

Geometrical Properties of Upholstery Fabrics used in Cars

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ABSTRACT

The main purpose of this research is to study about the geometrical properties of upholstery fabrics used in cars such as cotton and polyester. These fabrics such as cotton and polyester were assessed by its fabric count both warp and weft directions, fabric thickness and fabric weight. From the analysis of the result, it can be concluded that Cotton fabrics had better strength than other selected polyester fabric.

KEYWORDS: Upholstery Fabrics, Thickness, Weight.

INTRODUCTION

The word textile comes from the Latin word "textiles" and from the verb "texere" which means to weave. Today textile is freely defined as any product made from fibers, and the name is applied to non woven fabrics, knitted fabrics and special construction in addition to woven goods. When the word textile is used with the term fibers, it refers to any product capable of being woven or otherwise made into fabrics.

Textiles play an important role in everyday life, both in household fabric and in garment form (Gale, 1998). Today a textile is freely defined as any product made from fibers and the name is applied to non-woven goods. The term textile fiber refers to any product capable of being woven or otherwise made into fabric.

1. Textiles used in automobiles, shipping, railways and aerospace are known as Mobile tech.
2. Textiles are used in cars for a wide variety of purposes: to enhance comfort, thermal

insulation, design, vehicle safety and more often required acoustic properties.

A fabric must fulfill the requirements of everyday use and it must be functional. Fabrics have been used for many purposes and they are primarily used for apparel, household fabrics, furnishing, accessories and industrial materials. Fabrics differ widely in their qualities and accordingly they are chosen to satisfy the specific needs. Fabrics which are rough textured are chosen for furnishings and those that are soft are generally used for clothing. Upholstery is the work of providing furniture especially seats, with padding, springs or webbing. The word upholstery comes from Middle English word up and holden, meaning to hold up. A person who works with the upholstery is called as an upholsterer. Automotive upholstery fabrics are known as trimmer, coach trimmer or motor trimmer.

Nowadays car interiors have become increasingly important for variety of reasons. People spend more time in cars generally with increased daily commuter distances to and from work, increased

traffic density and because more people are working away from home and travelling long distances by car at weekends.

Upholstery plays a very important role in car interiors. Car upholstery fabrics should withstand certain mechanical and comfort properties such as bending length, flexural rigidity, drapability, tensile strength, abrasion resistance, color fastness, wrinkle resistance etc, while using it. Most commonly used upholstery fabrics used in cars are cotton and polyester blend fabrics.

Polyester is one of the most successful of the man-made fibers, accounts for a large proportion of all fiber used today. The most important characteristics of polyester fibers are wrinkle free appearance and ease of care. This fabric requires little or no ironing; It is are easy to launder and quick to dry.

The main objectives of the study

- To determine the geometric properties of fabric count of the selected upholstery fabrics (i.e.) cotton and polyester.
- To determine the geometric properties of fabric thickness of the selected upholstery fabrics (i.e.) cotton and polyester.
- To determine the geometric properties of fabric weight of the selected upholstery fabrics (i.e.) cotton and polyester.

Cotton

The word cotton is derived from the Arabic word 'Qutun' meaning a plant found in conquered land 1 It is one of the world's most vital and economically important agricultural crops (O' Connor, 1983).

Quality of cotton

The requisites on the basis of which the quality of cotton is judged are the grade, the color, the length of fibers and the character. The grade is given by the external appearance of the cotton and is determined on the basis of the major or minor brightness of the fibers, by its more or less white color; by the major or minor presence of particles of the leaf or other extraneous substances (Cottons Journey .com)

The color is another important element of evaluation of cotton. Infact, from the major or minor whiteness of the cotton, depends the facility of later workings and the possibility of obtaining good yarns. The color of cotton fiber differs greatly; that of cultivated cotton is generally white, more or less candid or tending

towards grey; but there also reddish, tawny, chemo is etc. cloned.

History of polyester

Polyester fiber was a British invention and currently the most rapidly grown synthetic fiber (Chapman, 1967). In 1941 Winfield and Dickson Calico printers association introduced a successful polyester fiber. Polyester fibers are derived from coal, air, water and petroleum. The chemicals dimethyl terephthalate and ethylene are also used in polyester.

A polyester has been defined in Textile Product Identification Act as 'manufactured fiber in which the fiber forming substance is any long chain synthetic polymer composed of at least eighty five percent of weight of an ester as a dihyric alcohol and terephthalic acid (Labarthe, 1994) it is also defined as a manufactured fiber in which the fiber forming substance is any long chain synthetic polymer composed of at least 85% of weight of an ester of substituted aromatic carboxylic acid (Tortora, 1978). Polyester is used for a wide variety of apparel, home furnishing and industrial fabrics (Corbman, 1987)

Care of upholstery

Upholstery should be brushed and vacuum-cleaned frequently, not only to remove dirt but to prevent attacks by moths on wool. To guard against moths, when a new piece of furniture is bought, make sure the upholstery fabric is treated chemically to make it moth proof. Muslin covering inside of the upholstery fabric will keep the moths inside the furniture.

The main purpose of this study was to evaluate the comfort, durability and colour fastness properties of 100% cotton and polyester viscose blend upholstery fabrics used in cars

METHODOLOGY

Selection of fabric

The fabrics selected for the study were 100% cotton and 100% polyester. The sample were purchased from a reputed shop in Chennai .The details of the fabric is given in appendix I

Laboratory

tests were conducted to determine the geometric, comfort and durability.

Geometric properties

Fabric count

The fabric count was determined by the raveling method. Fabric count denotes the number of warp yarns per cm or ends per cm and the number of

filling yarns per cm or picks per cm in a fabric. The samples measuring one quarter 1¼ inch square were from drawn each test samples and yarns were ravelled out on all four sides so that precisely one square inch of fabric was obtained. The warp and filling yarns from one inch square left were then ravelled out and counted separately and readings were taken along warp and weft separately for each of the sample and the average was obtained .The result was expressed as ends per cm and picks per cm respectively.

Fabric weight is the weight in terms of grams per square, meter of fabric. The sample for this test was prepared by cutting 5 centimeter x 5 centimeter square fabric .The fabric was weighed in an electronic balance, samples for each fabric were weighed and the mean of readings was taken. The weight per square meter of the fabric sample was recorded in grams.

Fabric thickness

Thickness is defined as the distance between the upper and lower surface of the material measured at a specific pressure (ASTM Standard, 1953). The fabric thickness was determined by using the Mercer thickness gauge.The presser foot and anvil were cleaned perfectly by passing a sheet of papers through the anvil and the presser foot. The gauge was set to 0 and 50 grams weight was added on the presser foot before testing the fabric .The samples were placed on the anvil and the presser foot was lowered onto the sample by raising lever slowly. The dial then indicates the reading.

The thickness was measured at 5 different places in each of the samples and the average was calculated. The thickness was expressed in millimeters. Fabric thickness in millimeters = the dial value x 0.01

RESULTS

The purpose of the research project was to study the comfort and durability of selected upholstery fabrics used in cars such as cotton and polyester. The results of all the tests mentioned above were analyzed, tabulated and discussed in this chapter.

Fabric count

The fabric count of selected fabrics along the warp and weft direction is expressed in ends per cm and picks per cm respectively. The results are tabulated in Table I, I (a) and graphically represented in Figure I & I (a).

The fabric count of polyester fabric was the highest value (125.0) when compared with the other

fabrics such as cotton along the warp direction, the values being 41.80 respectively.

The fabric count of polyester fabric was the highest value (67.75) when compared with the other fabrics such as cotton and fabric along the weft direction, the values being 38.20 respectively.

Fabric weight

Fabric weight of cotton was found to be (234.4) and polyester was (230.80) respectively. The results are tabulated in Table II graphically represented in Figure II.

TABLE I FABRIC COUNT WARP

Fabric	Mean	'T Value'
	Ends / cm	
Cotton	41.80	2.005
Polyester	125.0	

FIGURE-I FABRIC COUNT WARP

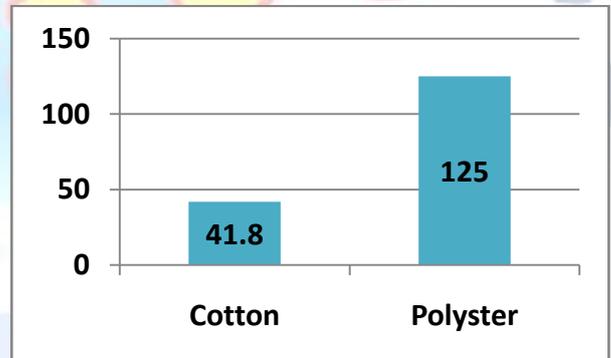


TABLE I (a) FABRIC COUNT WEFT

Fabric	Mean	'T Value'
	Ends / cm	
Cotton	38.20	3.585
Polyester	67.75	

FIGURE-I (a) FABRIC COUNT WEFT

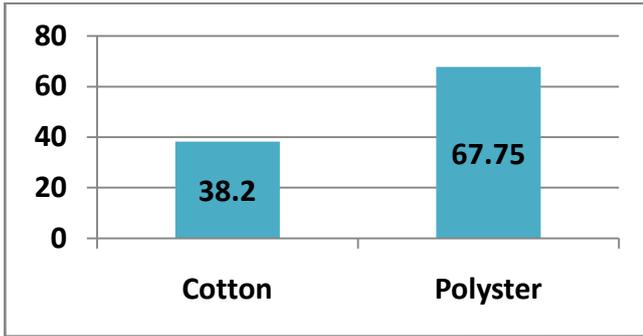


TABLE II FABRIC WEIGHT (Grams/Square meter)

Fabric	FABRIC WEIGHT (Grams/Square meter)	'T Value'
	Mean	
Cotton	234.40	129.22 2
Polyester	230.80	

FIGURE-II FABRIC WEIGHT

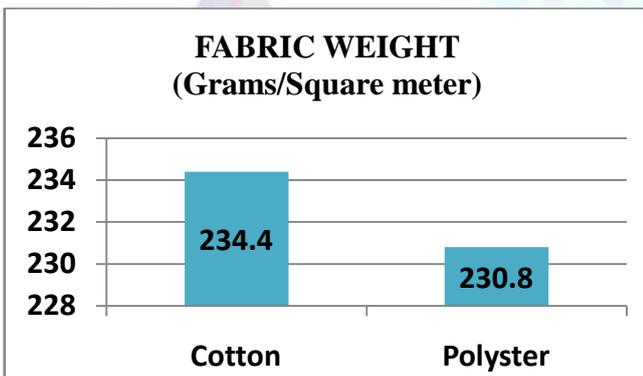
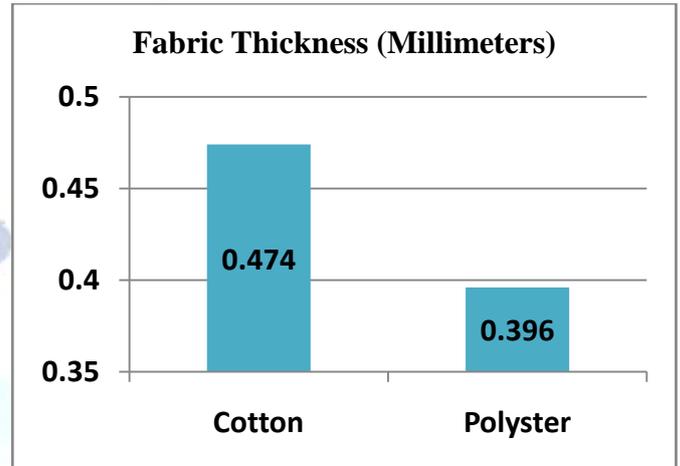


TABLE III FABRIC THICKNESS(Millimeters)

Fabric	Fabric Thickness(m m)	'T Value'
	Mean	
Cotton	0.474	11.154
Polyester	0.396	



Figure-III FABRIC THICKNESS



DISCUSSION

Upholstery plays a very important role in car interiors. Nowadays car interiors have become increasingly important for a variety of reasons. Upholstery textiles in cars provide a means of decoration and warm soft touch to surfaces that are necessary features for human well being and comfort.

1. The fabric count of polyester fabric was the highest than the other selected cotton fabric both along the warp and weft direction.

With regard to fabric weight it was found that the weight of the cotton fabric was maximum than the polyester fabric.

The fabric thickness of cotton was highest when compared with other selected polyester fabric.

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