

**Report
on yarn trials conducted by
Schoeller Textil of Germany
to compare
Schlafhorst's friction yarns
with
SpinWell friction yarns**

January 1996

**Note: Results have been blacked-out
because it was agreed that only
those companies involved in the
trials would be privy to the
information**

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Dear Dr. Brockmanns,

Friction Spinning

Now that I have had time to properly examine the results, I think our preliminary talk on 17 January was beneficial and attach my analysis at Appendix A.

At the meeting we concentrated on :-

- (a) The negative aspects of friction spinning relative to rotor spinning.
- (b) Comparing the two friction spinning systems.

Schlafhorst and Belroy have clearly targeted different priorities in their development programme. However, the key factor to consider is what can be achieved by the use of friction technology as a spinning system, rather than our own individual efforts.

- By working together, it is totally realistic to believe that for a relatively small investment, and in a short time scale, we could combine the best of our two friction spinning technologies.

Such a combined friction spinning technology would include the :-

1. Regularity of Schlafhorst friction yarns which is already better than rotor.
2. Speed at which Schlafhorst have processed the yarns.
3. Strength of Schlafhorst yarns on the coarser yarns.
4. Strength of SpinWell yarns on the finer yarns.
5. Higher elongation of the SpinWell yarns.
 - (a) This will offset any strength differential relative to rotor yarns for many applications.
6. Good blackboard appearance of the SpinWell yarns.
 - (a) If this were combined with the excellent Uster regularity of the Schlafhorst friction yarn, then the appearance would be extremely good.
7. Handle of the best of the SpinWell yarns (with no attempt to produce a soft yarn) is already reasonable and without any doubt a more regular yarn would improve this considerably.
8. From comments made, it is apparent that the SpinWell box will be less expensive to manufacture and require less air than the existing Schlafhorst box.

Once such combination was achieved, then we would have a commercially viable technology already able to compete in every sector with ring, rotor and jet spinning.

In addition, once spinning machines are in operation, and the spinners are able to contribute, then ongoing improvements will occur very quickly.

With our combined technological know how, the level of improvement needed is relatively small to ensure a major impact in the spinning machine market and re-establish Schlafhorst as a world leader.

You are seeking a massive injection of funds to develop a new single position prototype.

- The question that must surely be asked is why ?

I know that using two perforated rollers poses massive economic and manufacturing cost disadvantages, but to use a single perforated roller requires a more refined friction spinning technology.

- This matter is commented upon at Appendix B.

The only way you will make significant savings in manufacturing cost and air usage is to employ a single perforated roller.

- This must be part of the reasoning why you want a new box !
- Whereas this is the technology we already employ.

With the aid of Schlafhorst's skills at design for the rest of the machine, the quickest route to the development of a commercial friction spinning machine would then be available to Belroy.

- Particularly more so, since I designed the SpinWell with the objective of retaining as many features of existing rotor machines as possible.

It would not surprise me if you are confused by Roy referring to the SpinWell's technology as being frozen.

- Particularly, when I had supplied yarns for examination which were clearly non commercial in terms of regularity, thin and thick places.
- So at Appendix C, I explain why there is no disagreement between Roy and myself on freezing the Mark 12 box design. And why I simply cannot wait for Roy to raise the funds to enable us to start producing a range of modified Mark 12 boxes targeted at specific yarns.

As we saw on 17 January, to combine business and technical matters in one meeting simply does not work. I believe there would be great mutual advantage in meeting again, however :-

- I believe that any future meetings between you and I should be on a one to one basis.
- Such meetings to concentrate on technical aspects without the distractions of other matters.
- To this end, I invite you to Bolton at your earliest convenience.
- I list possible further discussion points in Appendix D.

I have also included two further Appendices for possible discussion as follows :-

Appendix E - Change in Belroy's philosophy of marketing with the advent of the Mark 9 box.

Appendix F - What should the initial targeted yarn be ?

I look forward to seeing you shortly in Bolton.

Yours sincerely,



Alan Parker.

APPENDIX A Analysis of Yarn Trials

1. Fibre

1.1 Belroy were supplied with BO and LG quality.

1.2 Schlafhorst used BO, LG and IP quality.

1.2.1 Also, on one of the Schoeller test sheets it said UG. However the results on this yarn suggest it was wrongly labelled and is in fact a ring yarn.

2. Results from IP fibre

2.1 Rotor yarns were almost cNTEX stronger than from LG fibre (the yarns from LG were coarser and the cNTEX normally increases as the yarns become coarser).

2.2 Schlafhorst friction yarns were cNTEX stronger than those spun from BO fibre.

3. Results from LG fibre as against those from BO fibre.

3.1 Rotor yarns were cNTEX stronger than from those spun from BO.

3.2 Schlafhorst friction yarns were cNTEX WEAKER than from BO.

3.2.1 Also, they were dramatically hairier.

3.3 SpinWell yarns were cNTEX stronger than from BO, but with similar hairiness.

3.4 Comments :-

3.4.1 For whatever reasons, the LG quality processed poorly on the Schlafhorst friction box and relatively less well than Rotor on the SpinWell box.

3.4.2 When I was working with Mr. Schenk of Schoeller, we also found some fibre specifications which processed better on Rotor than friction and some which processed MUCH better on friction than Rotor.

(i) To the best of my knowledge, Schoeller Textil always employed a different fibre mix on the MasterSpinner friction spinner than on their rotor machines.

(ii) I believe Leopold's comments as to the larger difference in handle with the MasterSpinner refer to those which processed best on friction compared to those which processed best on Rotor.

(iii) As examples, friction was less susceptible to micro dust, maturity and honeydew than Rotor.

(iv) It is this crucial input from the spinner that is essential to get a new process into the market place.

4. Cotton fibre requirement for friction yarn less restrictive than for rotor yarn.

4.1 Schlafhorst have applied great pressure on the Industry to :-

4.1.1 Grow cotton fibres which are more suitable for rotor spinning than ring spinning.

4.1.2 Change the method of grading to make the fibre which is ideal for rotor less expensive.

4.2 I understand that this strategy has met with limited success.

4.3 However, it is my belief that, across the count range, the fibre requirements for friction are generally less restrictive than for rotor.

4.4 Once friction gets established, I am certain this will prove a very positive feature of the yarn.

5. Blackboard appearance

- 5.1 Compared to the SpinWell yarn, the Rotor blackboard appearance was, in my opinion, very poor.
- 5.1.1 I was surprised that nobody at the meeting seemed interested in how poor the rotor yarns were in appearance.
- 5.1.2 Why bother to make blackboards if they were not to be included as part of the comparison ?
- (i) Surely, if one uses rotor yarn as the standard to judge factors such as strength, regularity and fabric handle, then it is only fair to comment on its negative characteristics.
- 5.1.3 In any case, I would have presumed that having the combination of Schlafhorst's technical department and a high quality spinner, then the comparison with rotor would have been against the "best" rotor yarn that could be produced at the present time.
- (i) Yet the rotor yarns reminded me of those we recently tried to make on your Autocoro machines in Africa.
 - (ii) These yarns were for supply to European knitters and to towel manufacturers in both Africa and Europe.
 - (iii) We employed a new type of navel specifically provided to produce soft handle yarns.
 - (iv) In all instances, the knitters and towel manufacturers totally rejected the samples because of poor blackboard appearance.
- 5.1.4 Because of language difficulty, I was unaware of the comments made by Mr. Tony of Schoellers on this subject.
- 5.1.5 Apart from Leopold, other people seemed to have nothing to say.

6. Fabric Handle

- 6.1 The one thing I do not have access to is automatic twist testing equipment.
- 6.2 In the Schlafhorst report there is clear indication that the measured twist in the SpinWell yarn is higher than in either the Rotor or Schlafhorst friction yarn.
- 6.3 The difference in the samples I sent from the same fibre quality were those spun to produce different twist levels, but how different I do not know.
- 6.4 One of the SpinWell yarns had a quite good handle for a 100% cotton yarn.
- 6.5 One of the Rotor yarns was also quite good.
- 6.6 All the Schlafhorst friction yarns had a harsh handle.

7. Presentation of Results

7.1 Now that I have studied the results I now realize things are somewhat different than presented in the bar charts.

7.1.1 This being because of the different fibre types used for particular yarns.

7.2 The following table, extracted from the Schlafhorst report, gives a clear idea as to the yarns which could reasonably be compared with each other.

7.2.1 For the finer of the two counts I have only been able to compare Belroy using LG with Schlafhorst using BO quality.

7.2.2 In Leopold's letter setting up the trials, he asked for the finer yarn to be from LG.

(i) I obliged, whereas Schlafhorst did not.

(ii) The reason is probably as previously mentioned in section 3.4.1.

7.2.3 The Schlafhorst yarn from IP quality was of no relevance to the trials.

(i) I am sure that neither Schoeller Textil, nor any other spinner would use such a high quality fibre for medium count yarns:

(ii) One of the particular strengths of Schoeller Textil when I worked with them on the MasterSpinner friction yarns, was their ability to find a "cost effective" fibre mix for each product.

(iii) Good enough; but not too good !

Schoeller BO fibre spun to 34 Nm German count									
Box	Tex	Nm	cNTex	Elongation	Thin	Thick	Nep	CV%	Hairs
SpinWell									
SpinWell									
Schla(F4)									
Schla(F4)									
Rotor									
Rotor									

Schoeller LG fibre spun to 30 Nm German count									
Box	Tex	Nm	cNTex	Elongation	Thin	Thick	Nep	CV%	Hairs
SpinWell									
SpinWell									
Schla(F0)									
Schla(F4)									
Rotor									

Schoeller LG fibre spun to 60 Nm German count									
Box	Tex	Nm	cNTex	Elongation	Thin	Thick	Nep	CV%	Hairs
SpinWell									

Schoeller BO fibre spun to 60 Nm German count									
Box	Tex	Nm	cNTex	Elongation	Thin	Thick	Nep	CV%	Hairs
Schla(F4)									

Appendix B

Two Perforated Rollers -v- One Perforated Roller

I consider that using two perforated rollers poses major economic and manufacturing cost disadvantages.

- Unless one is able to operate at extremely high delivery speeds, I have always believed that with two perforated rollers the air flow requirements will be too great for a commercial friction spinning machine for the mass short staple market.
- The cost penalties of having to employ two perforated rollers are :-
 - The box manufacturing cost will be very expensive.
 - The power required to drive the rollers will be high.
 - The box requires a complex unit design.

To use a single perforated roller requires a much more intricate friction spinning technology.

- Based on my own work many years ago, using two perforated rollers rather than with just one, it is dramatically easier, from a friction spinning technology point of view, to produce a yarn.
- Using just one perforated roller, the seemingly insurmountable technological problems of producing a yarn, let alone a good one, are why Dr. Fehrer never believed it to be possible. And I suspect still cannot bring himself to believe that it is.
- However, having overcome the technological problems so that the SpinWell Mark 12 box produces a good yarn, the advantages are substantial and will become even more so as the technology is further refined.

Appendix C

Freezing of the SpinWell at the Mark 12 Box

It would not surprise me if you are confused by Roy referring to the SpinWell's technology as being frozen.

- Particularly, when I had supplied yarns for examination which were clearly non commercial in terms of regularity, thin and thick places.

Irrespective of the problems caused by the fire in the SpinWell's machine room, any knowledgeable yarn technologist would ask the question :

- How could one freeze a design in these circumstances ?

However, the simplicity of the SpinWell design is such that Roy's so called freezing of the Mark 12 box still gives massive scope for making changes to internal key components that affect yarn characteristics, whilst at the same time allowing the go ahead of a full machine design incorporating very simple automation.

- Consequently, there is absolutely no disagreement between Roy and myself on freezing the Mark 12 box design.
- I simply cannot wait for Roy to raise the funds to start producing a range of modified Mark 12 boxes targeted at specific yarns.
- Similar to your Autocoro, and unlike the MasterSpinner, the key will be to allow the spinner to select the optimum internal components for different yarn requirements.
- On the MasterSpinner and most of the early work on the Spinwell, regularity was always as good or better than rotor yarn, and as such I tended to ignore it and concentrate on strength, blackboard appearance (primarily to examine hairiness and neps) and the minimum use of air.

In the short term, I have the objective to refine the Mark 12 box to produce yarns which have all the advantages of both the Schlafhorst and SpinWell friction spun yarns.

- There is no doubt whatsoever that this can be achieved within the confines of the design of the Mark 12 box being frozen.

Belroy had planned to carry on with the SpinWell's development programme until the end of 1995, but stopped work in September 1994.

- I did not want to meet Schlafhorst until the objective of bettering rotor yarn had been achieved.
- But you must now be feeling the same frustration as I do at the lack of funds which are able to be obtained for friction spinning development.

I am well aware that until the Uster regularity of the yarns from SpinWell Mark 12 box matches rotor yarn, we do not have a commercial product.

- I am unable to give a cast iron guarantee that I will ever improve strength.
- However, I will give a cast iron guarantee that the regularity of the yarns from the SpinWell Mark 12 box will be improved up to the level of rotor yarns.

Unfortunately, because of Belroy's financial constraints and my resultant other commitments on consultancy work abroad, this will almost certainly take months rather than weeks.

- Only when this has been achieved, will I then switch attention to optimizing the SpinWell Mark 12 box to produce high quality yarns with a soft handle to pass onto Schoeller or other spinners/knitters for their comments.
- Again I am certain that this can be achieved without any changes to the overall design of the SpinWell Mark 12 box.

As experienced at the 17 January meeting with Schlafhorst & Schoeller Textil :-

- It is always the negative features of a new system which dominate, rather than the positive features.
- And there is no point producing soft handle fabrics with poor yarn regularity.

Appendix D

Areas for possible future discussion between Dr. Brockmanns & Alan Parker

(a) Multi position design.

I would like clarification of what stage you would move to a multi position design.

(b) Fibre alignment.

In earlier correspondence you will see that I believe that the fibre alignment of the SpinWell yarn is better than rotor yarn.

Also, I stated that the difference in yarn strength compared to rotor is not due to fibre alignment.

(c) Looped fibres.

One of your observations was that there were some looped fibres in all the friction yarn which demonstrated that the fibre alignment was not yet good enough.

Unfortunately the meeting drifted away from a meaningful discussion on this critical area.

There will always be looped fibres in any yarn (even combed ring).

However, the crucial factor is how many are tolerable and what causes them.

This is a major point to discuss.

(d) Air usage

Air usage and its implications is also an important area for discussion.

(e) Schlafhorst's lack of awareness of good points of MasterSpinner yarns

It was very apparent that some of the comments of Leopold Schoeller jr. clearly surprised Schlafhorst during the 17 January meeting.

So, I must conclude that Schlafhorst know very little about the positive features of the MasterSpinner yarns which, during the mid 1980s, were being sold by not only Schoeller Textil from their mill less than 20 miles away, but also by other mills around the world.

(f) Box design

Roy told me that you are looking for considerable funds to develop a new box.

→ Therefore, it is clear that you believe you have achieved the best with your latest box.

→ Whereas I have not yet achieved the full potential of our Mark 12 box.

This is another area which I would like clarification as to your reasoning.

Appendix E

Change in Belroy's philosophy of marketing with the advent of the Mark 9 Box

When we started the Spinwell development in 1986, our original target was to overcome all the operational problems experienced with the MasterSpinner's friction spinning technology.

The plan was to match MasterSpinner yarn quality, but to have a box which was simpler, more reliable and, most importantly, could be effectively automated.

- As such we did not see the need for a short length prototype to establish markets for which the yarn was suitable.
- It was considered that the MasterSpinner had already set up a base line market which could be expanded.

Since that time, the technology of ring and rotor spinning has moved on, and even though the earlier SpinWell boxes had many advantages over the MasterSpinner, the Mark 9 boxes onwards are even better.

Most importantly, the Mark 12 box has the potential of eventually matching rotor in all respects and bettering it in key areas.

- We therefore need to treat the SpinWell as a new technology.

I am totally convinced that it is only once sufficient yarn can be produced to be able to get practical information from the weavers/knitters, who the spinner is supplying, that the potential of a new system can be established.

- Inevitably this requires a short length machine to establish suitable markets for the yarn.
- In my previously close association with Mr. Schenk of Schoeller I was tremendously impressed by how effectively this difficult task was performed.
- To my mind, this is the absolutely crucial contribution that Schoeller could provide again.
- Without sufficient yarn to supply for further processing, I believe a spinner has little to contribute to establishing a new process.

Appendix F

What should the initial targeted yarn market be ?

In September 1994, we carried out yarn trials with Courtaulds at their Swan Lane Spinning Mill in Bolton.

- The SpinWell Mark 12 box produced yarn from Courtauld's polyester/cotton fibre which was knitted into small fabric samples.
- A comparison was made with fabric from Courtauld's Autocoro yarns from the same fibre.
- The appearance and cover of the fabric from the SpinWell yarns was very good and enthusiastically received by Courtaulds.
- This was when Roy decided he had spent enough money, and the SpinWell Mark 12 box became frozen.
- We saw that with the SpinWell Mark 12 box we had a product capable of commercialisation.
- Consequently, the supply of yarns for knitting became the main thrust of our marketing objectives.
- As a simple policy for financiers not knowledgeable on textiles, this was, and still is, a simple easy to understand policy to adopt.

Anybody who understands the textile industry is aware however that it is a complex industry dominated by fashion trends.

- The Repco machine is a prime example of the machinery maker introducing a machine for one type of yarn and the industry finding it was in fact ideally suitable for another.

If, on the MasterSpinner, the concept of using customers to find markets for the yarn had been restricted to only one or two customers I believe it would have been an excellent way to introduce a new technology.

- However, machines were supplied to a wide range of potential customers to try and develop markets for the yarns produced.
- Additionally, the complexity of the box design prevented it being optimized to meet the specific requirements of these individual customers.
- I have set out in a separate report, but not included herewith, the wide range of yarns for which the Spinwell has the potential to be successful.

Without a multi position spinning machine able to produce commercial quantities of yarn, it is impossible to move beyond making small knitted samples of fabric.

- For example, to make a yarn for towels needs 10s if not 100s of kilos of yarn.