

**Weaving and Weaving Preparation at ITMA '03**

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ABSTRACT

This paper extensively reviews the advances in weaving and weaving preparation at ITMA 2003. Whenever appropriate a technical background and/or critical comments are provided. ITMA 2003 has brought to weavers major technological advances that will help weavers to fully control their machines electronically from user friendly interfaces, produce broad range of woven fabrics, manufacture intricate jacquard designs at the speed of commodity fabrics, form leno fabrics faster, inspect fabrics on-loom, use optical and laser detection of warp break, reduce down time due to higher level of automation and quick style and warp beam change.

Key words: ITMA, Weaving, Automation, Leno Mechanism, On-Loom Inspection

INTRODUCTION

At the 14th ITMA show, weaving and weaving preparation equipment occupied a significant share of the number of halls at the National Exhibition Center (NEC) in Birmingham, UK despite the absence of major machine manufacturers. Prior to the show, the attitude toward holding the show in UK for the first time in its history was negative due to the low expectation of participation. Machine makers, however, have been overwhelmed by the success of ITMA' 2003 in terms of attendance and multimillion dollar sales contracts. Examples of sales contracts are: (1) Picanol contracted with 8 March Textile Company of Vietnam to deliver 150 machines, (2) Promatech sold 60 Mythos Tec air jet machines that was unveiled at this ITMA to Brazil's Textil Canatiba, a denim fabric producer, (3) Promatech will also supply

180 machines (mainly Alpha rapier and 18 new Myth Tec air jet machines) to Taiwan's Nien Hsing Textile, another denim producer, (4) Sultex (formerly Sulzer Textil) received a major order for 412 projectile weaving machines from Italy's Tessival SpA. The success of weaving and weaving preparation machine makers at ITMA' 2003 may be attributed to the realized advances that provide weavers with low power consumption, flexibility and versatility while weaving at high speed.

This report reviews new development in weaving and weaving preparation at ITMA' 2003. Technical background is provided whenever appropriate. The review follows the flow chart of processes from package winding to weaving.

WINDING

Muratec showed their No.21C winder. The new features of the winder include: (1) new

antipatterning mechanism, Pac21, (2) Air type yarn hairiness reduction system, Perla-A, and (3) Disc type yarn hairiness reduction system, Perla-D.

Perla-A (Figure 1) uses a compressed air to false twist the yarn a matter that causes yarn hair to wrap around the yarn body. Perla-D (Figure 2) uses discs that are derived by servo motor to false twist the yarn. The winding speed of Perla-A could reach 1,800 m/min, while the winding speed of Perla-D could be up to 1,200 m/min. Comparison between hairiness of yarn from spinning bobbin, yarn wound on conventional winder, and yarns wound using Perla-A and Perla-D is shown in Figure 3. Experimental study by

Muratec showed that yarns produced using No.21C winder have the following advantages over yarns produced using conventional winders:

High productivity in warping and sizing processes

Improved weaving efficiency in air jet weaving due to less warp clinging caused by hairiness

Reduced size agent consumption that leads to lower sizing and desizing cost

Reduce fly generation especially in knitting process

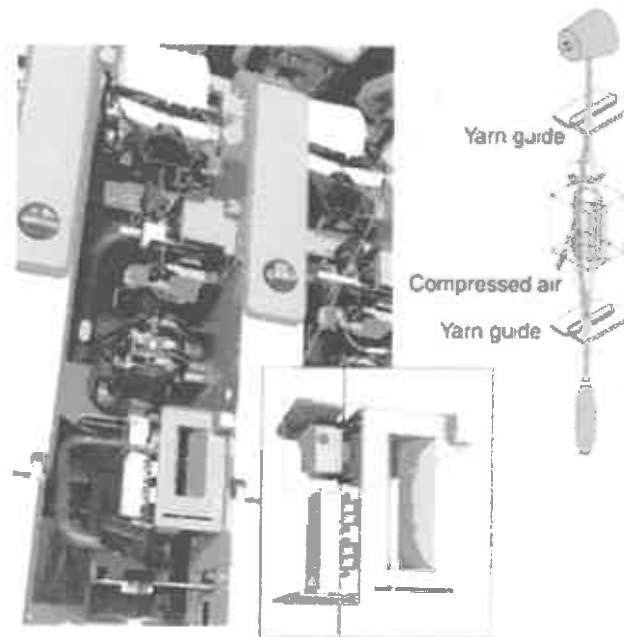


Figure 1 Hairiness reduction by air – Perla-A

Patterning is known to take place in friction (drum) winding at critical package diameters when the wind (the number of revolutions or yarn coils made by the package during the time taken for the yarn to traverse in one direction across the package) is a simple number. The new Pac21 antipatterning mechanism prevents/reduces patterning by using drum with multigrooves (for example,

a drum with two grooves, one with 2 revolutions and the other with 2.5, see Figure 4). The Pac21 monitors the critical parameters that causes patterning and switches the yarn from groove to another to avoid patterning. Wound packages produced using Pac21 system can be unwound at higher speed as compared to those wound using conventional winders.

The No.21C winder is designed to accommodate different yarn joining techniques. A splicer can be easily and quickly removed and replaced by simple

release and lock system. The options of yarn joining include knotting, water splicing, and air splicing.

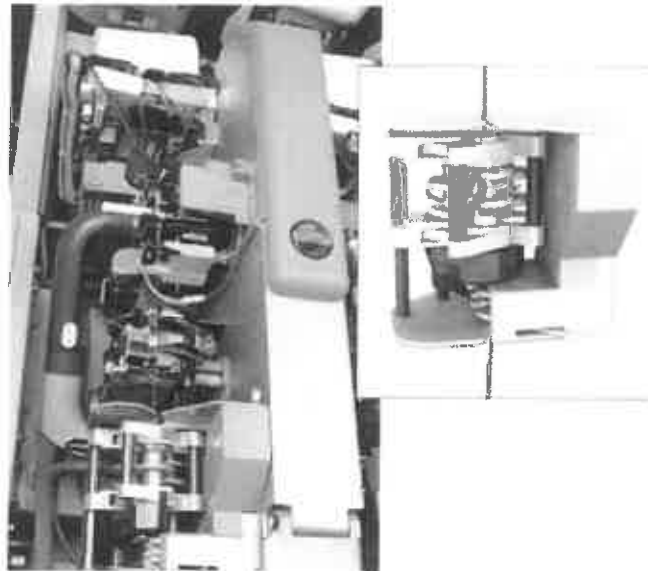


Figure 2 Hairiness reduction by friction discs – Perla-D

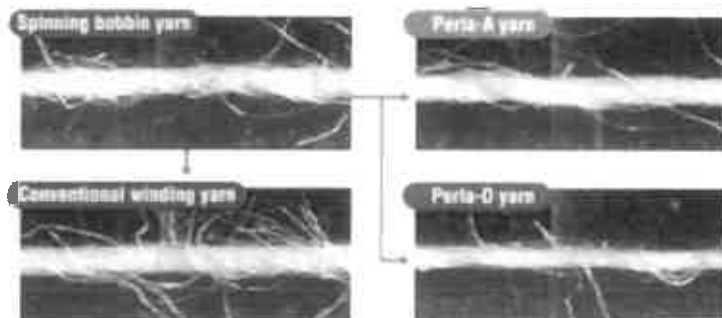


Figure 3 Comparison of yarn hairiness of different systems



Figure 4 Multigrooves drum

WARPING

Sectional Warping

Benninger and Karl Mayer showed their impressive automatic section warpers, the BEN-MATIC and Rob-o-matic ROB. Their warpers were observed in action by significant number of attendees. The Benninger's BEN-MATIC was unveiled at ITMA' 2003. While the Karl Mayer's ROB was shown for the first time at this ITMA, it was shown previously at ATME-I' 2001.

The BEN-MATIC performs the following steps automatically with no intervention from the operator:

The new band is firmly attached to the pattern drum by adhesive foil tape, which is automatically attached to the band (Figure 5)

Using two conventional lease reeds, the band is split to two sheets to form a shed

To obtain clear separation between the two sheets (clear shed), a split arm is inserted between the two sheets to overcome clinging due to yarn hairiness (Figure 6)

The lease insertion system (insertion arm, knotter, lease thread feeder, air system) inserts lease threads (as many as required) in a loop form through the shed (Figures 7 a,b)

Adhesive tape is attached to the band, band cutting is performed, and end of band is attached to the pattern drum.

The final leasing (Figure 8) and setting for beaming require the operator intervention.

Figure 5 Adhesive foil tape

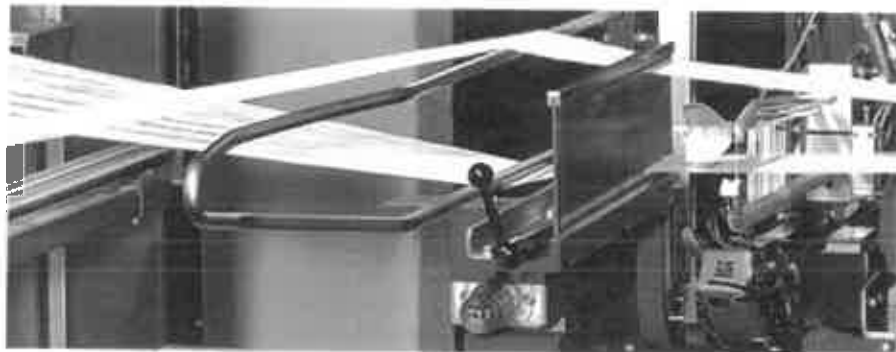
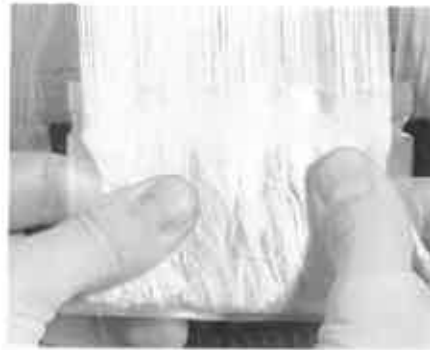


Figure 6 Clear shed by split arm

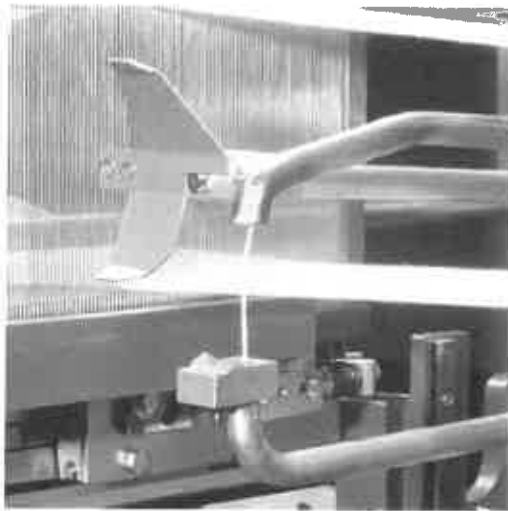


Figure 7-a Lease arm and lease thread

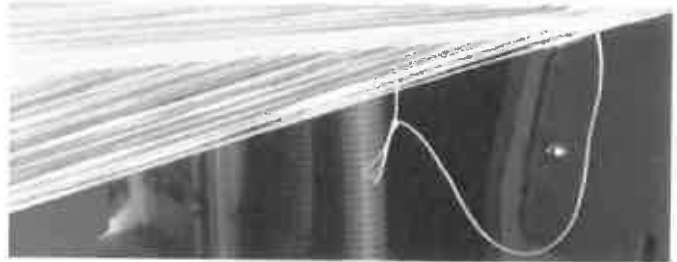


Figure 7-b Lease thread in loop form



Figure 8 Final leasing

In case of Karl Mayer's ROB, the formation of shed is achieved by harnesses similar to those used in weaving. The insertion of lease bars is achieved by a pneumatically operated

gripper (Figure 9). The bands are cut after warping is completed. The cutting and beaming require the operator intervention.

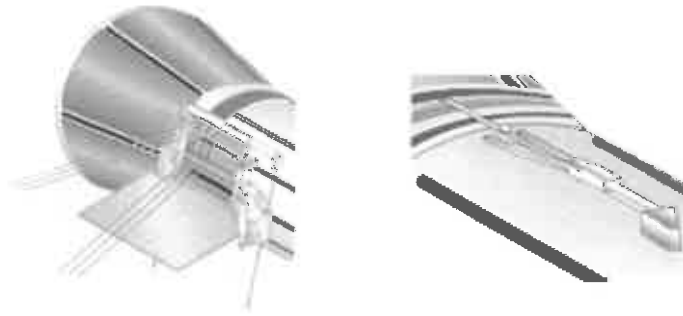


Figure 9 Shed open (left), lease bar and gripper (right)

Integration of Warp-Draw and False Twist Texturing

Karl Mayer showed a new direct warper that integrates warp draw and false twist texturing. While the warper is designed to handle a maximum of 700 warp yarns, a demonstration system handling few yarns was shown at this ITMA. A schematic of the

warper is shown in Figure 10. It was observed that threading of the yarns through different components was cumbersome a matter which may cause extremely low warping efficiency. To be accepted commercially, the system must be more economical than separate draw texturing and warping processes.

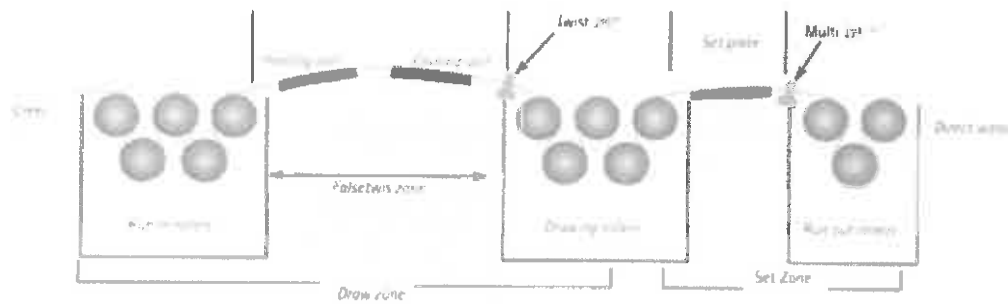


Figure 10 Schematic of warp draw/false twist texturing warper

SIZING

Benninger unveiled a new development in pre-wet sizing, the TKV pre-wet/size box. The TKV includes a pre-wetting bath and

size box (Figure 11). The system is flexible in that the pre-wetting bath can be used as a second size box in case of treating warps that do not need pre-wetting.

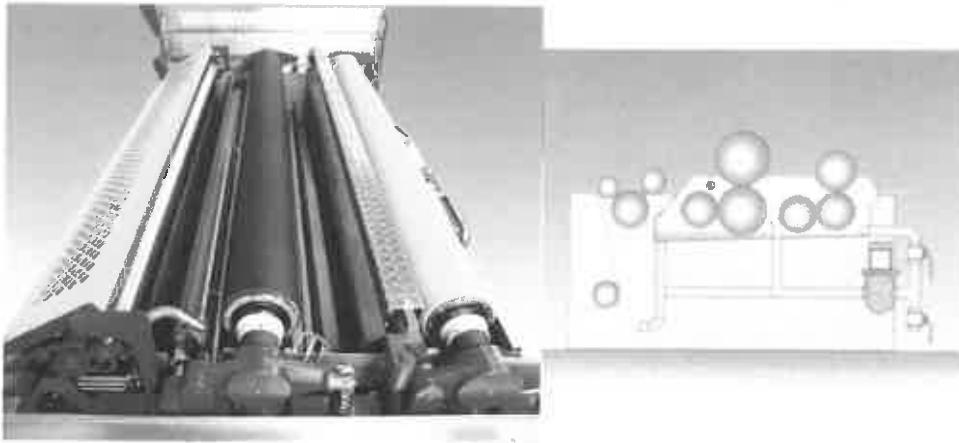


Figure 11 Benninger's TKV pre-wet size box

Karl Mayer showed a new pre-wet sizing system, type MPCPW. The system consists of a pre-wetting tank with double squeeze, at entry and in exiting (Figure 12), and double

dip size box. The system is designed with a short distance between the pre-wet and size boxes to prevent the warp yarns from kinking and cooling.

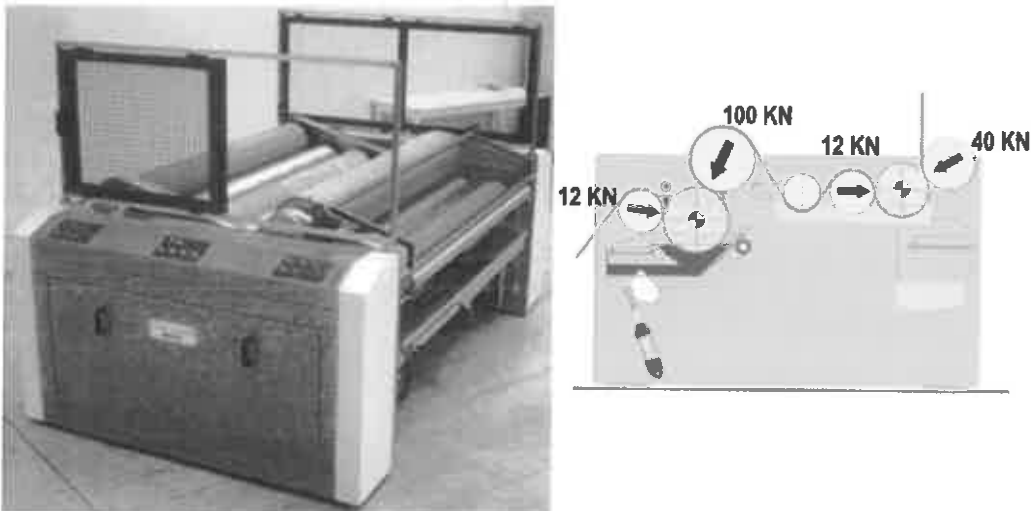


Figure 12 Karl Mayer's pre-wet size box

TYING-IN AND DRAWING-IN

At this ITMA Knotex showed a range of new development in tying-in technology. The Knotex KR-8 Monofilament Frame is specially designed to handle stiff warp yarns with high density, a system that is suitable for weavers of industrial fabrics such as woven belts for paper felts and hydroentangled nonwoven bonding machines. The clamping and tension rails of this tying-in machine are reconfigured to allow the operators easily clamp the warp sheets from the top. Newly developed optional thread pressers permit the application of uniform pressure across the warp sheets.

Another new development by Knotex is TS/2 TapeMaster tying-in frame. This machine is ideal for tying-in polypropylene and polyester tapes and low density warps including monofilament warps. The machine is equipped with a microprocessor that uses magnet sensors to evaluate the position of the advance feeler and report it to the threads picking up elements; this results in precise picking up of the correct threads

from the two warp sheets.

Knotex developed a new Remote Control to remotely monitor the status of an automatic tying-in machine from any location in the mill. The system allows the operator to perform other duties while the tying-in process is being performed.

Staubli presented the OPAL (Figure 13), a new automatic leasing machine for leasing warp yarns. The OPAL can combine several warp sheets (from one to eight sheets) of multi-colors or single color into one lease to prepare such warp for automatic drawing-in or tying-in (Figure 14). The OPAL is capable of handling continuous filament yarns as well as spun yarns. The leasing process is fully automated once the operator programs the required color sequence using sensitive touch screen. The machine is equipped with a camera system to ensure correct yarn color order as programmed by preventing doubles and distinguishing between threads of different colors. Depending on the application, the leasing speed of the OPAL is up to 100,000 threads per 8-hour shift.



Figure 13 Staubli's OPAL automatic leasing machine

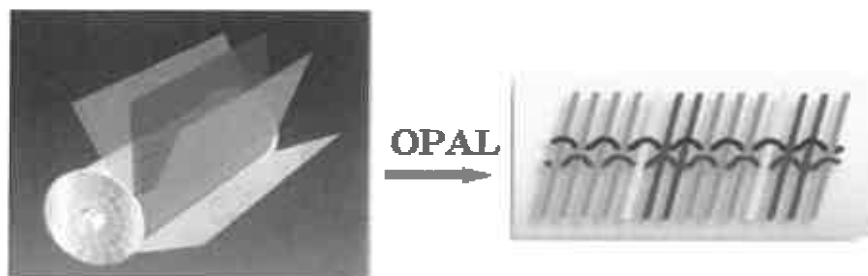


Figure 14 Leasing multi-colors warp sheets

The OPAL provides weavers employing direct warpers the opportunity to make the process of producing stripped warp as easy as those using sectional warpers.

WEAVING

Despite the absence of major weaving machine manufacturers (Tsudakoma and Toyoda), significant number of machines was shown at this ITMA. The weaving speed and rate of filling insertion (RFI) remained about the same as those shown at ITMA' 99. The marriage of air jet and jacquard, however, resulted in higher speed of jacquard weaving that has never been seen before. Today, jacquard weaving manufacturing cost is almost the same as weaving commodity fabrics. Additionally, the variety of fabrics woven at ITMA' 2003 was broader than ever and characterized by intricate designs and industrial applications. The show speeds reported here were collected from brochures and signs posted at booths. In terms of filling insertion systems, only two projectile looms were shown and

the air jet and rapier machines were about equally exhibited.

Fastest Single-Phase Weaving Machines

Air Jet Weaving

Dornier showed one of the two widest air jet machines (5.4 m), AWSL 4/-EasyLeno (first time at ITMA). The other machine was shown by Sultex and will be described later in this section. The Dornier machine was weaving leno fabric for carpet backing at width in reed of 5.2 m and speed of 450 picks/min or 2,349 m/min rate of filling insertion.

Picanol featured wide range of air jet machines. Four machines out of the seven shown exceeded 2,000 m/min RFI. Table 1 shows the data of these machines.

Promatech showed three air jet machines. The fastest is their MYTHOS TEC of width 3.4 m weaving sheeting fabric at width in reed of 3.2 m and speed of 780 picks/min (2,496 m/min RFI).

Table 1 Picanol's Fastest Air Jet Machines

Machine Type	Fabric	Speed, picks/min	2 RFI, m/min
OMNIplu-2-P 280	Air Bag	770	2,079
OMNIplu-4-P 340	Awning	750	2,385
OMNIplu-2-P 280	Sheeting	770	2,202
OMNIplu-6-J 250	Mattress Ticking and Table Cloth (Jacquard Fabric)	1025	2,460

Sultex featured one of the two widest air jet machines (5.4 m), the new type L9400 P 540 N 2 L. The machine was weaving leno fabric for carpet backing at width in reed of 5.33 m and speed of 420 picks/min or 2,238 m/min rate of filling insertion. Sultex showed another fast air jet machine (LS400 S 210 N 4 SP TL) weaving ladies' wear fabric at width in reed of 2.1 m and speed of 990 picks/min or 2,079 m/min rate of filling insertion.

Projectile

As usual, Sultex was the only company that showed this type of weaving machines. Two machines were exhibited. The fastest is their 3.9 m machine type P7300 B 390 N 4 SP D12 weaving a 5-harness cotton sateen cloth at width of 3.514 m and 370 picks/min corresponding to 1,300 m/min RFI. The machine was equipped with multi-filling insertion of 4 with individual feeder, guides, tension control, etc. for each yarn. The actual filling insertion rate considering the

four simultaneous insertions is 5,200 m/min. The other machine was type P73 RSP B 360 N 4 SP D12. The machine was weaving a cotton canvas cloth at a width of 3.65 m and speed of 330 picks/min corresponding to 1,205 m/min rate of filling insertion.

Rapier

Dornier exhibited four rapier machines. Their fastest is type PTS 8/S weaving a fancy dobby fabric at 1.78 m width in reed (maximum is 1.9 m) and 600 picks/min corresponding to 1,068 m/min rate of filling insertion. The other machines were weaving jacquard labels, filter cloth, and jacquard fabrics with on-the-fly-pattern change (from upholstery to drapery) and variable pick density. The jacquard fabrics were woven using Staubli jacquard, type LX 3201 with 10,752 hooks.

Picanol showed six rapier machines of width range of 1.9 m – 3.6 m. Table 2 depicts those with RFI of higher than 1,000 m/min.

Table 2 Picanol's Fastest Rapier Machines

Machine Type	Fabric	Speed, picks/min	3 RFI, m/min
GamMax-6-R 190	Shirting	720	1,138
GamMax-4-R 360	Denim	420	1,482
GamMax-4-R 250	Glass Fiber	450	1,053
GamMax-6-R 340	Voile	420	1,260
GamMax-12-J 320	Upholstery (Jacquard)	400 300	1,168 876

Promatech showed 8 rapier machines of width range of 1.9 m – 3.2 m. Table 3 shows those with RFI of higher than 1,000 m/min. Smit showed a total of nine weaving machines. Eight of which are rapier and the

other is air jet. Six of the rapier machines were weaving fabric with range of applications at RFI that exceeded 1,000 m/min. These are shown in table 4 along with the fabric types.

Table 3 Promatech's Fastest Rapier Machines

Machine Type	Fabric	Speed, picks/min	4 RFI, m/min
ALPHA, 3.2 m	Upholstery (Jacquard)	480	1,433
ALPHA, 2.2 m	Wool Apparel	520 580	936 1,044
LEONARDO, SILVER FTS, 1.9 m	Industrial	620x2	1,178x2
LEONARDO, DYNA TERRY, 2.6 m	Terry Towels	430	1,132
LEONARDO, SILVER FTS, 2.1 m	Upholstery (Dobby)	700	1,190
LEONARDO, SILVER FTS, 1.9 m	Shirting	650	1,081

Table 4 Smit's Fastest Rapier Machines

Machine Type	Fabric	Speed, picks/min	5 RFI, m/min
GS900-S 360 N8 SP	Curtain	410	1,400
G6300F TERRY-B 260 N8 SP	Terry Towel	480	1,107
GS900-S 190 N8 SP	Tie	700	1,008
G6300-S 230 N4 SP	Air Bag	600	1,362
G6300-W 220 N8 SP	Men's Wear	600	1,094
G6300F TERRY-B 260 N8 J	Terry Towel (4 panels)	480	1,241

Sultex showed three rapier machines. The fastest was weaving men's wear fabric at 600 picks/min corresponding to 1,045 m/min RFI. The other two machines were weaving labels and souvenir terry towel.

Multiphase Weaving

The Sultex's M8300 multiphase weaving machine, which was revealed for the first time at ITMA '95, has continued to be one of the main attractions at ITMA' 2003. One machine was shown weaving a

polyester/cotton dense twill fabric of construction 40.5x20.5, 40/1x28/1 (threads/cm and metric count). The fabric was woven at 2,824 picks/min or RFI of 4,775 m/min. This is an improvement over the machines shown at last ITMA. One machine then was weaving a much lighter fabric of 2x1 twill and construction 26.4x18.1, 40/1x28/1. This lighter fabric was woven at speed of 2,430 picks/min or 4,118 m/min RFI. The machine is now capable of producing denser fabrics at

higher speed than before, a sign of improvement. Sultex indicated that the machine can weave plain, 2x1, 3x1 and 2x2 weaves and warp density is limited to a maximum of 45 ends/cm.

New Jacquard Shedding Concepts

At ITMA' 99 Grosse and Staubli showed new jacquard machines in prototype stage, the UNISHED and the UNIVAL 100. At this ITMA' 2003 they continued to show their jacquard machines. While the Grosse's UNISHED is still at the prototype stage, the UNIVAL 100 has been made available for sale. The principle of shed formation of the two machines is different but they have achieved common goals, reduction in the jacquard engine parts. Both of these machines are based on individual control of each warp yarn.

Figures 15 and 16 show Grosse's UNISHED and the shed formation principle. The shed formation in the UNISHED is achieved by leaf springs. Each leaf spring is connected to a heddle that controls one warp

end. The leaf springs, which are controlled by actuators, control the bottom shed as well as the top shed (positive jacquard shed type). The configuration of the jacquard head and the individual control of each heddle (or warp end) allow the heddles to be set vertically. These settings permit the elimination of harness cords, magnets, hooks, pulleys, springs, and the gantry. This results in lower building and air conditioning costs. The Jacquard head is mounted directly on the side frames of the weaving machine (Figure 15) thus making Quick Style Change (QSC) possible in jacquard weaving since it is easy to exchange the entire jacquard head including the heddles.

The UNISHED was mounted on Dornier LWV6/J air jet weaving machine with the following specifications:

Fabric:	Upholstery
Warp Yarn Material:	Cotton/Polyester
Warp Yarn Count:	N _m 70/2
Warp Density:	40 ends/cm
Filling Yarn Material:	Cotton/Polyester
Filling Yarn Count:	N _m 70/2 and 32/2
Pick Density:	Variable
Width in Reed:	142 cm (nominal width: 150 cm)
Speed:	800 picks/min
RFI:	1,136 m/min

The above parameters are exactly the same as last ITMA.

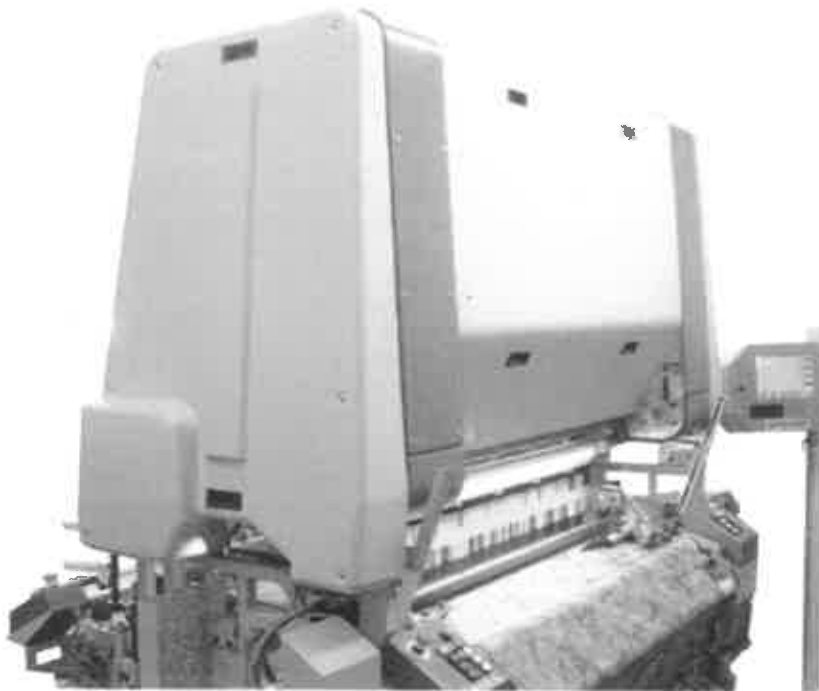


Figure 15 Grosse's UNISHED Jacquard

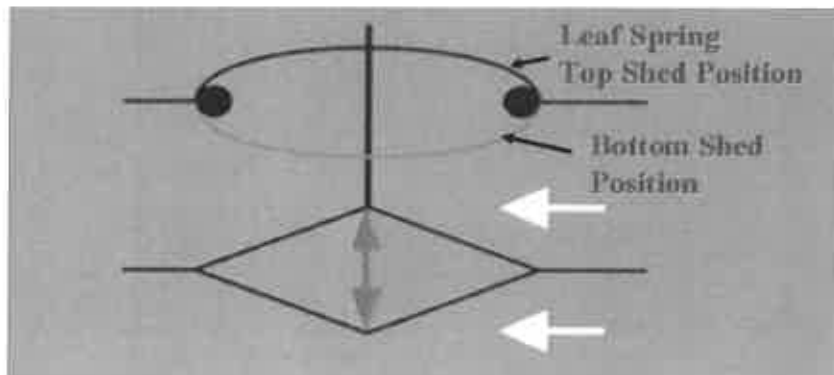


Figure 16 Shed formation principle of the UNISHED

The shed formation in the UNIVAL 100 electronic jacquard machine is achieved by controlling each individual warp end by a stepping motor. The harness cord (or warp end) selection is performed electronically and hence fabric design is achieved in the same way as any current electronic jacquard system. The dimensions of the jacquard head (the jacquard head and tie width is the

same as the width in reed) and the control of individual warp end by a stepping motor permit the harness cords to be set vertically. The design of the UNVAL 100 permits the elimination of hooks, knives, magnets, and pulleys since each harness cord or heddle is directly attached to a stepping motor. The UNIVAL 100 was running on Picanol OMNIplus-6-J 250 with the following specifications:

Style:	Mattress Ticking and Table Cloth
Warp Yarn Material:	Polyester/Cotton
Warp Yarn Count:	50/2 N _m
Warp Density:	33 ends/cm
Filling Yarn Material:	Polyester/Cotton + Nylon
Filling Yarn Count:	50/2 N _m + 2100 dtex
Pick Density:	25-28 picks/cm
Width in Reed:	2.4 m
Speed:	1,025 picks/min
RFI:	2,460 m/min
Total # of Ends:	7920 (7920 stepping motors).

The specifications above are much different than the specifications of last ITMA. The UNIVAL 100 commercial machine seems to have been advanced significantly. In fact this is the highest rate of filling insertion in jacquard weaving history and the highest at this ITMA compared to any other shedding motion shown. The UNIVAL design provides the weavers with new opportunities that have never been available before in jacquard shedding. With such a system the shed height can be easily set, several sheds can be formed, etc. All settings can be

conducted electronically through a user interface without the need of mechanical adjustments. Another significant feature of the UNIVAL is its independency from weaving machine drive since it has its own drive without mechanical coupling to the weaving machine. In a press release, Staubli indicated that the UNIVAL modular construction enables jacquard capacity range of 5,120-20,480 warp threads (stepping motors). Figure 17 shows the UNIVAL jacquard machine that was set at the Staubli stand.



Figure 17 UNIVAL 100 Jacquard machine

Versatility

Quick Style Change (QSC)

The QSC has been available for cam or dobbie since early 90's. At this ITMA, Grosse announced a new QSC for jacquard. The system was shown by a 10 minute video at Grosse site. The actual time of style change is said to be 90 minutes. The key feature of the development is redesigning the harness tie for easy coupling and decoupling of harness neck cords from the hooks. With such a system, jacquard weavers are able to weave short runs.

Dornier equipped air jet and rapier machines with patented Pneumatic Shaft Lock, type PSL. The system permits locking and unlocking of shafts using the touch display, which further facilitates quick change of warps and styles.

Variable Pick Density

Dornier, Panter, Picanol, Smit, and Sultex showed air jet and rapier machines equipped with programmable variable pick density. The variation in pick density has been achieved through modularity and controlling electronic let-off and take-up

mechanisms via microprocessor. The difference between low and high pick

density is one order of magnitude (Table 5).

Table 5 Pick density range

Company	Machine	Pick Density Range, picks/cm
Dornier	PTS 8/S, Rapier	11-200
Picanol	TERRYplus-6-J 260, Air Jet	18-136
Smit	G6300-S 170 N8 J, Rapier	52-200
Smit	G6300-S 140 N8 J, Rapier	30-200
Sultex	L5400 S 150 N 6 J, Air Jet	30-130
Sultex	G6200E S 140 N 8 J	29-100

Variable Speed

Variable speed weaving was first introduced by Picanol at ITMA' 99. With a powerful motor termed Sumo, the machine can be derived directly without belt or clutch. The starting torque is very powerful and adjustable. The beat-up force is constant from the start through out the entire weaving process. The Sumo can be programmed to run at different speeds as desired. This is useful in case of weaving different filling yarns of different attributes. For example, a weaker yarn needs to be run at low speed while another yarn can handle much higher speed. Without variable speed, the machine has to run at low speed corresponding to the weakest yarn. Picanol now provides the Sumo motor as the standard drive for all their new lines of OMNIplus and GamMax machines. At ITMA' 2003, Dornier, Panter, Picanol, Promatech manufacturers showed variable speed weaving machines. The highest difference in speed were shown by Dornier and Picanol (100 picks/min).

On-Loom Inspection

At ITMA' 99, EVS (Elbit Vision System) an on-loom inspection system was installed on one of Picanol's weaving machines. At this ITMA, an on-loom inspection system by EVS termed LOOM-

TEX was installed on Dornier's PTS 4/s rapier machine. Barco and Uster provide their own versions of on-loom inspection, Cyclops and Fabricscan.

The on-loom inspection systems use either cameras or scanners to scan the entire fabric. The system can now be installed between the front fabric rest and take-up rolls. Figure 18 shows an example of on-loom inspection system. While this is an improvement over off-loom cloth roll and post-weaving inspection, more than one meter fabric can pass before the system can detect it. The on-loom inspection systems can identify defects, capture and store their images, report defects map, and stop the weaving process if desired.

PROMATCH has its own inspection system, a new electronic eye. The company installed the electronic eye on one of their LENARDO SILVER FTS rapier machine shown at this ITMA. The system features are small dimensions, low cost, and integration with the machine. The function of the electronic eye is not only to detect defects but also to interact with the machine and change the setting. While this may be true for some defects, other defects would not be repaired or avoided without operator intervention.

Figure 18 Barco's Cyclops on-loom inspection



Advances in Primary Motions

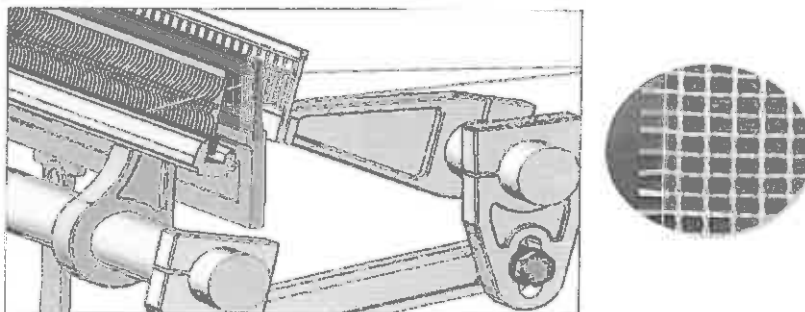
New Leno Shedding Mechanisms

Dornier exhibited a new leno shedding motion (patent application filed) that is completely different from the traditional leno. The Easyleno consists of: A stationary guide bar (shown in blue, Figure 19) where the standard warp ends are drawn, and a movable guide bar (shown in grey, Figure 19) where the leno ends are drawn through. The stationary bar is moved once to the right and once to the left each leno weave repeat. The movable guide bar is raised and lowered twice every weave repeat (two picks). The lay controls the reed and the movable guide bar motions. At the beat up position the reed

is in its most forward position (front center) and the movable guide bar is down. When the reed at the back center, the movable guide bar is up (Figure 19). The Easyleno was shown on wide AWSL 4 machine weaving carpet backing for the first time at this ITMA.

Sultex showed a completely new wide (5.4 m) air jet machine, type L9400, with innovative new leno mechanism termed PowerLeno. The main components of the PowerLeno is a guide bar (B in Figure 20) and eyeleted reed (A in Figure 20). The shed formation is achieved by opposing upward and downward of the guide bar and the eyeleted reed. The guide bar is given a lateral motion to twist the yarns.

Figure 19 Dornier's Easyleno mechanism



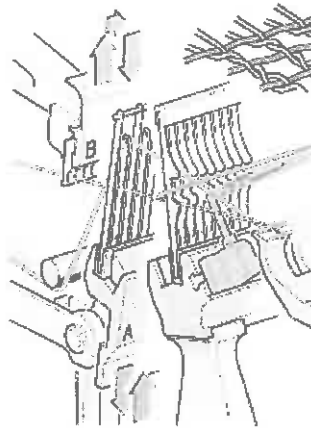


Figure 20 Sultex PowerLeno shedding mechanism

The main feature of these new leno mechanisms is the gentle action on the warp yarns that allows leno weaving at higher speed than traditional leno. These systems can switch from leno to plain weave if the lateral movement is skipped.

Dornier ServoTerry

A new air jet machine by Dornier, ATVF 8/J ServoTerry, was shown weaving terry fabric with variable height loop. In this system, a

servomotor replaces the traditional terry cam for pile formation, thus the reed does not drop back. The fabric is positively driven back toward the reed (when the reed at the front center) to form the piles. The fabric is moved by positively driven backrest and terry bar in combination with the temples. The pile warp feed can be programmed to obtain terry fabrics with variable height loops for effect. Figure 21 shows a terry fabric with variable height loops.

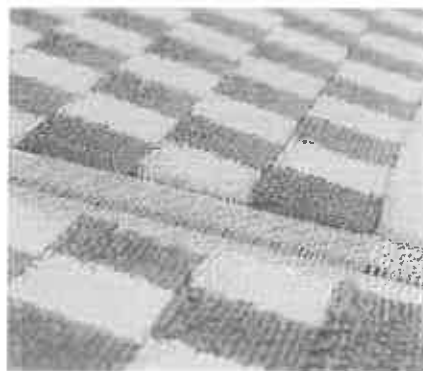


Figure 21 Terry fabric with variable height loops.

Dornier AirGuide System

Dornier at ITMA 2003 unveiled an air guiding system for the rapier during its movement. The rapier glides on an

aerostatic support instead of the traditional guide rollers. The air is supplied by a strip as shown in Figure 22. This system reduces the wear on the rapier.

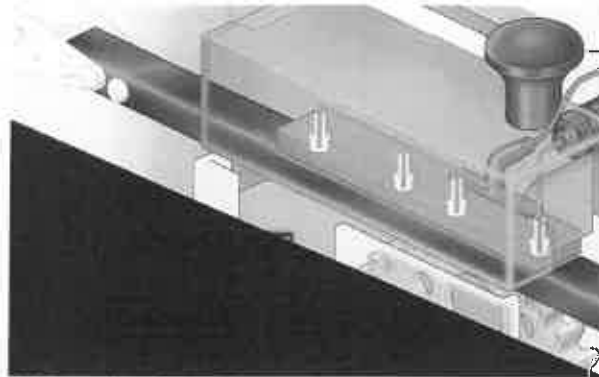


Figure 22 Dornier AirGuided rapier system, air is shown in blue

Advances in Auxiliary Motions

Warp Stop Motion

Dornier showed a Protechna optical warp stop motion (Figure 23) working with PTS 4/S rapier machine with monofilament warp. Picanol showed a laser based warp

stop motion installed on an OMNIplus-2-p 280 with nylon 6.6 warp. These types of stop motion, if successful, would eliminate the drop wires that cause harmful abrasion especially to sensitive yarns.



Figure 23 Protechna optical warp stop motion

CONCLUSIONS

ITMA' 2003 was a success in the weaving and weaving preparation areas. The advances were not revolutionary. This ITMA, however, brought major evolutions that will help weavers to fully control their

machines electronically from user friendly interfaces, produce broad range of woven fabrics, manufacture intricate jacquard designs at the speed of commodity fabrics, form leno fabrics faster, inspect fabrics on-loom, use optical and laser detection of warp break, reduce down time due to higher level

of automation and quick style and warp beam change.

While the new developments shown at this ITMA are significant, the demand for more will continue. Many items are still on a wish list of those in the weaving field. Here are some reasonable items:

- Elimination of drop wires as mean of monitoring warp end breaks through enhancing warp quality and/or smart sensors.
- Fully automated start mark mechanism that does not need labor intervention.
- Reduce the filling waste to the length of the fringes that remain in the fabric.
- Fully automated style change.
- Multiphase weaving machine for dobby and jacquard weaving.

Will the machine manufacturers make these wishes come true at ITMA '2007?