AN EVALUATION OF BURCKHARDT ROTOR
COMPONENTS

The trend today is for textile mills which produce
yarn by open-end spinning to use smaller diameter
rotors in the production of those yarns. Smaller rotors
can be run at higher speeds, increasing productivity
and decreasing the mills' costs. The International
Center for Textile Research and Development recently
conducted a study comparing Burckhardt-manu-
factured small diameter rotors and twist traps with ro-
tor components produced by Schlafhorst in an at-
tempt to identify the benefits, if any, in rotor-spinning
performance and yarn properties obtained by the use
of smaller rotors. In this issue of Textile Topics we are
presenting a summary of that study.

Knitting yarns size Ne 30/1 with a range of twist
levels from 3.20 to 4.04 were spun using Schlafhorst
torque stops, Burckhardt twist traps and rotors manu-
factured by both companies, in various component
combinations. The components were used with and
without a 1.5 mm washer beneath the navel. Use of
the washer lifts the navel toward the [face of] the rotor
to increase twist in the yarn as it exits the rotor
through the torque stop or twist trap.

The various components, and the combination in
which they were used, had an effect on the success-
ful production of the yarns. Rotor component combi-
nations were run at rotor speeds ranging from
100,000 to 130,000 rpm. However, only the Burck-
hardt rotor in combination with the torque stop or
the twist trap could be run at 120,000 and 130,000 rpm; the Schlafhorst rotors could not be run at the higher speeds due to a speed limitation of 110,000 rpm.

The best component combination when spin-
n ing at 100,000 and 110,000 rpm was the Schlaf-
horst T231D rotor with the Burckhardt twist trap
(Figure 1). This rotor was more successful in spin-
n ing Ne 30/1 yarn than either the Schlafhorst
G231D or the Burckhardt BA 29.5 YG, due to the
geometry of each rotor. The Schlafhorst T231D
and G231D rotors are the same diameter size but
there are differences in the surface shape of the
grooves. The T231D rotor has a tight T-shaped
angle, whereas the G231 D has a more curved
G-shaped angle. With the T231D rotor, less contami-
nation collected in the groove to cause yarn breaks,
resulting in a low break rate and good yarn strength
when spinning at 110,000 rpm with this rotor. The
break rate increased dramatically and yarn strength
decreased when spinning with a Schlafhorst G231D
or a Burckhardt BA 29.5 YG rotor. The Burckhardt
29.5 YG is a smaller rotor size with a groove shape
similar to the Schlafhorst G231D (curved G-shaped
angle). The curved groove allowed for more contami-
nation to be collected, causing an increase in yarn
breaks.

As mentioned previously, only the Burckhardt rotor
would permit spinning at speeds above 110,000 rpm.
The higher rotor speeds influenced both the number
of breaks occurring and the yarn strength (the higher
the rotor speed, the fewer yarn breaks occurred). Ta-
ble I on the next page shows that when spinning at
110,000 rpm there were an excessive number of yarn
breaks, although yarn strength was relatively good.
As the rotor speed increased from 110,000 to
130,000 rpm, break rate dropped dramatically with,
however, a decrease in yarn strength.

At 130,000 rpm the Burckhardt BA 29.5 YG rotor

![Figure 1: Break Rate Against Twist Multiplier (Schlafhorst rotors)](image)
and the Schlaflhorst torque stop exhibited the most constancy. Break rate and yarn strength remained constant with increased twist multipliers. At this speed the break rate was excessively high when using the Burckhardt twist trap (Figure 2).

The Schlaflhorst torque stop and Burckhardt twist trap were used interchangeably with Schlaflhorst and Burckhardt rotors. Overall, the Burckhardt twist trap showed the best performance at all rotor speeds except 130,000 rpm, where the Schlaflhorst torque stop showed the best results. The shape of the Burckhardt twist trap, which is slightly curved, allowed for a more smooth and even path for the yarn en-route to the package as it exited the rotor.

We extend sincere thanks to Burckhardt America for the loan of the rotor components used in this study. This project was sponsored by the Texas Food and Fibers Commission. The report was written by Cay Amason and edited for Textile Topics by Harriet Boone. A copy of the complete report may be requested by contacting us at the address given on the back page of Topics.

### TABLE I: ROTOR SPINNING TRIAL RESULTS (Burckhardt BA 29.5 YG rotor)

<table>
<thead>
<tr>
<th>Rotor Type</th>
<th>Burckhardt 29.5 YG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor Speed (rpm)</td>
<td>110,000</td>
</tr>
<tr>
<td>Distance Piece:</td>
<td>None</td>
</tr>
</tbody>
</table>

**SILVER**

<table>
<thead>
<tr>
<th>Machine</th>
<th>Schlaflhorst Autocore SE 9</th>
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</thead>
<tbody>
<tr>
<td>Nominal Yarn Number (Ne)</td>
<td>30/1</td>
</tr>
<tr>
<td>Rotor Type</td>
<td>29.5 YG</td>
</tr>
<tr>
<td>Rotor Speed (rpm)</td>
<td>110,000</td>
</tr>
<tr>
<td>Opening Roller Type</td>
<td>B174 DN</td>
</tr>
<tr>
<td>Opening Roller Speed (rpm)</td>
<td>7500</td>
</tr>
<tr>
<td>Draft</td>
<td>189.7</td>
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<tr>
<td>Twist Multiplier (ome)</td>
<td>4.04</td>
</tr>
<tr>
<td>Yarn Speed (yd/min)</td>
<td>136.0</td>
</tr>
<tr>
<td>Navel</td>
<td>KN 4 = 0 + TT</td>
</tr>
<tr>
<td>Ambient Conditions</td>
<td>72°F/65% RH</td>
</tr>
<tr>
<td>Test Duration (Rotor hours)</td>
<td>22.83</td>
</tr>
</tbody>
</table>

### YARN PROPERTIES

**Tensile Test:**
- Yarn Number (Ne): 30.12 | 29.99 | 29.86
- CV% of Count: 0.89 | 0.91 | 0.63
- Count-Strength Product: 2136 | 2103 | 2068
- CV% of CSP: 4.0 | 5.0 | 5.6

**Single Yarn Tensile Test:**
- Tenacity (g/tex): 14.62 | 13.32 | 13.06
- Mean Strength (g): 274.7 | 262.6 | 258.1
- Elongation (%): 7.74 | 10.41 | 9.62
- CV% of Elongation: 4.56 | 4.39 | 4.13
- Spec. Work/Rupture (g/tex): 0.347 | 0.305 | 0.287
- CV% of Work of Rupture: 14.49 | 16.18 | 16.16
- Initial Modulus (g/tex): 271 | 209 | 320

**User Evenness Test:**
- Non-Uniformity (CV%): 16.11 | 15.45 | 17.09
- Thin Places/1,000 yds: 103 | 126 | 183
- Thick Places/1,000 yds: 117 | 165 | 270
- Nees/1,000 yds: 366 | 547 | 779
- ASTM Yarn Grade: B+ | B+ | B

### PERFORMANCE

| Number of Breaks | 75 | 18 | 6 |
| Break Rate/1,000 rotor hrs. | 3417 | 864 | 311 |

**FIGURE 2: BREAK RATE AGAINST TWIST MULTIPLIER (Burckhardt rotors)**

**TEXTAS TECH GRAD JOINS COTTON INCORPORATED**

Texas Tech University textile engineering graduate Mike Rodriguez has been appointed to the new position of Manager of International Marketing for Cotton Incorporated in Raleigh, North Carolina. He will report to Dean B. Turner, vice president, International Marketing in New York.

Rodriguez will be responsible for Cotton Incorporated activities in Mexico and the rest of Latin America as they develop. In addition, he will be involved in all other international activities and follow-up as needed related to technical issues.

He has extensive fiber and yarn processing experience, having worked at Schlaflhorst Inc., WestPoint Pepperell, Lorenzo Textiles and here at the International Center for Textile Research and Development.

We congratulate Mike Rodriguez as he assumes his duties with Cotton Incorporated.
IMPROVEMENT IN COTTON STRENGTH ON THE TEXAS HIGH PLAINS

The Texas A&M University Experiment Station at Lubbock, Texas, began the Plains Cotton Improvement Program in 1983. This program is designed to meet the needs of cotton producers on the Texas High Plains by improving and developing new strains of cotton for this region. One aspect of this program is increased emphasis on fiber strength. Due to the limited growing season here, and competition with other cotton-producing regions in the U.S., where the fiber has generally higher strength, improvements in new cotton varieties were urgently needed.

Improvement in the fiber strength of High Plains cotton is evident in the USDA’s Cotton Quality Reports for the last twelve years. HVI testing performed on these cotton crops shows a continual increase in fiber strength. As shown in the graph, there have been years when the High Plains cotton strength decreased slightly, due to growing conditions, but the overall trend is for high strength.

Emphasis on cotton fiber strength is promoting the use of HVI technology among all aspects of the textile industry – cotton breeders, producers, merchants and textile mills. Increased usage of open-end (rotor) spinning equipment has influenced the use of HVI systems in the mills. The most important fiber quality in open-end spinning of high-quality yarns is strength. By use of High Volume Instruments, textile mills can ensure more uniform laydowns that result in consistently better yarns.

High Volume Instrument (HVI) testing is a cotton classification system used worldwide that is capable of testing the major fiber properties (length, length uniformity, strength, elongation, micronaire, trash and color) in large volumes at a high rate of speed with excellent and efficient results. The complete classing of cotton using the HVI system was begun at the USDA classing facility in Lamesa, Texas, in 1980. That year, 306,000 bales of cotton were classed by HVI. Today the entire U.S. cotton crop is classed on the HVI system, with premiums being paid on fiber strength.

NATURAL FIBER TEXTILE PLANT

Herb Wright of Wright Fibers Inc. and Moore Development of Big Spring Inc. have announced plans to open a natural fiber textile plant in Big Spring, Texas, in the near future. Some of the procedures developed at the International Center for Textile Research and Development will be used at the plant.

Among these will be a cleaning process for retrieving cotton lint left in cotton-ginning waste. These fibers will be used for making 100% cotton bale bags. Cotton bale bags are cleaner than the polypropylene bags used today, and could reduce cotton-cleaning costs. With cotton bales wrapped in cotton, the amount of damage to machinery and contamination to fiber if parts of the bag were to be accidentally shredded would be minimized.

With demand for natural fibers increasing, Wright Fibers also will be knitting all-cotton and cotton/wool blend fabrics for pants and skirts. The cotton/wool blend known as TEXCELLANA was developed at the Texas Tech University International Center for Textile Research and Development and at present is not widely marketed.

We wish Wright Fibers Inc. and Moore Development for Big Spring Inc. much success in this venture.
VISITORS

Visitors to the Center during March included Mark Hampton and Don Compton, Mission Valley Mill, New Braunfels, TX; Barbara Shaeffer, Motion Control Inc., Dallas, TX; Carlos E. Baresh and Leonardo Duarte, Protela, Bogota, Colombia; Herb Wright, Wright Fibers Inc., Decatur, TX; Virginia Belew, Lydia Rey, Chris Churchwell, Charla Lewis, Danette Toome and Esther Lopez, Big Spring, TX; and Tom Stanton, Midland, TX.

Groups coming for tours of the Center included 35 students from the Agricultural Economics Department at Texas Tech University; 55 students from Lamesa High School, Lamesa, TX; and 32 from Plains High School, Plains, TX.