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TEXTILES AS UPHOLSTERY MATERIAL [1]

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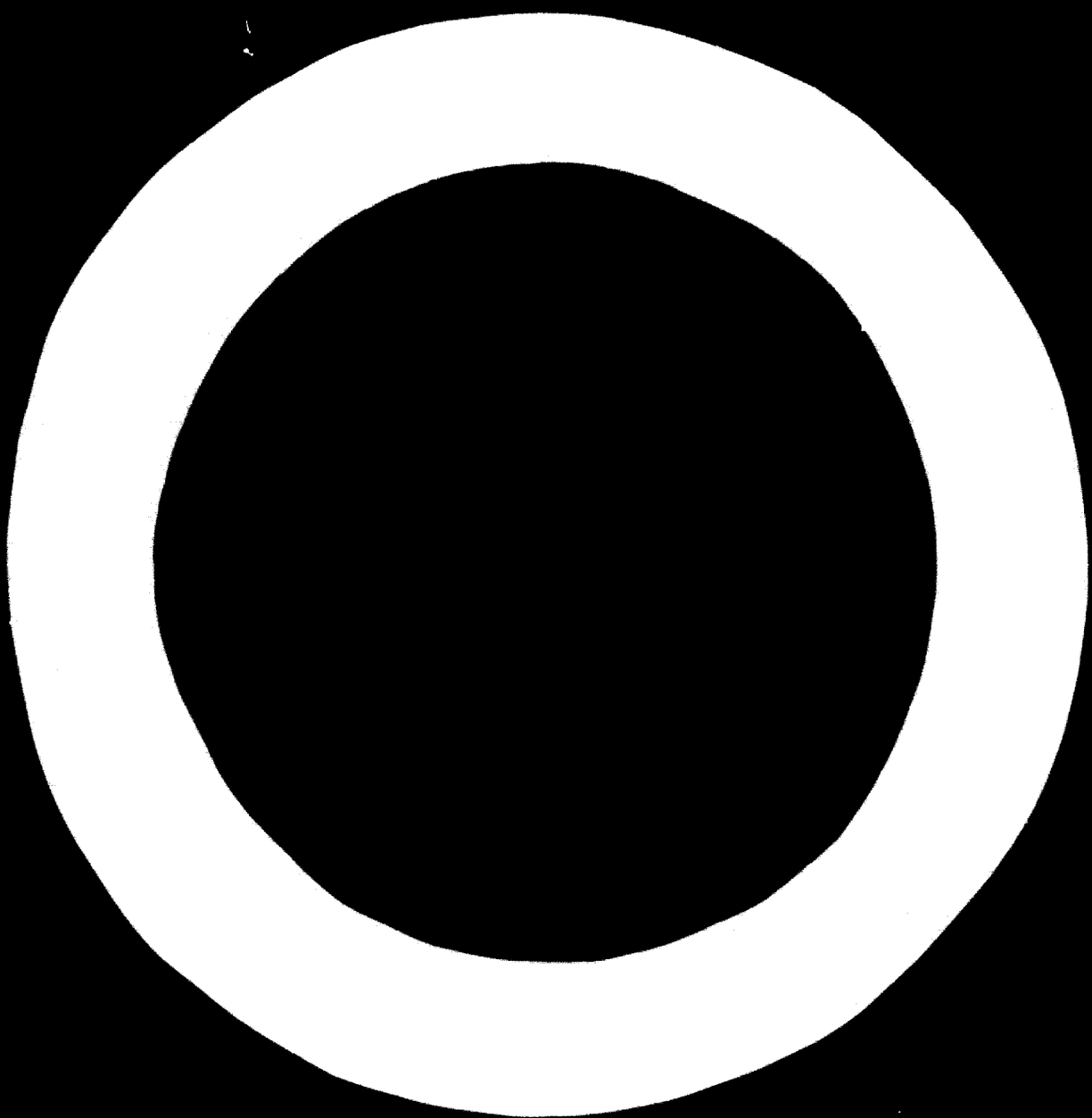


TEXTILES AS UPHOLSTERY MATERIAL

Eero Pellas

Textiles are a traditional material for upholstery purposes. Compared to other materials textiles have many advantages for this application. The possibilities of design and colour are nearly unlimited. The uncoated textile is airpermeable, absorbs moisture and transfers heat. The surface of a textile fabric is soft and aesthetically pleasing. Textiles elongate by stretching and revert to their original length - a property necessary for upholstery fabrics.

On the other hand these textiles have certain limitations. The abrasion resistance in many types of upholstery textiles is lower than in synthetic leather or other materials. Textiles have lower resistance to soiling and are more difficult to clean than synthetic leather. A woven cloth is in many cases not suitable for rational mass production of upholstery, because it is not homogeneous in all directions. In most cases price is the determining factor for the choice of the material. The manufacturing of textile fabrics includes spinning, weaving, dyeing and finishing. These stages consist of several processes. High manufacturing expense is the reason for the higher prices of textiles compared to other upholstery materials, which are usually manufactured in one or two processes. The textiles for upholstery purposes are suitable for hand-weaving because the fabrics are of high weight-class and consist of coarse yarns. The share of knitted and non-woven fabrics is increasing in the textile industry. In the future the price level of upholstery fabrics manufactured by these methods will decrease.

The fibre materials in upholstery textile have changed during 20-30 years. Wool was the main raw material earlier. Today pure wool is used for qualities of higher price level, only. The main use of wool is in blends of wool and other fibres, especially with regenerated cellulose. The common mixture is 50 per cent wool and 50 per cent cellulosic fibre. An addition of 10-15 per cent synthetic fibre, usually polyamide, in wool-rayon blends increases the strength. The mixture is

easy to dye, in piece or yarn form, and it is possible to reach the required dye fastness properties. Wool-rayon blend is the main raw material for upholstery textiles in Scandinavia today. In wool-rayon blends the good properties of wool: softness, abrasion- and soiling resistance, are partly maintained. The cellulosic part, the rayon, lowers the price of the raw material. The price of rayon is about 30 per cent of that of wool. Wool and rayon absorb moisture which gives the fabric antistatic properties. The soiling property of rayon is lower than in wool and synthetic fibre. For wool and rayon fabrics it is possible to give finishing treatments to improve their properties. Anti-soiling, water repellent, flame resistant, antiseptic treatments are possible as well, but such upholstery fabrics are required for special purposes only, such as for official use: hospitals, boats, etc.

Cotton and its blends with synthetic fibres are common raw materials for upholstery fabrics. The cost of raw material and the weight of the fabric determine the price of the product. Compared with other fibre materials the price of cotton is about 30 per cent and the price-level of synthetic fibres 60-70 per cent of the wool price. The cotton fabrics are usually piece-dyed or printed. To increase the wearing properties, resin treatment and coating finishing are common in upholstery fabrics made of cotton.

The use of synthetic fibre increases in every textile field. In 1969 the consumption of synthetic fibres was 21 per cent of the total fibre production in the world. The prognosis for 1980 is 39 per cent.

The main synthetic fibres for upholstery textiles, are polyamide, polyacrylic, polyester and polypropylene.

The most famous trademarks in polyamide fibre class are: Nylon Antron and Perlon. This fibre has good abrasion resistance and is easily dyed and has good fastness properties.

Textured polyamide filament yarn, Antron, is a common raw material for upholstery fabrics. When blending polyamide yarns with different dyeing affinities, it is possible to reach multicolour effects in piece dyeing.

Dralon, Orlon and Exlan are common fibre brands in the polyacrylic fibre class in Europe. This fibre is soft to touch. Abrasion resistance is lower than that of polyamide. Polyacryl is used in modern upholstery fabrics, in velvet and stretch qualities. With polyacrylic fibre it is possible to obtain bright shades and the fastness properties are good. On the market there are anionic and cationic dyeable fibres. Hence it is possible to get two-colour effects of quite different shades in dyeparts.

Polyester is not used to a large extent for upholstery fabrics although this fibre has good wearing properties. The dyeing of polyester is difficult, and this fibre needs thermosetting finishing treatment. Therefore, it is not widely used today. But in the future textured polyester yarn will be one of the raw materials in knitted upholstery fabrics.

The use of the polypropylene fibre class, also called olefines, is increasing as a raw material for the upholstery fabrics. The olefine fibres are widely used in carpet manufacturing today. Olefine has good abrasion resistance and high breaking strength. The fibre is soft to the touch. The price is low compared to other synthetic fibres. The difficult dyeability of olefine has prevented its larger use. For many years coloured olefines were available only as mass-dyed material.

The properties primarily required for upholstery textiles are: good abrasion resistance, pilling resistance and good resistance to fading. The breaking strength gives a good idea of the wearing properties. The weave construction must be tight enough to avoid slippage of yarns in seams. The wet fastness of the dye against rubbing, perspiration, water and cleaning must be good. The fabric must have some elasticity and stretch recovery.

In a modern textile mill all samples undergo testing before the production to make sure that they fulfil the requirements for upholstery fabric.

For determination of abrasion resistance there are many abrader types. Their principle is the same. The loaded sample abrades against a grinding paper. The number of cycles needed to wear through the sample is noted. The tests with a STOLL-abrader have shown that the minimum range for upholstery fabrics is 1,200 - 1,500 cycles. In these tests the weight of the load used is 1 kg and the fineness of the grinding paper is zero. Abrasion resistance for fabrics made of synthetic fibres is about 4,000... 5,000 cycles and for coated fabrics 12,000 ... 14,000 cycles.

The light fastness of the dye is tested according to the standard method with xenotesters or fadeometers. The sample is exposed to light for 200 hours. The result is compared with a control sample consisting of 8 different standard samples. The number of the standard showing a similar change to the sample is noted. The light fastness requirements for upholstery fabrics is 6.

The fastness values for wet fastness properties of colour are 4. It means that a light staining of white test fabric is allowed. The minimum value for breaking strength is 45 kg. The sample measurements are 200 mm in length and 50 mm in width.

Pilling resistance gives a good picture of the wearing properties in upholstery fabrics. The test is carried out in a rotating box in which four samples of test material, wound on rubber tubes, rotate and rub each other for 10 hours. The number of small fibre balls, so-called nops, on the fabric surface is noted. The pilling effect is possible in such fabrics, which are blends of fibres with a low and a high breaking strength, e.g., is blends of rayon and synthetics or wool and synthetics.

The standard methods for testing the wearing and colour fastness properties of textiles are published by the American Society for Testing and Materials, 1916Race St., Philadelphia 3, Pa. USA : ASTM Standards on Textile materials.

The quality control of new products and production is very important and necessary in textile manufacturing when the production consists of several raw materials, hundreds of colour shades and fabric constructions.

The application of new fibres and manufacturing processes provides the upholstery industry with new products as well.

Olefine fibres have a share of 2-4 per cent in upholstery fabrics today but this figure is expected to increase in the near future. Experiments are made to use glass-fibres for upholstery fabrics. It is already on the market in curtain-fabrics. The properties of this fibre are also suitable for upholstery fabrics.

Glass-fibre has very good abrasion resistance and is non-inflammable.

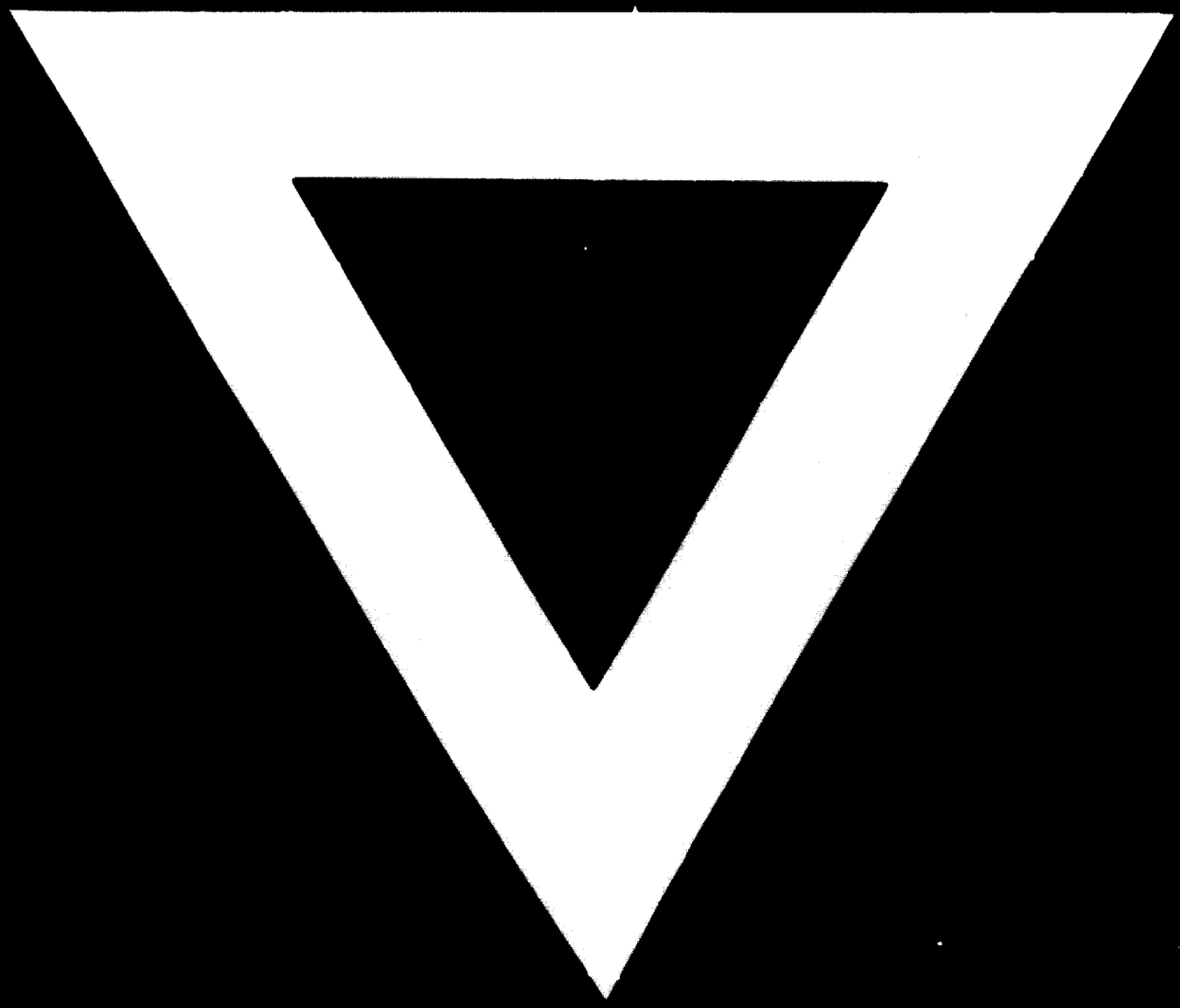
Stretch fabrics for upholstery purposes are on the market and the share of these is expected to increase.

In USA this year the stretch fabrics are expected to constitute a minimum of 10-15 per cent of all upholstery fabrics produced. One of the changes in textile manufacturing is the increase in the knitting sector. To produce a fabric by knitting is 10-20 times faster than by weaving. The increase of the production of knitted fabrics will also bring new products for the upholstery industry at a lower price. With the help of coating processes it is possible to give knitted fabrics properties which make them suitable for upholstery.

Broader use of needling and tufting techniques in upholstery fabrics is also envisaged.

Non-woven manufacturing is a sector which has shown a great increase. The production speed in this technique is high and it is comparable with the production speed of synthetic leather. Non-woven fabrics have the appearance and softness of textile. By printing it is also possible to produce designs. When using bi-conjugate nylon as raw material, it is

possible to produce a non-woven fabric with good wearing properties without using binding substances. The bi-conjugate nylon has a nylon core 6 and a surface fibre nylon 66. Using heat treatment, the surface layer of nylon 66 melts and binds the fibres. Non-woven products are suitable for mass-production in upholstery industry; the material is easy to cut and no fraying occurs.



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