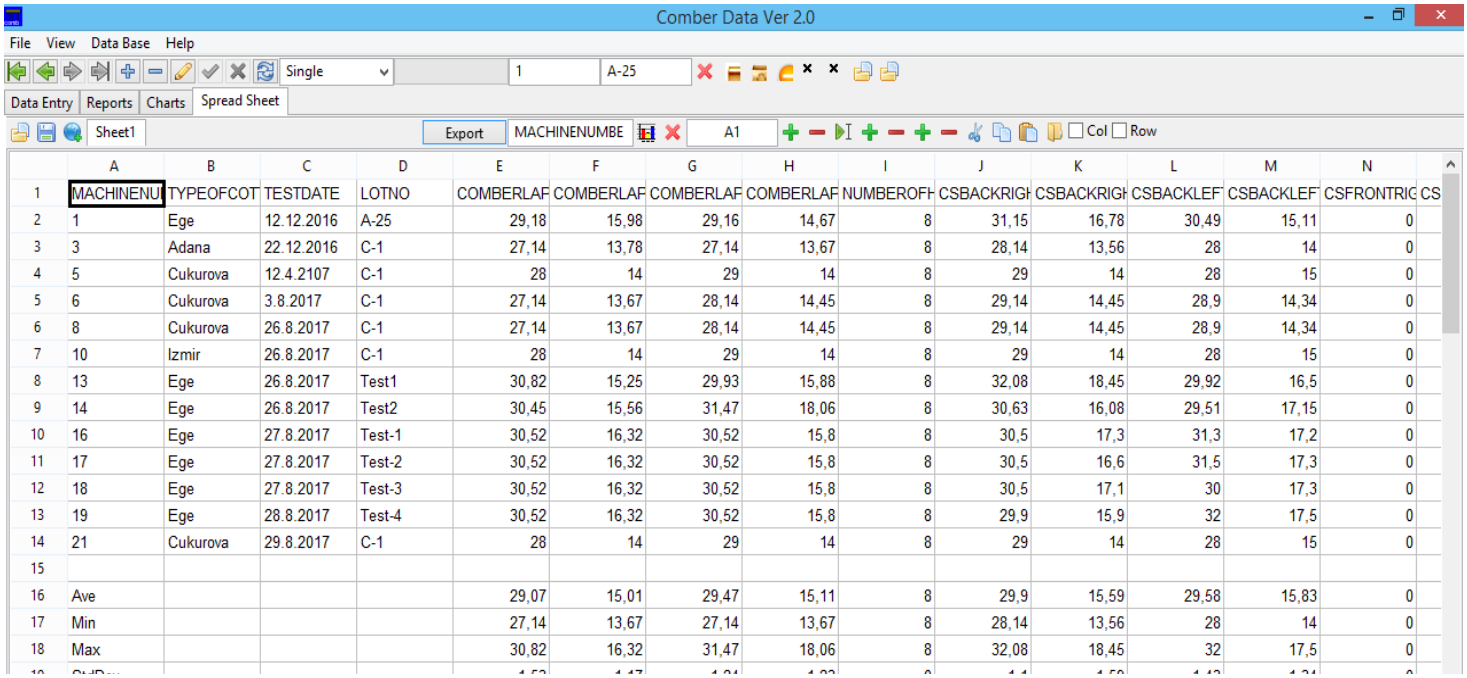
6 Spread Sheet and Spread Sheet Charts

Press Export Button to export calculated database to spread sheet. There is exporting Fibre Transfer Data exporting to spread sheet. Make two sheets on the spread sheet system and export each of them to separate sheets in the spread sheet.

Spread Sheet Functions :

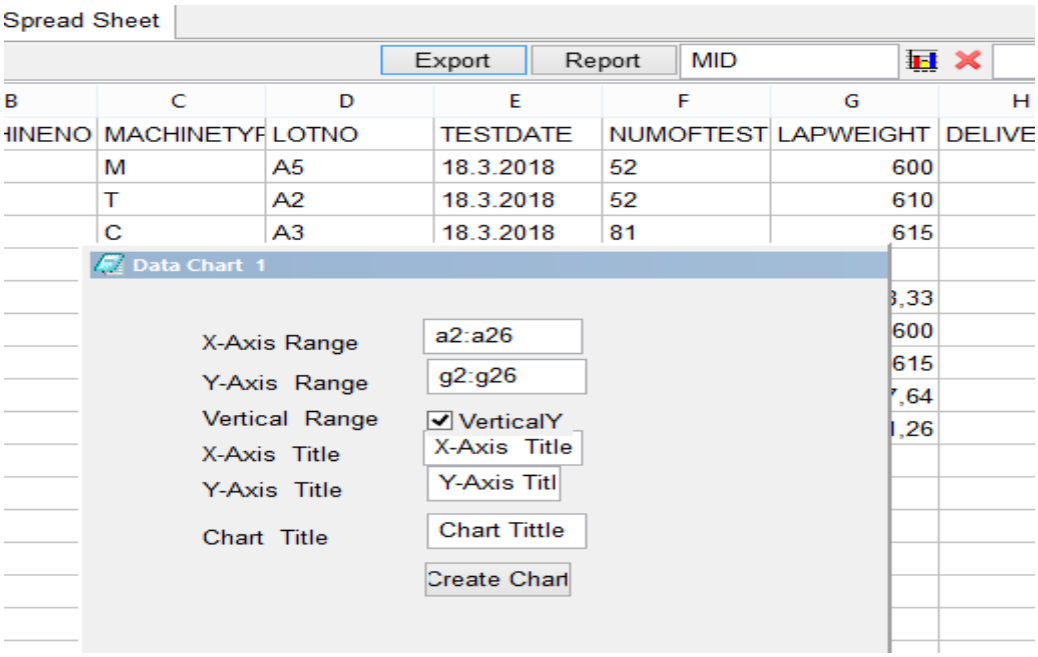
Add-Delete-Rename Sheets
Add-Delete Rows and Columns
Cut-Copy-Paste -Clear Selected cells
Fixed Cols and Fixed Rows
Save Spread Sheet Excel or open office
Load Spread Sheet files
New Spread Sheet
Open and Close Chart Dialogue

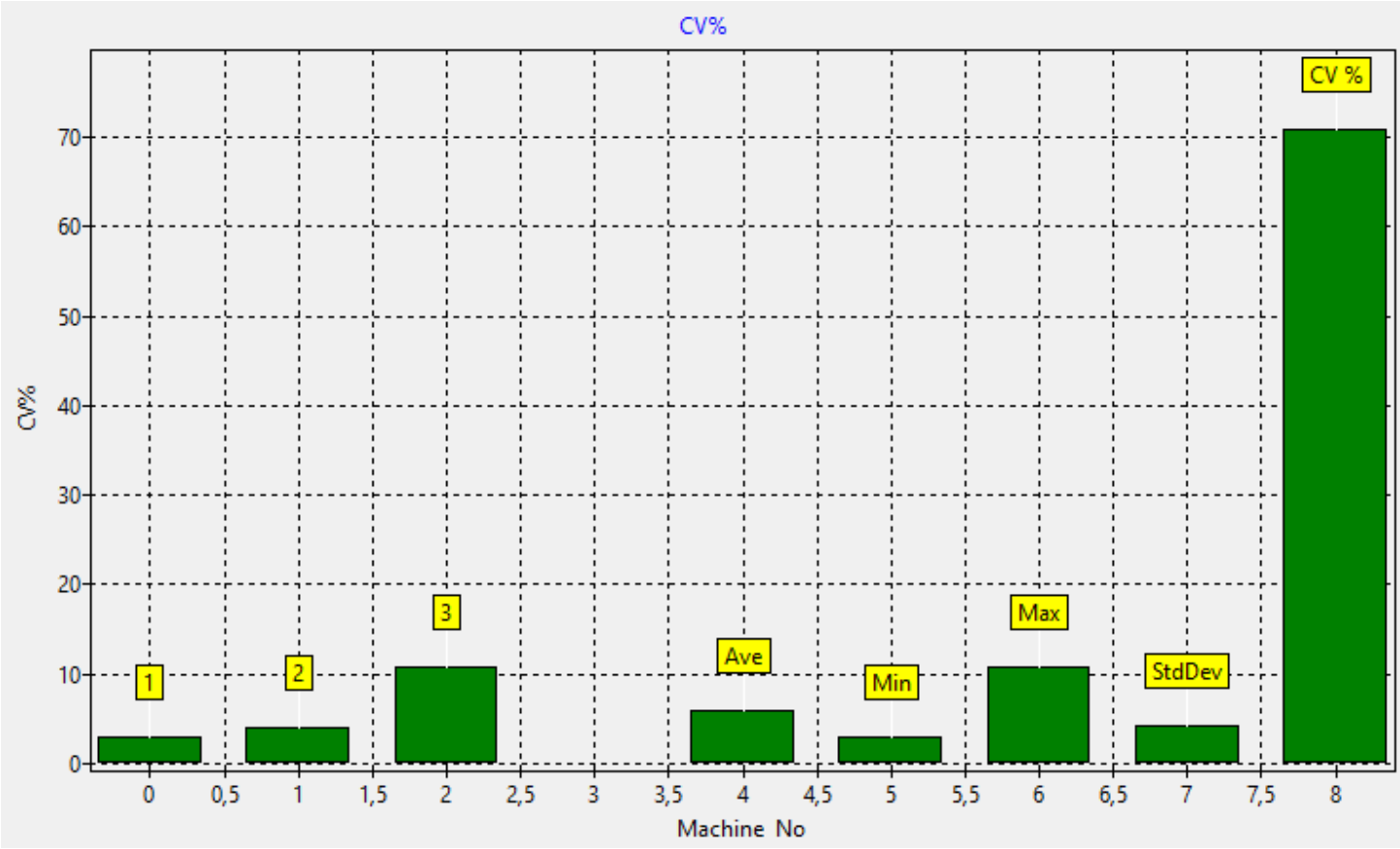
APPLICATION OF CARD FIBRE TRANSFER TESTING VER 2.0 TO SPINNING MILLS -23



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	MACHINENU	TYPEOFCOT	TESTDATE	LOTNO	COMBERLAF	COMBERLAF	COMBERLAF	COMBERLAF	NUMBEROFH	CSBACKRIGH	CSBACKRIGH	CSBACKLEF	CSBACKLEF	CSFRONTRIC
2	1	Ege	12.12.2016	A-25	29,18	15,98	29,16	14,67	8	31,15	16,78	30,49	15,11	0
3	3	Adana	22.12.2016	C-1	27,14	13,78	27,14	13,67	8	28,14	13,56	28	14	0
4	5	Cukurova	12.4.2107	C-1	28	14	29	14	8	29	14	28	15	0
5	6	Cukurova	3.8.2017	C-1	27,14	13,67	28,14	14,45	8	29,14	14,45	28,9	14,34	0
6	8	Cukurova	26.8.2017	C-1	27,14	13,67	28,14	14,45	8	29,14	14,45	28,9	14,34	0
7	10	Izmir	26.8.2017	C-1	28	14	29	14	8	29	14	28	15	0
8	13	Ege	26.8.2017	Test1	30,82	15,25	29,93	15,88	8	32,08	18,45	29,92	16,5	0
9	14	Ege	26.8.2017	Test2	30,45	15,56	31,47	18,06	8	30,63	16,08	29,51	17,15	0
10	16	Ege	27.8.2017	Test-1	30,52	16,32	30,52	15,8	8	30,5	17,3	31,3	17,2	0
11	17	Ege	27.8.2017	Test-2	30,52	16,32	30,52	15,8	8	30,5	16,6	31,5	17,3	0
12	18	Ege	27.8.2017	Test-3	30,52	16,32	30,52	15,8	8	30,5	17,1	30	17,3	0
13	19	Ege	28.8.2017	Test-4	30,52	16,32	30,52	15,8	8	29,9	15,9	32	17,5	0
14	21	Cukurova	29.8.2017	C-1	28	14	29	14	8	29	14	28	15	0
15														
16	Ave				29,07	15,01	29,47	15,11	8	29,9	15,59	29,58	15,83	0
17	Min				27,14	13,67	27,14	13,67	8	28,14	13,56	28	14	0
18	Max				30,82	16,32	31,47	18,06	8	32,08	18,45	32	17,5	0

Click on the Chart Button to Open Chart Dialogue press the Create Chart and goto chart page.

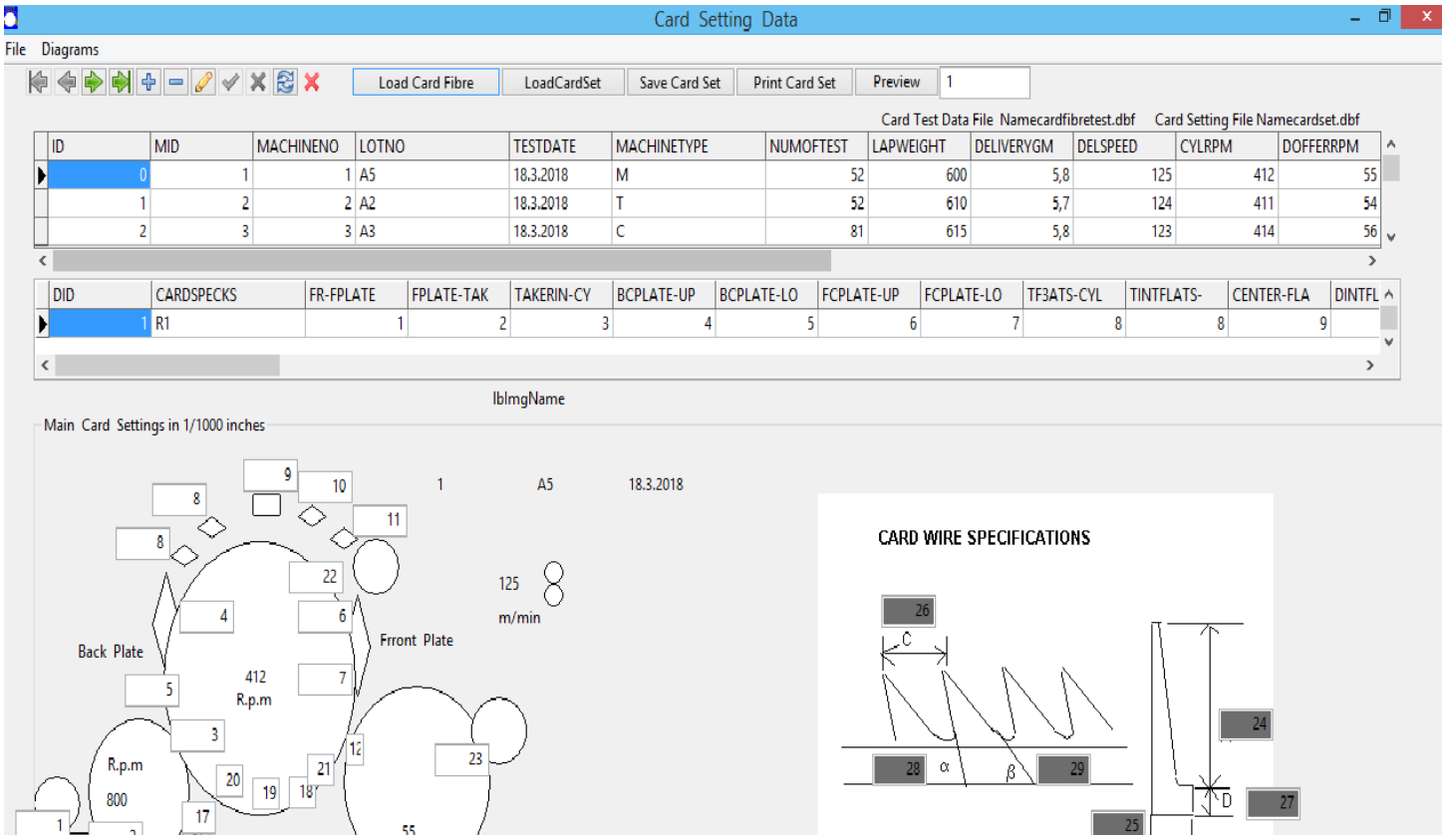




7 Card Setting Data

Click on the Card Setting Button to see the Card Setting Parameters.

Card Setting Data consists of main card setting and card wire specifications data. Knowledge Based Information for card setting information is also provided for main card setting.



For every Card Test Data there is a Card Setting Data parameters.

Test Data Base File : cardfibretest.dbf

Card Setting Data Base File :cardset.dbf

Each data base is connected with MID and DID parameters to each other. Card Test Data Base file is master and corresponding card setting data base is details. Enter same MID number for DID number for connection.

Data Base Files :

cardfibretest.dbf Machine Data Parameters

cardfibretest.dbt Test Data is saved

cardfibretest.mdx Index file

Do not use insert button when running Card Setting Diagram . Insert Records in main window and Edit Card Setting Parameters in Card Setting Diagram window. The program automatically creates card setting parameters for Card Test Data.

You can load Card Test Data and Load Card Setting Data Base file as well. In that case you should know which test data is related to which card setting data.