PROCESS PARAMETERS IN SPEED FRAME

INTRODUCTION

Roving machine is complicated, liable to faults, causes defects, adds to production costs and delivers a product that is sensitive in both winding and unwinding.The following parameters are very important in SPEED FRAME. They are

1. Feed hank
2. Delivery hank
3. Roving tension
4. break draft
5. Drafting system
6. Bottom roller setting
7. Top roller setting
8. condensers and spacers
9. Twist in the roving
10. Bobbin content
11. flyer speed
12. Creel and creel draft
13. Drawframe sliverand can
14. Bobbin height
15. Breakage rate
16. Piecings

DRAFTING SYSTEM

- Since modern Ringframes are capable of handling higher drafts in ringframe without quality detrioration It is better to have coarser hanks in the speed frame. This helps to increase the prodction in speed frame. Investment cost will also be less,because the number of speedframes required will be less and the cost per mchine is also high. The following table can be a guidle line for speed frame delivery hank

• MATERIAL	• YARN COUNT	• HANK	• TOTAL DRAFT
COTTON combed	36s to 40s	1.2	10
Cotton combed	24s to 30s	1.0	10
Cotton combed	14s to 24s	0.7 to 0.8	9
Cotton karded	36s to 40s	1.3	9
Cotton karded	24s to 36s	1.1	8
Poly/cotton	36s to 45s	1.2	11
Poly/cotton	24s to 36s	1.0	10
Poly/viscose	36s to 40s	1.0	11
Poly/viscose	24s to 36s	0.85	10
Poly/viscose	16s to 20s	0.7	8

The above said details are for producing a good quality yarn. This is suitable for 4 over 4 drafting system with front zone as a condensing zone without a draft.

- With 4 over 4 drafting system, the toal draft can be upto 13, whereas in the case of 3 over 3 drafting system , the draft can not be more than 11.
- The Roving thickness and Roving hairiness(yarn hairiness) will be less with 4 over 4 drafting system compared to 3 over 3 drafting system.
- In 4 over 4 drafting system, since the fully drafted material is just condensed in the front zone, if the stikiness in case of cotton or static in case of synthetic is high, then the lapping tendency will be very high on second top roller or second bottom roller. But in case of front roller, since the twist is

penetrating upto the nip, lapping on the front bottom or top roller will be less.

- As long as stickiness, honey dew in cotton and static in synthetic fibres is less, 4 over 4 drafting system with front zone as condensing zone, will give better results upto even 51 mm fibre.Of course the humidity conditions should be good.
- 4 over 4 drafting system can be described as follows

1. bottom roller diameter is 28.5 mm
2. Top roller diameter is 28 mm
3. Break draft is between 4th roller and 3rd roller
4. Main draft is between 3rd roller and 2nd roller
5. Bottom apron is run by a 3 rd roller
6. between front roller and 2nd roller is a condesning zone
7. front zone setting 35 mm(even for 51 mm fibre)
8. Main draft zone setting is 48 mm
9. Back zone setting depends on break draft, but it is normally 5o mm for cotton and T/c and 55 mm for synthetic fibres(44 to 51mm)

- 3 over 3 drafting system is good for fibres longer than 51 mm. 30 or 32 mm bottom roller diameters will be used with this system.
- Feed hank depends upon the total draft in speed frame. The drafts mentioned in the above table can be consdiered as a guide line.

While processing 51 mm synthetic fibres, if the delivery hank is coarser,and the delivery speed is verh high, the break draft and the back zone setting to be widened. Break draft and break draft setting does not depend only on T.M and fibre properties, it depends on the total production also. If the total production is very high, with low break draft and closer setting, roving breaks due to undrafted strand will increase.

- Therefore, for very high production rate , higher break draft and wider break draft setting is required. This will result in very high "H" and "I" classimat faults(long thin faults). Therefore the breakage rate in spinning will increase.
- Break draft setting and break draft should be nominal. Abnormal break drafts and wider break draft settings indicate that there is a major problem in the process.
- Some times draw frame coiling is a very big problem with synthetic fibres . If kinks are formed in the sliver, the kink has to be removed before entering the draft zone.
- Kinks in the drawframe sliver depends upon

1. drawframe delivery speed
2. delivery can diameter
3. coiler type

- Higher the delivery speed, more the chances for kinks to be formed in the sliver. Lower the can diameter more the kinks. If a coiler which is meant for cotton is used, the kinks in the sliver will increase in case of synthetic fibres.
- While processing synthetic fibres if kinks are more, it would be better if the creel is stopped. Sometimes it would be recommeded to use a rod between top arm and the first creel roll, so that the sliver takes a 90 degree bend before entering the top arm. This will help to remove the the kinks in the sliver. Otherwise, slubs in the roving will be more and the breakage rate in speed frame due to undrafted strand in the drafting zone will be more.

ROVING TENSION

- The roving tension depends on the delivery rate and the difference between peripheral speeds of flyer and the bobbin.
- If the delivery length and the peripheral speed difference are same, then the tension is ideal.If delivered length is more than the difference in peripheral speed , then the roving tension will be loose. If the delivered length by the front bottom roller is less than the difference in pheripheral speeds of flyer and the bobbin, the roving tension will be tight.
- Roving tension can be of three types

1. Roving tension at the starting. It depends upon the Bare bobbin diamter and the Cone drum belt position
2. Roving tension during build-up. It depends upon the Ratchet wheel and lifter wheel. The difference between peripheral speeds of flyer and bobbin should be same and it should be slightly more than the length delivered by the front roller.
3. Roving tension during up and down movement of the bobbin rail should be same. It depends upon the half tooth

movement of the ratchet. If it is not exactly half tooth, then the tension will be different during up and down movement of the bobbin rail

4. With modern machines, cone drum is removed. Bobbin speed, bobbin rail speed and flyer speed is determine by the computer depending upon the tension settings.In some machines, it can be programmed and the tension sensor helps to control a bit.In some makes, the tension setting totally depends upon the sensing by sensors. The sensing accuracy depends upon the twist cap type, twist cape fixing, oil on top of twist cap etc. If only one roving tension is different due to various other reasons, then the entire machine tension will be altered. This is very dangerous. Enough care should be taken to avoid this problem.
5. If lifter wheel is changed, then tension during build up will also change, the ratchet has to be selected accordingly. For a particular roving hank, ratchet wheel depends on Lifter wheel also.
6. If the tension is low but unfiorm through out the bobbin, then the bobbin will be soft. Bobbin content will also be less. Chances of roving damages will be high.
7. If the roving tension is more, then the stretch on the roving will be more, thin places will be more. But it is better to increase the TPI little bit and increase the roving tension so that the bobbin content is more, roving damages are less, and creel stretch in the ring frame will also be less, because of higher TPI in the roving.

OTHERS

- It is better to adopt group creeling in speed frame. Because every piecing of sliver will result in a thin and thick place. Therefore it is preferable to change 30 upto 60 cans together and remove the sliver piecing from the roving.

Care should be taken so that no sliver piecing and roving piecing enters the ringframe and results in yarn. This yarn always results in thin and thick places from .6 to 2 meters length. This will not be cut by the yarn clearers if the difference in size is less.

- Roving Breaks in speed frame should not be more 1 to 2 per 100 spindle hours.If it is more than that, the reasons should be analysed and corrective action should be taken immediately.
- Spacers should be as small as possible, to improve yarn quality. If slubs and roving breaks due to undrafted is more, it would be better to use a bigger spacer(distance clip) instead of increasing the break draft and break draft zone setting to an abnormal level.
- It is better to use good quality apron and rubber cots , since the quantity produced by one apron and top roller is very high compared to ringframe. If the apron breaks and top roller damages are under control, It is always better to use the best apron and rubber cots available in the market. One should not think about cost saving in this machine. Cost saving for apron and cots can be considered for ringframes.
- Buffing should be done once in 3 months and the top roller shore hardness is around 80 to 85 degrees. After buffing, it is better to treat with acid or some special liquids which are being supplied to reduce lapping
- Bottom and top clearers should rotate and should touch the top and bottom roller properly.
- While processing cotton combed material, flyer speed is very critical. When the bobbin diamter is big, because of the centrifugal tension, surfact cuts will increase. i.e. roving breaks may occur at presser or in strand that have just been wound on the top surface of the package. To avoid this problem, it is better to use inverter drive system, to reduce the flyer speed, when the bobbin diameter is big. Otherwise the overall speed should be less for the entire doff, this will reduce the production of speedframe. Sometimes, higher Twist will also reduce the surface cuts.