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Reduce operating costs and yarn wastage

Fritz Legler, Sulzer Textil

A firm, strong selvage is extremely important not only when producing fabrics, but also in their subsequent treatment. On modern, shuttleless weaving machines, selvage formation is usually a costly item. It was this that prompted Sulzer Textil to develop methods and devices for its weaving machines which reduce both operating costs and yarn wastage.

On conventional shuttle looms, a strong selvage is created automatically. The weft which is inserted is practically endless. At the border of the fabric it changes direction, and this results in the formation of a strong selvage. Modern, shuttleless weaving machines, on the other hand, achieve their high performance by inserting the weft into the shed with low-mass elements – projectiles, rapiers, water, or compressed air. To accomplish this, the weft has to be cut off following insertion, so that it can be fed to the insertion element again. This in turn results in a weft end extending beyond the fabric border both on the left and on the right. Trimming the ends to a uniform length is not a problem, but pointless because there is nothing to retain the warp ends at the fabric border, so the fabric could easily fray. To prevent this, the border is strengthened with one or more pairs of leno threads. The fine leno threads, made of high-tensile polyester twist, are looped around the weft ends in such a way that they can no longer slip off, and thus a non-slip selvage is created. New technologies developed by Sulzer Textil reduce both the cost of selvage formation and the wastage involved. With valuable raw materials, in particular, this results in substantial savings.

Avoidable waste

In practice, the pairs of leno threads at the fabric border are not sufficient to ensure a neat, durable selvage and correct weft insertion on shuttleless weaving machines; so-called auxiliary

selvages are also needed on both sides of the fabric, and additional warp ends and leno threads are required for these auxiliary selvages. Since the auxiliary selvages increase the working width, the weft also has to be longer. The auxiliary selvages are cut off while the fabric is still on the machine and thus become waste, consisting of (polyester) leno threads, warp ends and weft threads, i.e. a material mix, consisting for instance of polyester and the base material of the fabric wool, cotton, etc.). As a rule, impure waste of this kind cannot be put through any recycling process.

Valuable raw materials saved

The Sulzer Textil G6200 rapier weaving machine is used primarily to produce high-quality and intricately patterned fabrics for men's and women's outerwear, from woollen and other high-grade yarns. Until now, auxiliary selvages, as described above, were needed to create a neat main selvage on the rapier weaving machine. Now, however, thanks to a recently developed weft gripping device, the Waste Saver, the left auxiliary selvage can be dispensed with. This special, controlled device takes over the function of the auxiliary selvage. To ensure correct transfer of the weft thread to the gripper head, the Waste Saver is controlled by a linear motor and synchronized with colour selection.

Due to system design, the right-hand auxiliary selvage is still necessary. However, the elimination of the left auxiliary selvage

means that about 37 mm of thread per weft insertion are saved. Together with the saving in warp and leno threads, the total quantity of waste is reduced by some 40%. Over the year, this saving of about 37 mm per weft thread thus results in a substantial reduction in waste. With a fine worsted fabric, for example, around 200 kg of yarn a year can be saved by reducing weft wastage, and with exclusive camel-hair fabrics for ladies' coats as much as 800 kg. Depending on the raw material, these savings can result in a substantial cost reduction.

Eliminating auxiliary selvages

For technical reasons, the tried-and-trusted, waste-free tucked selvage cannot be used when producing heavy, densely woven fabrics, e.g. denim, on projectile weaving machines. Selvage formation with leno threads, as described in the foregoing, is therefore used for this type of fabric, and so, depending on the size of the weaving facility, substantial quantities of waste may be generated.

A new type of selvage formation has now been developed which allows the auxiliary selvages on both sides of the fabric to be eliminated. A new weft end gripper, the Selvage Saver, clamps the weft end following insertion. Extractor nozzles on the left- and right-hand borders of the fabric hold the weft ends so that they can be neatly trimmed and simultaneously extracted. The auxiliary selvages on the right and left are no longer needed, resulting in a 35% reduction in weft yarn wastage alone. At the same time, efficiency and quality are improved by the reduction in warp stoppages, and output is increased by better utilization of the available working width.

Approximately two-thirds of all denim produced in the world is woven on Sulzer Textil projectile weaving machines. With the Selvage Saver, some 350 kg of yarn are saved annually per weaving machine in the production of standard denim fabrics. In an average-sized denim weaving facility with 100 weaving machines, this

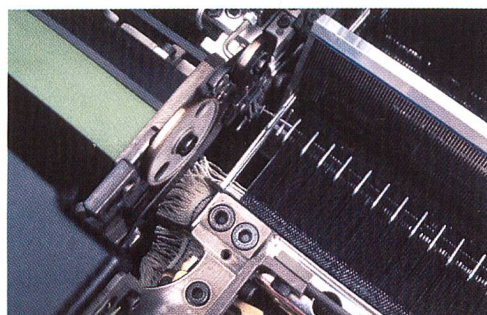


Abb. 1.: Vergleich der Kantenbildung an einer Projektelwebmaschine, links ohne Hilfskante, rechts mit Hilfskante

Das erste Gerücht:

Schlafhorst, Volkmann, Zinser, Allma, Elitex, Hamel, Melco und Saurer Embroidery bieten jetzt auch Spinn- und Texturiermaschinen für Chemiefasern an.

reduces the amount of yarn used by around 35 metric tons.

Preserving valuable investments

The devices described here are also available as retrofitting kits for Sulzer Textil projectile and rapier weaving machines. Through its extensive

service network, Sulzer Textil supports its customers with life-cycle engineering in weaving machine service and maintenance, and offers new product enhancements and accessories which can be retrofitted. Retrofitting is possible even on machines that have been in service for 20 years or more. Thus we help to ensure that

fashion fabrics and standard weaves can be produced economically even on these machines, thus greatly extending their service lives. Depending on the range of products woven, the retrofitting investment may pay for itself within a few months.

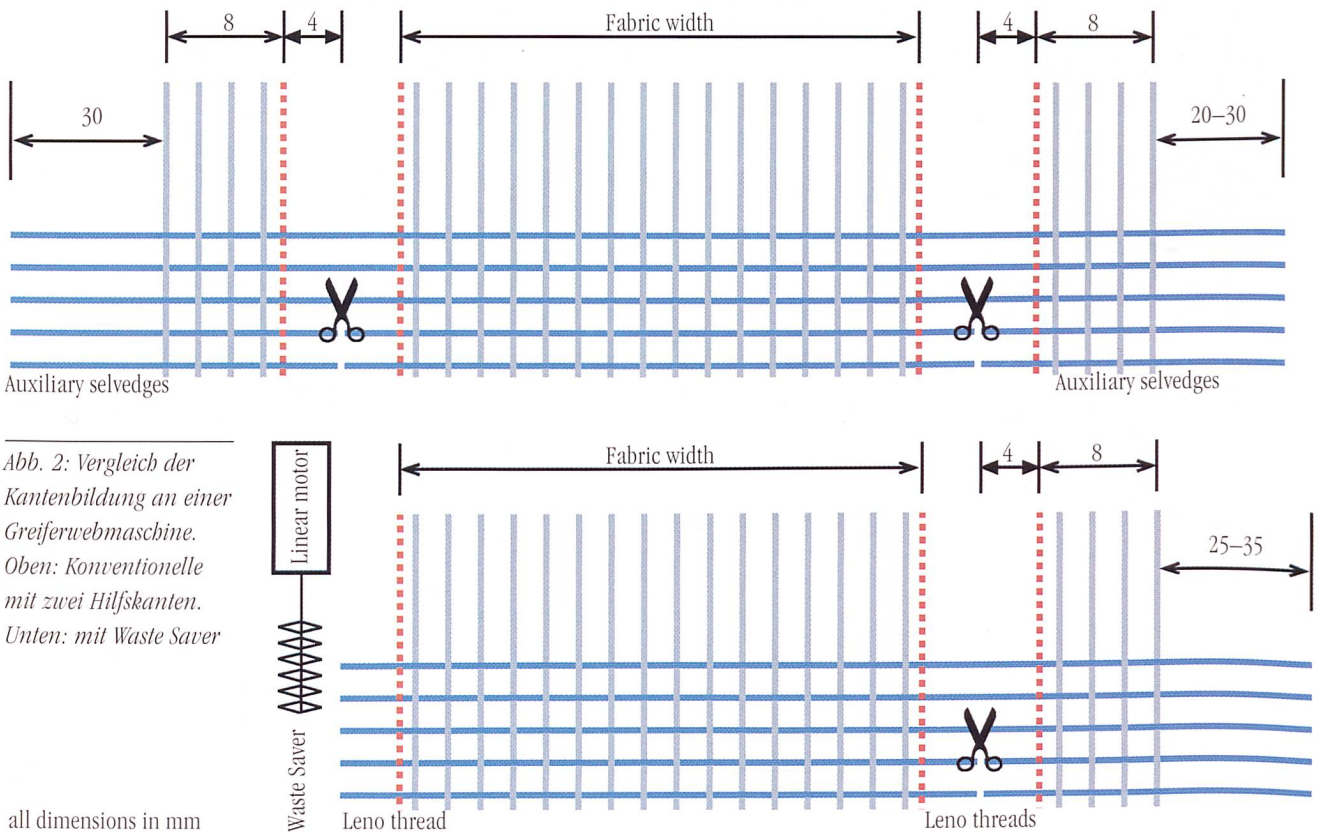


Abb. 2: Vergleich der Kantenbildung an einer Greiferwebmaschine. Oben: Konventionelle mit zwei Hilfskanten. Unten: mit Waste Saver

Deutsche Kurzfassung

Entschieden weniger Bedienungs- und Materialaufwand

Für die Projektile- und Greiferwebmaschinen hat Sulzer Textil Verfahren und Vorrichtungen entwickelt, die den Bedienungs- und Materialaufwand für die Dreherkanten erheblich reduzieren. Auch Maschinen, die schon länger in Betrieb sind, können nachgerüstet werden. Damit auf schützenlosen Webmaschinen eine saubere und haltbare Kante entsteht, genügen die Dreherpaare am Geweberand nicht. In der Regel sind auf beiden Seiten Hilfskanten notwendig. Durch diese Hilfskanten wird die Arbeitsbreite vergrößert

und je nach Schusseintragssystem dadurch die Eintragsleistung reduziert. Die Projektile- und die Greiferwebmaschine können mit Vorrichtungen ausgestattet werden, die erhebliche Materialeinsparungen bei der Kantenbildung ermöglichen. Durch weniger Kanten- und Dreherfäden wird zudem die Bedienung der Maschinen vereinfacht. Durch den Einsatz einer gesteuerten Schussfadensklemme (Waste Saver) kann auf die linke Hilfskante bei Greiferwebmaschinen verzichtet werden. Diese spezielle,

gesteuerte Klemme übernimmt die Funktion der Hilfskante. Für eine korrekte Übergabe des Schussfadens an den Greiferkopf wird sie synchron mit der Farbauswahl durch einen Linear-motor gesteuert. Systembedingt ist die rechte Hilfskante weiterhin notwendig. Durch Wegfall der linken Hilfskante werden pro Schuss etwa 37 mm Faden eingespart. Zusammen mit der Einsparung der Kett- und Dreherfäden ergibt sich eine rund 40%ige Reduktion der Abfallmenge. Bei der Herstellung von schweren und dichten Geweben auf der Projektilewebmaschine kann die bewährte und abfallfreie Einlegekante eingesetzt werden. Eine spezielle Randfadensklemme ermöglicht es, an der Projektilewebmaschine die linke und rechte Hilfskante wegzulassen.

Die Vorrichtungen stehen auch als Nachrüstätze zur Verfügung. Auch Maschinen, die bereits 20 Jahre im Einsatz sind, können nachgerüstet werden.