

**A business opportunity for an  
initial turnover of between  
100-150 million Deutschemarks  
(£40-60m) per annum**

**Preliminary Report  
for**

**Dr. Brockmanns**

W. Schlafhorst AG & Co.  
Postfach 10 04 35  
D-41004 Monchengladbach  
Germany

**from**

**Alan Parker**

Belroy  
186-194, Green Lane  
Bolton BL3 2LX  
United Kingdom

**20th October 1994**

## INTRODUCTION

At Belroy we consider the present stage of the SpinWell's technological development is such that a machine incorporating its current technology would achieve sales which are complementary to, rather than compete directly with, Schlafhorst's Autocoro.

However, there would be no advantage to Belroy in me providing more detailed information, including fabric samples, to amplify the points made in this preliminary report, unless Schlafhorst's business plans can accommodate the concept of selling friction machines at a level less than, but complementary to, rotor sales.

Our view that a substantial business is waiting to be earned from friction spinning is currently only shared by the few textile people who gained first hand experience of working with the MasterSpinner's friction spinning technology. Like myself, they were able to see the sales potential of its yarns. Unfortunately, and for some inexplicable reason, the detail operational problems of the MasterSpinner seem to be thought of by MOST people as fundamental to friction spinning technology, rather than problems of that particular machine, but we remain convinced that the machine builders will eventually come round to our view.

If the next friction machine to enter the staple yarn market is non-SpinWell based, we are well positioned to offer the competition a ready made alternative technology.

As Schlafhorst is still Belroy's first choice to produce a machine based upon the SpinWell, we hope that your business plans can accommodate the concept of initially selling friction machines at a target level of between 100 to 150 million Deutschmarks (£40-60 million) per annum, and which turnover we would anticipate being additional to your rotor sales. As such, we have not yet approached any other machine builder with our present plans.

Fortunately from my point of view, with textile engineering not being Belroy's core business, then if we are unable to attract a suitable joint venture partner for our present plans, the company can put the SpinWell's technology "on ice" and utilise my talents in other areas whilst we wait to reap the financial benefits for all the time, effort and money we have expended on the SpinWell's development since early 1986.

## START POINT FOR BELROY

The start point in 1986 for the development of both the SpinWell's friction spinning technology and the engineering design of the spin-box was the positive and negative features of the MasterSpinner. I thought it would be useful to give you my interpretation of this start point to enable you to compare them with your own understanding of the situation.

## SOFTER FEEL THAN ROTOR

In the early days of development, of what later became known as the MasterSpinner, it was apparent that the MasterSpinner technology could produce yarns with a softer feel than rotor. This was in complete contrast to the surface of DREF friction spun yarns. The DREF machines are associated with fabrics having a very harsh feel. Friction spinning as a technology does not therefore FUNDAMENTALLY PRODUCE a yarn with a soft handle. This was a feature of the technology which we had developed at Platt Saco Lowell.

Without this technological advantage, friction spinning would have to rely solely on its potential for higher speed to enable it to compete with the already established rotor spinning technology. A key objective of the SpinWell has been to expand the marketable advantages that fabrics from friction spun yarn can offer to complement the potential for higher throughput speed.

## **STRATEGY BEHIND THE MASTERSPINNER SPINTESTER PROGRAMME**

Yarns produced on the MasterSpinner were significantly weaker than could be produced on rotor machines.

Knitting yarns represent about 40% and weaving 60% of all yarns. Because of the experiences on the Repco Self Twist Spinner, in which a radically different yarn structure, with a strength of only about 40% of ring spun yarn was successfully marketed, it was known at Platt Saco Lowell that strength was not crucial for knitting yarns.

It was also well known that the exact strength needed for any particular application depended on many things and could only be established by commercial trials. There were many weaving applications as for example velvet, corduroy, and the plush in towels plus many other weft applications in which either surface appearance or yarn "bursting characteristics", rather than strength, was the crucial yarn parameter.

Additionally, the strength and elongation of 100% synthetic yarns is so much higher than cotton yarns that there were some woven fabrics, including warp yarns, for which the aesthetic appeal of friction yarns was considered to be a marketable feature to counter its lower yarn strength.

Consequently, a policy decision was taken by the UK operation of Platt Saco Lowell to try to replicate the success of the Repco on the much larger market for short staple yarns by establishing markets for which the yarn was suitable, rather than be put off because the yarn was weaker than either ring or rotor yarn.

As a consequence of this past success with Repco, the strategy of marketing the MasterSpinner was similar to that adopted for Repco in that interested companies were required to purchase, rather than be supplied free of charge, 10 position spintesters and no exceptions were made. These companies were then able to produce sufficient yarn for their knitting and weaving customers to sample the yarns. The mills customers could then decide if the yarns were strong enough and also whether the fabrics were marketable for their particular application.

In this way, only customers seriously interested in purchasing full length machines were likely to be involved in the Spintester programme. However, they only had to risk a relatively small amount of money to be able to spin enough yarn on their own premises, and under their own control, to establish whether they could establish a market for the yarn produced on the MasterSpinner.

At the strength level achieved with the MasterSpinner, there was great interest in the machine. If the position to position uniformity, engineering performance and automation had worked satisfactorily, then a business worth between 100 and 150 million Deutschemarks (£40-60 million) per annum would, without any question, have resulted.

The original purpose of the the SpinWell's friction spinning technology, and also the engineering design of the spin-box, was to prevent a machine incorporating the SpinWell failing for any of these reasons. Clearly, if friction yarn strength achieves parity with rotor spinning the increased speed potential of friction spinning will enable it to supersede rotor spinning as the major competitor to ring spinning.

## **CUSTOMERS LIKED THE FABRICS PRODUCED FROM MASTERSPINNER YARN**

The purchasers of the full length MasterSpinners had already established markets for the yarns from their work on the 10 position Spintesters. Most spinners had potential markets far in excess of what they could supply on the machines they purchased.

Almost without exception the purchasers of the friction yarn liked the fabric it produced. Unlike rotor yarn, which is still frequently sold at a discount price in relation to ring, the yarn spinners frequently got a premium for friction spun yarn.

## **OVER 3 MILLION KG. OF YARN PRODUCED ON MASTERSPINNERS**

At a conservative estimate, over 3 million Kg. (3,000 tonnes) of yarn from the 30 full length MasterSpinners went into commercial fabrics. Although this is tiny in relation to the world consumption of yarn, it is a significant amount of cloth. I give a brief explanation below as to the problems experienced by the spinners in commercially producing this quantity of yarn on the MasterSpinner.

## **POSITION TO POSITION VARIABILITY**

My brother in his note of the 17 September 1994 mentions the operational difficulties and position to position variability of the MasterSpinner.

It was not until we had full length machines operating that the scale of the position to position variability on the MasterSpinner became apparent.

The problem was so fundamental that I could see no solution without a complete re- design of the spin-box. It was kept under control for a number of years by having Platt Saco Lowell technicians, either permanently on site, or instantly available to visit those mills with full length machines.

## **COMPLAINTS BY KNITTERS ABOUT MASTERSPINNER YARN**

There were complaints by the knitters about the yarn. These fell into four categories

- There was a greater incidence of dye bars in critical colour plain fabrics produced on multi end knitting machines. This was established as a position to position problem.
- Complaints about yarn weakness were always found to be associated with extremely weak yarn packages. These were found to be due to a deterioration in performance caused by fly build up during round the clock operation.
- Unwinding difficulties due to yarns snagging caused problems at knitting. This was a feature of the yarn and is an area I believe I have resolved on the SpinWell.
- Those customers who did not re-wind the yarn had too many piecings that showed up as faults. This is a fundamental problem of manual piecing and why Schlafhorst have sold so many Autocoro machines.

## **AUTOMATION**

### **Rotor Spinning Machines**

I am certain that Schlafhorst gained their dominating position in rotor spinning because your automation worked in a commercial environment whereas that of Rieter, Schubert & Salzer, Platt Saco Lowell, Savio and the B.D. machines did not. In particular, the quality of the Autocoro's piecings was such that yarn could be used directly off the machine and classed as fault free.

### **MasterSpinner Automation**

The fundamental weakness of the MasterSpinner was its automation. By the time I left Platt Saco Lowell, I was 100% convinced it would not work in a commercial environment. The failure to achieve the level of automatic piecing performance and piecing quality, established as the norm by the Autocoro, was the reason why the MasterSpinner was withdrawn from sale.

## **MOST BLAME TECHNOLOGY NOT MACHINE**

I remain convinced that the marketing strategy adopted for the MasterSpinner served its purpose in that it established friction spinning as a viable spinning system for short staple yarns. Applying the lessons learned from the full length MasterSpinner machines operating in a commercial environment will transfer the technology into a commercial process.

It has always surprised me that MOST otherwise knowledgeable textile machine engineers have referred to the MasterSpinner's problems as problems inherent in the fundamental technology of friction spinning.

All the problems are clearly resolvable, but demand :-

- A machine builder with the engineering capability to manufacture mass production components to precise engineering standards and build a reliable automated machine producing good quality piecings
- A spin-box of adequate friction spinning technology to compete successfully in the staple yarn market and such a spin-box having a well thought out engineering design.

## SPINWELL

### FIRST STAGE TECHNOLOGY - MARK 1 to 8 PROTOTYPES

In our first stage of development we retained the basic concept of the MasterSpinner's friction spinning technology. However, the new spin-box incorporated a completely new engineering design to enable the 10 or so parameters that determine the twist and structure of a friction spun yarn to be set to closely defined limits.

As part of this new design we separated the elements for piecing away from the spin-box. This resulted in a piecing concept which would be much easier than a rotor spin-box to automate and produce piecings as good as the Autocoro.

Initially the yarns I was producing on the SpinWell exhibited similar snagging problems to those experienced with the MasterSpinner. It was almost by accident that I discovered a way to overcome this problem.

I was always aware that the snagging was an important negative feature of friction spun yarn and was particularly pleased to find a solution to this problem.

### SECOND STAGE TECHNOLOGY - MARK 9 to 12 PROTOTYPES

Unfortunately, to overcome the snagging problem meant that I had to completely re-design the spin-box. At the time, Belroy could not afford to carry out the necessary development work to produce the SpinWell Mark 9 prototype. As a consequence, the project was put into abeyance whilst I was assigned, for just under two years, to do consultancy work for a company in Scotland who manufacture special carbon fibre products .

During the second half of 1993 the development of the SpinWell Mark 9 Prototype was started. I have had to work to a very tight budget and have experienced delays due to always having to employ outside companies to manufacture prototype components for the Marks 9-12 prototypes. As a consequence I have made less progress in raising the strength of the yarn than I had hoped.

However I have made very significant progress in other areas.

- I now know for certain that I am achieving a fibre alignment that is better than on the MasterSpinner and significantly better than rotor spun yarn. I feel confident in saying that the fibre alignment is as good as one is ever likely to get from an open end system. Consequently any increase in yarn strength will not come in this area.

I believe further increases in strength can be achieved from a modification to the structure of the yarn.

- By changing certain of the SpinWell's components, I am able to adjust the surface and yarn structural characteristics to meet different fabric requirements and thus widen the appeal of the SpinWell yarn. This is the area I propose to concentrate on for the next few months. However, it is too large a development area for Belroy to undertake properly with our limited resources.

The engineering design of the SpinWell spin-box has always been very different from the MasterSpinner. The changes incorporated in what is now the Mark 12 SpinWell spin-box have now taken the technology far beyond that achieved with the MasterSpinner.

## TO MARKET THE SPINWELL

It is my belief that Jet spun yarns and the higher speed rotor machines with small rotors are producing yarns which are moving closer to having performance characteristics and, when knitted, clearly defined stitch clarity to compete with textured continuous filament products. However, this is at the expense of having fabric characteristics which are looking less and less like staple products.

There is a substantial market for these type of high performance aesthetically unattractive products and by special finishing techniques some of the fundamental deficiencies of the staple yarn structure can be amended. However, there remains an **EVEN MORE** substantial market for yarns having the characteristic aesthetic appeal associated with staple yarns. It is quite clearly in the commercial interests of Schlafhorst to promote these high performance characteristics rather than the aesthetic appeal associated with ring spun yarns.

The two features that distinguish the SpinWell yarn at its present level of performance from rotor yarn are :-

- Those fabrics in which the soft handle is a requirement, or a marketable advantage.
- The present yarn structure, although having well aligned fibres, produces yarns which are bulkier than achieved with the MasterSpinner and significantly more bulky than rotor yarns. This occurs **EVEN** when the surface of the yarn is more highly twisted and therefore can have a greater abrasion resistance than rotor yarns.

It is those potential customers who value these particular characteristics highly who will be the ones that should be initially targeted. They are the ones who are unlikely to have purchased rotor spinning machines or who will be seeking to replace existing rotor machines with a technology which offers them something better.

During the next few months I will be seeking, with the help of Courtaulds, to produce fabric samples exhibiting a range of different surface characteristics.

## **SCHLAFHORST NO INTEREST UNLESS YARN AS STRONG AS ROTOR**

On our visit to Schlafhorst several years ago I came away with the clear impression that if friction spun yarn strength could not match that of rotor yarn Schlafhorst would not be interested in introducing a commercial friction spinning machine. I saw very little advantage therefore in further discussion with Schlafhorst until I achieved this standard on the SpinWell.

## **SCHLAFHORST ONLY WANTED MASSIVE VOLUME PRODUCTS**

I concluded during our visit that a business of 100 to 150 million Deutschemarks (£40-60 million) per annum, although large to most textile machinery makers, did not fit in with the Schlafhorst concept of highly automated mass production of a limited number of products. This factor was highlighted during our tour of the factory when I got the distinct impression that even having two different versions of the Autoconer was a nuisance.

My brother believes that Schlafhorst will no longer have this attitude and it is for this reason that I have prepared this preliminary report.