

DORNIER

INSIDER

Customer Magazine of Lindauer DORNIER GmbH / No. 12 / February 2003



New AirGuide™ on DORNIER
Rapier Weaving Machines
Straight forward

ServoControl™ = Higher Degree
of Automation on DORNIER
Air-Jet Weaving machines
Fast and Reliable



Peter D. Dornier
Managing Director of Lindauer DORNIER GmbH

**Dear Readers,
Dear Friends of DORNIER,**

Over the last weeks, we have often been asked how our company will overcome the economic crisis in the old „classic“ markets and how we plan to meet the challenge from the new markets in the Near and Far East. My answer is: With internal and external innovation and the reliable continuity for which DORNIER is known.

New products and developments such as our patented „AirGuide™“ and „ServoControl™“ technology for Rapier and Air-jet machines presented here for the first time will be complemented by improvements in our internal organization which will help us serve you as our customer even faster and more efficiently

It is also decisive to maintain trust in such „stormy times“ and to create trust where it does not yet exist.

We therefore have strengthened and extended our subsidiaries in India and China without, however, losing sight of the requirements of our customers in Europe and America.

We continue to place importance on close cooperation with the technological leaders of your industry and feel honored to present some of them again in this edition of the INSIDER and share in their success.

I wish you interesting reading. Our team and I would be pleased to soon welcome you personally here in Lindau.

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A LIFE IN SILK

The story of Jim Thompson and his „Thai Silk Company“ reads like a modern Asian fairy tale. It was almost 60 years ago that the American Jim Thompson, a member of the US Army at that time, came into contact with Thai silk for the first time and then, based in Thailand, conquered the world with his own silk fabrics. Jim Thompson has long become a synonym for Thai silk. „The Thai Silk Company“ he established no longer simply presents this silk in traditional style but as a fabric for modern home furnishings and, last but not least, fashion dreams.

The art of silk weaving - an ancient tradition - reaches back in Thailand to the prehistoric culture of Ban Chiang, 700-500 B.C. Weaving was well established at an early time and quickly spread to the major regions of Thailand, with each creating signature variations in design, color and purpose. In the late nineteenth and early twentieth centuries, Thai textiles suffered from the influx of cheaper imports. The knowledge and art of silk weaving was pushed into the background but remained intact.

American Jim Thompson was decisively responsible for keeping Thai silk alive. Thai silk is legendary for its unmistakable lustre and iridescence. In contrast to the Chinese silkworms from whose white cocoons a soft, fine yarn is produced, the Thai cocoons of the “Bombyxmori” silkworm are characterised by their golden-yellow hue.

Typical for Thai silk are also the “humps and bumps” as coined by Jim Thompson which give the silk fabrics their unique appearance.

Thai silk is especially appreciated for its fascinating beauty, colors, quality and diversity and has made an impressive revival in the last 50 years.



Trendy men's and women's collections, designed for Jim Thompson by the Thai fashion designer Nagara

“The Thai Silk Company Ltd.”

Jim Thompson not only succeeded in saving and reviving the traditional production of Thai silk but also in giving new impulses. His power of innovation gave Thai silk the worldwide reputation which it still enjoys. With the “Jim Thompson” label, the present owners, comprising the Thompson family, Thai business people and a Japanese department store chain, have developed new areas of application with current, modern designs.

Under their influence, Thai silk has turned into a modern fabric with which “The Thai Silk Company” produces trendy fashion collections for women and men, ties, scarves, furniture and decoration materials, cushions, handbags and other accessories.

Today, more than 2,800 employees work for the company which has a weaving shop, finishing shop, print shop and tailoring shop. They are even self-supporting in raw materials. They have exclusive contracts with 1,500 Thai farmers for silk worms.

This emphasises Jim Thompson's strong commitment to the rural life of the Thai people alongside the progressive company strategy. The same applies for the more than 1,000 employed weavers who still pursue the ancient tradition of silk weaving on traditional handlooms.

Handlooms and DORNIER Shuttleless Weaving Technology

„The Thai Silk Company“ combines hand weaving technology with the



Tradition and progress in the Korat factory by combining older handloom production with modern weaving machine technology

latest shuttleless weaving technology from DORNIER to meet the high demands for Thai silk in top quality and still be able to offer traditional Thai silks.

The complete Jim Thompson collection is woven on 54 Rapier and 2 Air-jet machines in Jacquard and dobby versions. Yarns used in the filling range from 18 den pure silk to Nm 5/1 chenille. Positive-controlled central transfer on the DORNIER Rapier machines also allows 4-fold filling insertion for 18 den fine silk yarns. This saves costs in preparation, increases production performance and enriches the spectrum of pattern variants.

Range of Styles

A dedicated team ensures that Jim Thompson's dream will continue to be pursued in the future. One of the first successes was a fashion line for home accessories matching international market trends and created together with the interior designer Ou Baholyodhin, renowned from Tokyo to London. This was followed by collections for the commercial and private furnishings markets. World-

wide renowned hotels such as „The Oriental“ in Bangkok use furnishing fabrics from Jim Thompson.

New paths are also taken in fashion. In the past the company was primarily known for its elegant tie collection but then created four years ago a new women's and men's fashion line in cooperation with the renowned Thai fashion designer Nagara.

It combines decorative materials with trendy creations. The latest 2002 collection presented an explosion of colors and designs using modern as well as traditional designs. Nagara thus succeeded in creating a fresh but still very gracious line.

A further strength of the company is its sales structure. Although only 30 % of the total production is directly exported, more indirect turnover is achieved via their own 28 Thai and 10 overseas shops to 27 countries in Asia, USA and Europe.

Despite the worldwide recession, the company with US\$ 45 million turnover in 2002 expects an annual increase of around 10 % over the next years. As Eric Booth, Marketing Manager of

“The Thai Silk Company“, reported, there is still strong demand for quality products as offered by the company.

Silk Fabric of the Future

The Jim Thompson company sees the future in a wide perspective. It plans to develop Thai silk in various directions, in other words not only as fashionable and trendy fabrics but also luxurious, high-quality fabrics. Finding perfect use in daily life - for example as sofa silks - and thus refining diverse living environments with the exotic charm of Thai silk is another characteristic of these dream fabrics.

STRAIGHT FORWARD

Political uncertainty has caused world economics to stagnate over recent months. End consumers have reacted with reluctance in purchasing but, at the same time, still want to follow fashion trends at acceptable prices. This means the textile industry has to utilize saving potentials with a simultaneous increase in creativity and speed.

This also forces weavers to re-evaluate existing filling insertion systems in order to meet the various criteria such as creativity on the one hand and, on the other hand, fast, reliable style changes as well as small yardages from a wide range of yarns, and this without faults. Short delivery times prevent reworking defective materials. DORNIER's strategy over many years has been that positively controlled rigid rapiers represent the most reliable filling insertion system and that the Air-Jet machine with its new technology is the logical supplement.

Mechanical filling insertion systems, such as flexible rapiers or projectiles, usually require guide elements over the complete reed width with corresponding higher friction as speeds increase and thus increased heat development and wear. In comparison, DORNIER rigid rapiers run with rolling friction at just 1/5 of sliding friction as shown in the relevant technical literature.

Even experts find it hard to decide which guide system is best for flexible rapiers in particular applications. Using guide teeth means accepting reed marks and filament damage and working without guide elements leads to more yarn breaks in the selvage area and overruns caused by asymmetrical rapier entry in the weaving shed. This seriously restricts the flexibility, productivity and reliable quality required by versatile, internationally active weavers producing a wide range of styles.

DORNIER carbon rapier rods combined with the specified machine design run without disturbing the lower shed and their extreme bending and tensile rigidity allows a precise transfer position in the middle. Guide elements in the shed - even for wide machines - are therefore not required on DORNIER machines.

This opens up universal system use because there is practically:

- no restriction in warp density
- no restriction in warp material use
- no warp streakiness
- no filament damage to unentangled or flat yarns
- no seasonal change of rapier guide elements or rapier heads and therefore
- no time-consuming readjustment of shed settings.

Open-Shed Filling Insertion

Another decisive advantage of the DORNIER design is open-shed filling

insertion. The two catch selvages bind the inserted filling thread after the exit rapier has come to a standstill. The thread is only now released and the shed closed. All this is performed under absolutely controlled conditions.

The advantage is that all filling materials are inserted independent of shed closing and inserted contact-free through the weaving shed. Elastic filling threads can remain free of tension in the weaving shed which results in excellent final fabric quality, especially for highly sensitive piece dyes.

To summarize, the following advantages result from this technology:

- all filling threads, whether elastic, coarse or fine have the same insertion length
- filling thread length is then only determined by the arrival of the exit rapier which is opened when at a standstill



Open-shed filling insertion on DORNIER Rapier Weaving Machine

- shed closing and warp tension have no relevant influence on filling thread length.

Negative flexible rapiers have a very high overstroke on the exit side and therefore release the thread at high speed. This means that all parameters such as shed closing, interlacing, warp tension, brake setting and elasticity of the filling thread influence the thread length. This leads to different filling thread tensions especially when processing elastan yarns and results in thick and thin places in the fabric which only become visible as faults after dyeing and therefore decisively affect the quality of piece-dyed elastan fabrics. What is more, these weavers normally stock large quantities of unfinished goods and customers only specify their color wishes when ordering.

Constructions controlling the exit rapier opening time cannot correct this

error because an open shed system is still not used so that the filling thread is tensioned in the shed.

Patented Air Guide for DORNIER Rapier Elements - AirGuide™

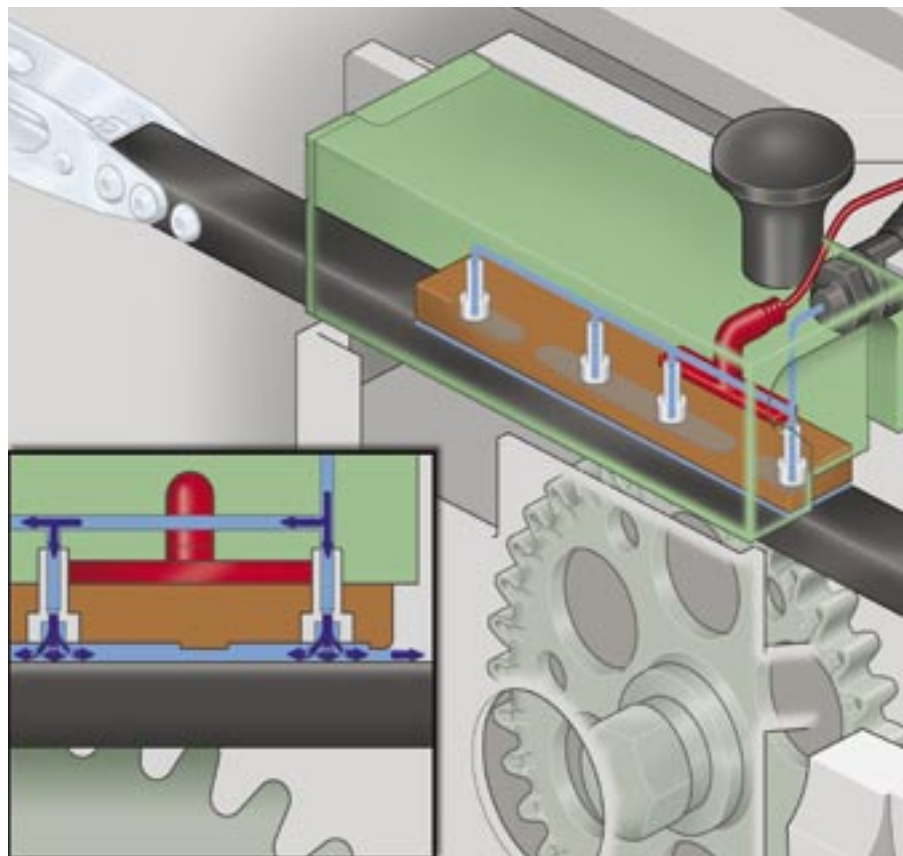
The technically perfect solution for guiding mechanical elements is the contact-free form of the aerostatic bearing. The straightness of DORNIER's rigid rapier offers ideal conditions for this "air cushion guide". A guide plate which directs air to the rod replaces the existing guide rollers. The plate also has a temperature monitor which, for the first time, provides automatic self-control on mechanical filling insertion systems. This opens up a new dimension in process reliability for users and provides a decisive technological lead for positive rigid rapiers.

Further advantages are:

- rod cooling by the air guide means longer lubrication intervals

- reduction in maintenance costs by doubling the service life, thereby
- improvement in efficiency and reduced personnel workload
- self-cleaning effect and therefore production of clean fabrics
- fail-safe characteristics.

The AirGuide™ has been available on request as from the 4th quarter of 2002 and can be retrofitted on all P types. Please consult our Customer Service if you wish to retrofit older Rapier machine types.



DORNIER rapier rod air guidance, type AirGuide™

Insider IMPRESSUM

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FAST AND RELIABLE

Permanent performance increases of Air-jet weaving machines make the use of control systems indispensable. Reason: filling yarn supply packages often cannot ensure constant load transmission to the yarn surface by the air flow.

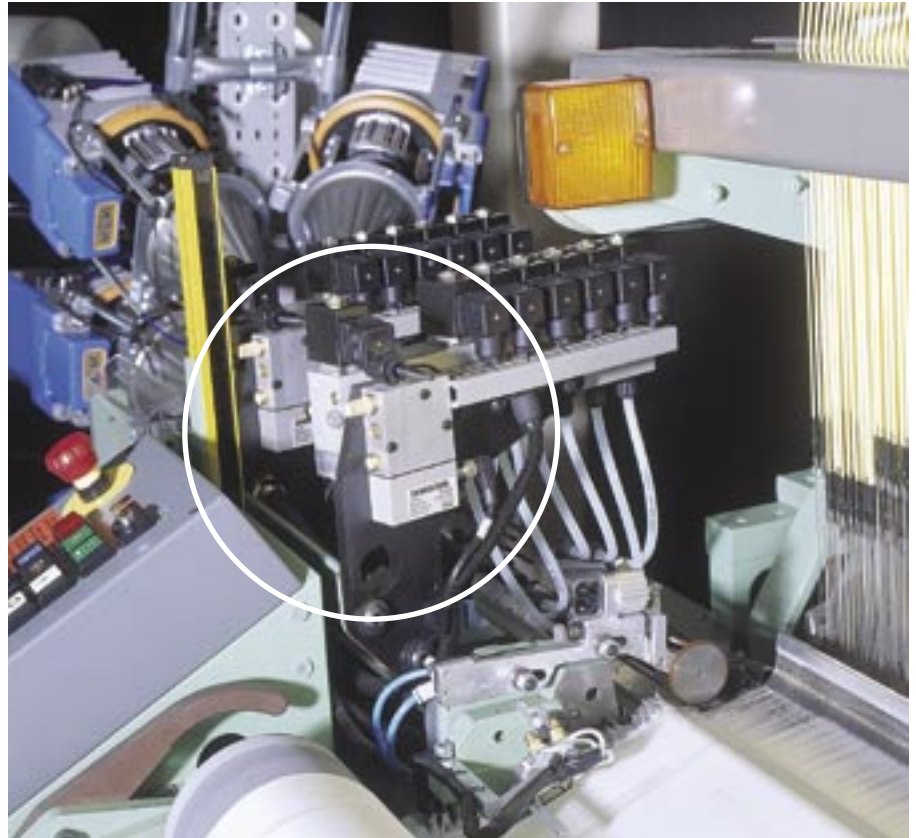
This is due to yarn differences which can arise in a yarn package as well as between spinning or color lots or yarn suppliers. Until now, machines could not react to these variations within a package or between lots, especially with different colors, and operators had to make corrections. This meant the running behavior of Air-jet machines was partially dependent on the quality of settings.

To allow Air-jet machines to react more sensitively and be independent from settings, they must have an intelligent system which supports automatic, independent filling insertion control. Such a system is necessary to attain constant thread arrival times with a uniform stretching phase and thus minimize the thread load.

With ServoControl™, DORNIER presents a patented system which works with just one servo valve with an extremely fast reaction time. This controls the pressure in a regulation circuit for all main nozzles depending on the defined thread arrival time.

Special DORNIER Characteristics

The compact servo valve with extremely fast reaction time is located in the throttle block of the main nozzles. This results in a low compressed air volume in the regulation circuit which ensures fast reaction times. Contrary to the eight control valves for the eight filling insertion nozzles required on conventional systems, the ServoControl™ requires only one servo valve to control filling insertion. This compact design also supports controlling tandem nozzles in the same manner as the main nozzles. Minimum pressure is used for the



Compact servo valve, ServoControl™ integrated into the throttle block

required load transmission to the yarn which means a decisive reduction in load peaks.

The extended setting range for filling insertion and the lower pressure required permits speed increases, especially for yarns with low strength, of up to 15 % at the same or even lower yarn break rate. This also means less napping and therefore better final fabric quality.

With DORNIER “ServoControl™”, the absolute pressure values are displayed digitally on the machine display and can be stored in the Style master file and then reused when the style is woven again.

You can retrofit “ServoControl™” on your Air-jet machines type A which are equipped with inclined throttle block (as from September 2001).

Advantages at a glance:

- display of absolute pressure values
- faster and reproducible machine setting when processing new, unknown yarns
- automatic compensation of yarn irregularities in filling packages
- one control valve for all eight main and tandem nozzles
- selective pressure regulation for all eight filling yarns
- reduced yarn load by avoiding load peaks
- 15 % higher speed at identical or lower yarn break levels
- better final fabric quality

THE FINE ART OF „STRETCH“



Attilio Reggiani (2nd from the left), owner of the company of the same name with members of his family and employees

Fashion world demands for comfortable, hard-wearing and above all easy-care textiles opened a way for the Reggiani weaving shop in Varallo, Italy, and, as one of the few companies in the industry, Reggiani specialised in reliable manufacture of highly sensitive, elastic fabrics and therefore had a decisive influence on this fashion trend. Sounds very simple but demanded high flexibility, comprehensive know-how and the proven team of the family company .

Convenience, comfort and functionality - this describes textiles combined with elastan. First talked about in the eighties and then already the „fabric of the future“ in the nineties - elastic fabric. Attilio Reggiani's decision as head of the family company of the same name in Varallo in Italy to use elastic fabrics marked the start of a success story characterised by great development efforts. Hardly any other fabric is so difficult to produce as fabrics with the vibrant elastan fibres.

The Reggiani company was considered a pioneer in this field and was

the first company able to establish stretch fabrics in the high-fashion sector as well as in sports clothes. Reggiani revolutionised stretch fabrics in the true sense of the word. And as can be expected from a real pioneer, the company performed enormous groundwork.

Today Reggiani looks back on his achievements with pride. The company certainly has the right to claim that it gave elastic fabrics a new look by combining elastan with natural fibres (cotton, wool, silk, cashmere). „Stretch“ has become respectable and is now an integral part in women's wear, and even men's wear. The advantages are obvious: High-quality clothes still look neat even when worn for a long time.

The Lanificio Reggiani S.p.A. Company

Reggiani is a family business where non-family members are part of the dedicated team. Son Giovanni specialises on research, daughter Elena is responsible for creative matters and Signora Beatrice, the wife of Attilio Reggiani, looks after administration.

Elena Reggiani is convinced that the success story of stretch fabric has only just begun. In future, fashion-conscious customers will certainly not want to miss the extraordinary wearing characteristics of modern fabrics, the softness, unique feel, stability and functionality. The commitment of the Reggiani company in product innovations is correspondingly great. More and more fabrics with so-called additional parameters are being created. For example „Windtex“, a watertight but breathable membrane, or „100 % Tactel Aquator“ a highly breathable Tactel quality which transports body humidity away from the skin or „Teflon“ an air-permeable fabric which protects against rain and dirt. „Sunfit“, a mixture of cotton and polyester/ceramic which protects against high outside temperatures and detrimental UV radiation is of special topical interest.

One normally assumes that so many innovations are based on decades - if not centuries - of tradition, as is the case for other Italian textile companies. Reggiani was however established as a family company „as late as“

1973! This structure is very important to those responsible for the company. The company must remain manageable to maintain and guarantee quality and maintain intensive, close contacts with innovative fashion markets. The flexibility which can exist only within a small, well-established team is a further reason to keep the company small and to face the future with even more intensive specialisation, performance increases and on-going development of new materials.

Production Equipment

The will towards innovation and the conviction to exist not only in the upper but also in the medium price range in future in the highly competitive textile market is expressed in the production equipment used. Workplaces providing a pleasant atmosphere for Reggiani employees influence motivation and, equally important, performance. A large laboratory performs research work with the most modern technology and equipment. And the result is impressive: 3 million meters of cloth are produced per year, with 100 employees. Production increases have been in double figures over the last years! A decisive factor for homogenous

performance at Reggiani is vertical production - from the own twisting shop, through the weaving shop to the finishing shop. The company closely monitors all production stages and can implement and tune experience in every area.

Reggiani is considered to be one of the most important manufacturers of elastic materials in Europe - and one with the highest quality. Quality inspections after every work process keep the second choice proportion of finished goods under 2 %. Although the lowest proportion arises in the weaving shop, and fast communication exists between weaving and finishing shops, a sample dye is performed for every style directly after the weaving startup in order to detect possible faults or special problems. The complete yardage is only woven after this check. Extreme caution pays off because Lycra is an extremely sensitive fibre, a fact which has to be continuously taken into account during production.

Decision in Favour of DORNIER Weaving Machines

The high quality demands of Lanificio Reggiani was finally responsible for

the decision in favour of DORNIER weaving machines. A total of 42 machines are installed in Varallo.

Attilio Reggiani declares openly that he decided in favour of DORNIER weaving machines because they are the only machines with reliable prevention of start-marks, even tension over the complete width of the fabric and an open-shed filling insertion which prevents filling backlash. Approximately 70 % of the production is exported. Buyers are renowned couturiers and fashion houses. The range comprises 250 styles made of bi-elastic fabric and runs from very fine shirt materials which are extremely sensitive to start-marks, to heavy, high-grade overcoat materials, for example wool-cashmere-elastan. Mixtures with cotton and silk have great success as well as Reggiani gabardine and fresco fabrics and of course the soft flowing soft-crêpe fabrics made of wool-viscose-Lycra.



DORNIER Rapier and Air-jet weaving machine park in the Varallo, Italy, factory

A New Mile Stone in the History of our Company

THE 50,000th DORNIER WEAVING MACHINE GOES TO ITALY



The headquarters of the Michele Solbiati Sasil S.p.A. in Lonate Pozzolo, Italy

In Autumn 2002, the 50,000th DORNIER weaving machine was delivered to the Michele Solbiati Sasil S.p.A. company, with headquarters in Lonate Pozzolo, Italy, as part of a follow-on order.

The first DORNIER Rapier weaving machines with patented, controlled central transfer left the Lindau factory in 1967 and proved themselves in the next 35 years as extremely universal and flexible machines for clothing and home textile sectors as well as the growing technical fabric area.

The new Air-jet weaving machine presented in 1991 marked the birth of the DORNIER system family with a powerful combination for optimum economic production across complete customer product ranges. Both technologies use the same basic, sturdy machine so that the majority of machine components are identical. The same is valid for electronics and accessories which means simple handling for personnel and lower storage and logistic costs.

Every third machine produced during the last 12 years was an Air-jet machine which demonstrates the significance of the Lindauer DORNIER machine mix.

The Solbiati Sasil company was one of the first Italian DORNIER customers to purchase Rapier weaving machines already in 1973. Continuous modernisation of the machine park increased the number of DORNIER weaving machines to 250.

This customer also uses the system family successfully with a group of Air-jet machines for high-value staple fibre complementing 176 Rapier machines in the Lonate Pozzolo and Varano Borghi factories.

The company was established in 1874 as a craftsman's business and is now a leading European linen weaver with close business relationships with all renowned great fashion designers

– from A for Armani through V for Versace to Y for Yamamoto.

New developments over recent years in the area of linen processing and the combination with other fibres serve to extend the product range with new, high-value fabrics for bed sheets, curtains, furnishing fabrics and home environment accessories.

A large trade network of branches in New York, Hong Kong, Beijing, Tokyo, Paris, London, Düsseldorf, Munich, Barcelona, Istanbul and investments in China and Brazil increased the export share to more than 65 %. This paves the way for future positive development.

The villa of Lonate Pozzolo, a former 18th century monastery now serving as company headquarters, accommodates an important record of Italian fabrics. It is supplemented by a collection of textile-specific books and works of art with linen as basic material and source of inspiration.



The 50,000th DORNIER weaving machine in the Varano Borghi, Italy, factory

A COMPANY VISION: TEXTILES WITH AN „IQ“

Austrian Styria is mainly famous for its thermal springs. Only insiders know that Graz accommodates a company which exports 85 % of its textile production worldwide. The Sattler group has around 550 employees and has become the worldwide leading supplier of sun protection textiles. At the same time, innovative projects such as plasma treatment of textiles set new standards in environmentally conscious finishing.

Even when it was founded in 1875, the Sattler weaving company in Thondorf near Graz was considered to be a modern, if not futuristic company. The large-scale factories, a progressive sales strategy and, in particular, the power of innovation were convincing and have brought lasting success to the company. In more than 100 years, the present Sattler group has developed into an internationally active textile company. The family company produces far away from its export markets which soon forced it to streamline its structure. The company attributes its success to uncompromising customer orientation. It produces and markets textiles with high functional and technical demands and relies on early recognition of market trends and niches as well as fast implementation of solutions.

Fabrics for awnings and large sunshades are produced with high-quality yarns and fibres and characterised by high light fastness and excellent weather resistance. The fabrics provide lasting protection against UV radiation. That collections are adapted to differing aesthetic requirements and vary in design and function depending on the end user country is a matter of basic understanding for the customer-oriented Sattler AG.

DORNIER the Guarantor for Production Quality

The two filling insertion systems of the DORNIER system family com-



DORNIER Air-jet weaving machine system for production of sunshade textiles in the Rudersdorf factory, Austria



DORNIER Rapier weaving machine system for production of industrial textiles in the Rudersdorf factory, Austria

prising four weaver groups with Air-jet machines and three weaver groups with Rapier weaving machines cover the diverse production areas in the weaving shop. Sun-blind materials mainly from acrylic staple fibre yarns are produced in 30 x 2 tex on the Air-jet weaving machines. The Sattler group uses Rapier weaving machines to produce textiles for the Pro-Tex and Multi-Tex ranges. Their strength lies in reliable filling insertion with different filling yarns.

The system also supports multiple filling insertion so that Sattler gains essential benefits from higher filling performance. The weaving machine park of the Sattler group at the production site in Rudersdorf in the Burgenland today comprises exclusively DORNIER weaving machines with very different nominal widths.

The pick performance of the Air-jet weaving machines is between 1,650 and 1,990 m/min., the Rapier weaving machines achieve even up to 2,800 m/min. with multiple filling insertion.

In the Sun-Tex business area, the latest development of textiles for visual and antiglare protection is another important component in Sattler's success, and prove their untiring power of innovation. The company philosophy brings the conviction of the Graz weaving shop to the point - „top quality combined with lowest costs and shortest delivery times under consideration of ecological and legal environments“. The Sattler group achieves 85 % of its turnover abroad, mainly in Europe but also in Northern America and Asia.

The range of products of the Sattler group is split into three areas, with sunshade textiles being the largest:

Sun-Text: Fabrics for shading, awnings, boat tarpaulins, camping tents, large sunshades, visual and antiglare protection.

Pro-Text: Textiles for industrial use, PVC-coated tarpaulins, textiles for extreme requirements and tents, textile constructions, canopies.

Multi-Text: Textile designs for special requirements (biogas reservoirs, air-inflated tents, textile architecture, textile construction for agriculture, environmental protection, industrial use).



The market position for technical fabrics (tarpaulins for trucks, large tents or large banners becoming more and more popular in the advertising sector) is important. Last but not least, the use of textiles in construction and building industry is developing into a significant market area. Textile building materials are characterised above all by economic cost-benefit relationships, rapid installation and negligible maintenance. The characteristics of plastic-coated fabrics (higher specific strength than steel, resistance against wear, age and weather, impressive in lightness and elegance) could make them the fifth building material in addition to concrete, steel, glass and wood.

Sattler also sees considerable growth prospects in the environmental protection area where more and more textile systems are being implement-

ed, for example in biogas reservoirs or as seepage protection for sewage treatment plants.

High Quality = Low Fault Quota

The large production range demonstrates that the company takes its innovation demand seriously. Just as important is the high standard of production and therefore end product quality. DORNIER was also able to contribute here to the high demand of the Sattler group. Replacing the shuttle weaving machines and then later the projectile weaving machines with modern Air-jet weaving machine technology reduced the fault rate by more than 70 %. More or less simultaneously, ISO 9001/14401 was introduced, technological and organisational optimisation measures implemented in the preliminary process. Dedicated training measures were carried out to improve the al-

ready high technical knowledge level of employees. These measures halved the fault rate again. Today, the Sattler group budgets a 0.25 % fault rate in their fabrics.

Recognising market trends and determining customer requirements are decisive for new developments. The company's own sales organisation ensures vital closeness to customers in the very important German market and independent sales partners serve customers in the other countries in Europe as well as non-European countries.

