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# JAMAKKALAM FABRIC – A CRITICAL REVIEW

S.Sundaresan[1], A.Arunraj[2], Kavikumar V[3], Amrithaa RS[4], Kalaiyarasan A[5]
[1] *Associate professor/Textile technology/Kumaraguru college of Technology, Coimbatore,*
[2] *Assistant Professor/Fashion Technology/ Kumaraguru college of Technology, Coimbatore,*
[3,4,5] *B.Tech,Textile,Final year students/Textile Technology Kumaraguru college of Technology, Coimbatore /Name of the*

## ABSTRACT

*JAMAKKALAM is more than just a textile product. It is a tradition that is two centuries old, and has been reflecting the rich craftsmanship involved. In Tamil culture, Jamakkalams are used in weddings, mosque prayers, and many auspicious occasions. But slowly yet steadily, it's relevance to the changing world is declining, leaving it in a dwindling state. It is high time we act on its revival, and that starts with understanding its roots, the art and the artisan involved in the making of the dream carpet called Jamakkalam.*

*Bhavani Jamakkalam refers to blankets and carpets manufactured in Bhavani in Erode district, Tamil Nadu. It has been recognized as a Geographical indication by the Government of India in 2005-06. In the late nineteenth century, competition from British made textiles led Indian weavers to invent new types of garments. In Bhavani, a community of weavers called Jangamars weaved a type of blanket using colored coarse threads called Jamakkalam. The popularity of the product led to the production of jamakkalams by other weavers replacing the production of traditional sarees and other cloths.*

**Keyword:** *jamakkalam, carpet, Geographical indication*

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## 1. Introduction

Bhavani jamakkalam is a GI-labeled product and it is saved uniquely for handloom weaving, Jamakkalam alludes to blankets and carpets produced in Bhavani in Erode region, Tamil Nadu. It is a custom that is two centuries old, and has been mirroring the rich artisanship included, understanding its underlying foundations, the workmanship and the craftsman engaged with the creation of the fantasy cover called Jamakkalam. In Tamil culture, Jamakkalams are utilized in weddings, mosque supplications, and numerous propitious events. The weaving has been perceived as valid to the Bhavani town which is known for its colossal material industry. Its subsequent name is "Carpet City" which then, at that point, gives more blessing to the area and expands its social and monetary worth.

The western Tamilnadu of today with special reference to the Coimbatore region has been well known for its handloom textile of cotton and silk for over 2000 years. The trading Romans were keen importers of textile from here and the heritage continues to earmark this region as a hotspot for global textile import till date. A significant textile heritage that this region has nurtured for nearly two centuries is carpet weaving – The Bhavani's Jamakkalam which has been recognized as a Geographical Indication by the Government of India in 2005. The tradition dates back to the 19th century when a group of weavers called the Jangamars in Bhavani located in the banks of Cauvery in Erode district started producing blanket using coarse cotton threads that were called as Jamakkalam. Presently the industry occupies around 20,000 handloom weavers in Bhavani, with women forming two-third of the workforce. Although Bhavani Jamakkalam is typically weaved in the form of carpets and blankets, there is surging demand for newer product versions. The rich handloom heritage of the region is still surviving, but in ways it is also languishing due to machines and market expectations related your research work Introduction related your research work Introduction related your research work

### 1.1Special Features of Jamakkalam

Two types of jamakkalams are produced in Bhavani. The first type is made from coarser cotton threads capable of producing carpets with colored bands. As the thread was coarser, designs could not be weaved on to this type of carpet. Hence, a second softer variety of jamakkalams were introduced that were made of artificial silk threads enabling weavers to weave different kinds of border designs. Jamakkalams are also used to make fashion products such as backpacks.

Traditionally, jamakkalams were weaved by independent weavers in their houses. Later it moved into a system where jamakkalam is weaved by weavers on hand-looms supervised by master weavers. The master weavers lease hand-looms and contract weavers. The hand-looms are owned by trade merchants who procure raw materials such as thread from neighboring cities of Coimbatore, Salem and Karur. About 1500 workers are involved in the production of jamakkalams with women forming two-thirds of the work force.

A pit loom is used to weave jamakkalams. The looms are made of wood with the threads stretched horizontally from end to end. The weaver sits in a pit dug in the ground, on level with the weaving surface. The weaver operates two pedals with his legs while enabling the hands to move the shuttle across to produce the weaving pattern

The jamakkalams manufactured in Bhavani are exported to various countries such as Sweden, Germany, Italy, U.K., U.S. and Singapore. In 1993, Swedish major IKEA started procuring jamakkalams from Bhavani to be sold across its stores

Traditionally, these carpets are woven with coarse yarn and strictly adhere to six standard colours: red, blue, green, white, orange, and yellow. But with our design intervention, we have introduced pastel shades, other colour combinations and design patterns.

Jamakkalam carpets are of two categories: one is for everyday usage using cotton yarn, and the other is woven with artificial silk, to be used as wedding mats for newly married couples traditionally.

Jamakkalam Durry is made from cotton, art silk, wool or jute yarn or in any combination. In the case of cotton yarn, it has a coarse count of single yarn of up to 20s or folded/plies of resultant count up to 10s. In the case of art silk yarn, wool yarn or jute yarn, it has up to 26 ends per inch, woven with plain weave or twill weave or in combination thereof in any dimension. The multihued Jamakkalam, which is a blanket or carpet with woven crossbars, has thrived for more than two centuries due to its distinct style, affordability and sturdiness. Today the Jamakkalam is becoming a product of the past, as its primary use is no longer fully relevant today's world and lifestyle.

There was a time when the jamakkalam was a part and parcel of Tamil households, rich or poor. They were specially ordered for weddings with the names of the bride and groom woven into them.

During festivals, they were spread out to accommodate guests. People sat on them to eat the wedding feasts served to them on banana leaves. In all marriage functions, the auspicious paraphernalia of sweets, fruits and flowers were lovingly arranged on the jamakkalam. The striped cotton mats served equally well for the paatu classes (music classes) as they did for quick afternoon naps.

Bhavani jamakaalams had a huge market in Odisha, Karnataka, Maharashtra and Andhra Pradesh. It still sends some to the Gulf countries where they are often used as prayer mats.

According to figures provided by the department of handloom and textiles, Erode, in 2015-16 there were 3,654 handlooms and 8,231 weavers in Bhavani. In 2020-21, the numbers are 3243 looms with 7368 weavers still working on them. There are 323 power looms working in this area.

**About Bhavani Jamakkalam**

Bhavani Jamakkalam is referred to blankets and carpets which are manufactured in Bhavani, Tamil Nadu.

- GI- Tag: Bhavani Jamakkalam is a GI-tagged product that was recognized as a Geographical indication by the government in 2005-6.
- Weaving Community: A community of weavers called Jangamars
- Basic material: The blanket is weaved by using colored coarse threads which are called Jamakkalam. Two types of jamakkalams are produced in Bhavani.
- The first type is made from coarser cotton threads.
- The second type is made of artificial silk threads.
- Loom: A pit loom is used to weave jamakkalams which are made of wood.

Bhavani Jamakkalam, the notable cotton carpet began at a humble community Bhavani in Erode locale in sixteenth century A. D, contest from British made materials drove Indian weavers to design new kinds of garments. In Bhavani, a local area of weavers called Jangamars weaved a sort of carpet utilizing hued coarse threads called Jamakkalam. The ubiquity of the item prompted the development of jamakkalams by different weavers supplanting the creation of customary sarees and different fabrics.

Generally, Jamakkalams were weaved by free weavers in their homes. Later it moved into a framework where jamakkalam is weaved by weavers on handlooms directed by master weavers. The master weavers rent handlooms and agreement weavers. The handlooms are possessed by profession traders who secure natural substances like yarn from adjoining urban communities of Coimbatore, Salem and Karur. Around 1500 laborers are associated with the creation of jamakkalams with ladies framing 66% of the work power.

Two sorts of jamakkalams are created in Bhavani. The first sort is produced using coarser cotton threads equipped for delivering floor coverings with shaded bands. As the thread was coarser, plans couldn't be weaved on to this kind of carpet. Hence, a second gentler assortment of jamakkalams were presented that were made of counterfeit silk strings empowering weavers to weave distinct types of boundary designs. Jamakkalams are likewise used to make style items like knapsacks.

**Figure1: Various designs of Bhavani Jamakkalam**

Customarily, these floor carpets are woven in plain weave design with coarse yarn and stringently stick to six standard tones: red, blue, green, white, orange, and yellow. Lately with mediation, they have presented pastel shades, other shading blends and configuration designs, which would make them appropriate for home style, an inventory idea of introducing a jacquard box in the pit loom to weave designs in the carpets, moving away from the standard stripes.

## 2. Review of Literature

Fabric is a kind of basic textile materials made of fibers and or yarns in the form of thick or thin sheet. Fabric or cloth is a kind of supple sheet materials which is made up of a network (non-woven) / interlacement / interlocking of natural or artificial fibers or yarns. Fabric can be different types such as woven fabric, knitted fabric, non-woven fabric & Braided [1].

Woven fabric is the most versatile fabric for its construction which is produced by the interlacement of two sets of yarn one is called warp yarn that is longitudinal & the other is weft yarn that is transverse. It is the most sophisticated & aristocratic fabric available with different designs. Due to the variation of interlacement it is possible to produce different designs like plain, twill, satin etc. These variations of the designs have some effect on the mechanical properties of woven fabrics. For textile fabric it is described as a result of the material’s resistance on the activity of external forces causing the change of shape [2]. The response of the textile material depends on the Mechanical properties, the way of load and its tension is applied. Mechanical properties that are important to a design engineer differ from those that are of interest to the manufacturing engineer. In design, mechanical properties are important in order to resist permanent deformation under applied stresses & subsequent uses [3]. For designing apparel as well as for other uses, the knowledge about the Mechanical properties of woven fabrics is important. Strength and elongation are the most important performance properties of fabrics governing the fabric performance in use Thus; the focus is on the end use application such as protective clothing, preform materials for composites etc. [4]. The aim of this study is to identify the important mechanical properties of plain and twill fabric and compare them for further end use application. From literature it is possible to detect that due to variation of fabric construction (designs) the mechanical properties of the fabric also vary. Among various properties, for this experiment tensile strength, tearing strength, abrasion resistance, pilling resistance & stiffness of three different types of fabric designs was tested [5]. Fabric woven at improper yarn tension not only having effects on fabric construction (thread density and GSM value) but also have an effect on fabric properties. Strength of Plain weave is higher than 2/1 Twill & strength of Twill 2/1 is higher than Twill 2/2 [5]. The prediction of tensile strength of polyester/cotton (52/48) blended woven fabrics was done by keeping constant all the constructional parameters. The outcome of the research was that, warp way plain is stronger than twill & also weft way plain is stronger than weft way twill [1]. However, how much they change due to the increase of interlacement point was not studied. To study the effect of weave design on warp & weft wise tensile strength of the fabric, comparison is made between the tensile strength of plain and twill fabrics that warp-wise tensile strength of plain weave is higher than the twill weave. Similarly, weft-wise tensile strength of plain weave is also higher than twill weave [2]. Mechanical properties (strength & stiffness) of different woven fabrics (plain, 2/2 twill & 5 end satin) were predicted by investigating two factors such as Crossing Over Factor (COF) & Floating Yarn Factor (FYF). The value of COF is higher in plain than twill & satin. Oppositely the value of FYF is more in satin than twill & plain. However, the effect of weave structure in the stiffness of woven plain and twill fabric was not specific. Tearing strength was tested for different twill samples (3/1 twill & 2/2 twill) & found that tearing strength is more in 2/2 twill than 3/1 twill due to double yarn is inserted as weft by taking the count 30 tex [6]. The general concept of mechanical property (tearing strength) was not investigated or proofed with experimental data. The tearing strength may be used to give a reasonably direct assessment of serviceability, and a textile fabric with low tearing strength is generally regarded as inferior product. Here taking different fabric constructions of basic plain & twill structure it was shown that the greater the difference in warp & weft yarn density the greater the difference in tearing resistance [6,7]. Abrasion is the mechanical deterioration of fabric components by rubbing them against another surface. Abrasion ultimately results in the loss of performance characteristics, such as strength, but it also affects the appearance of a fabric.

Fabric thickness is one of the most important factors determining thermal comfort.6 It was found that fabric thickness had a direct effect on thermal transmittance, where the thicker the material, the lower the thermal transmittance. Dorkin and Beever also stated that the thermal resistance through individual layers of dry fabrics was primarily dependent upon their thickness and was approximately two togs per 1 cm thickness varying from about 0.05 for cotton poplin to about 1 tog for a heavy overcoat. This value would be lower if the wind was present to cause more air penetration and higher natural convective heat loss.[8]

The tearing strength is more vital in heavy duty fabrics. So it is important to know the effects of the fabric structural parameters on the tearing resistance of these types of fabrics. In this work the effects of some fabric structural parameters were studied on the tearing properties of fabrics used in tents. The experimental work was divided into two parts; the first part was to study the effect of fabric design on the tearing strength. Six fabric designs of the same type of fiber were used. They were of different specific tightness. The second part was to produce fabrics which are used in tents with different specifications. Different sets of fabric specimens were prepared. These specimens were tested for tearing resistance, to study the effects of these structural parameters on the tearing resistance of the fabrics. The effects of the structural parameters on the tearing strength were deduced.[9]

The physical properties of plain and twill were analyzed. Physical, mechanical and other aesthetic properties are also tested and the finding results are also compared between two samples. After testing the samples it is found that rubbing fastness remains unchanged for plain and twill fabric. Abrasion resistance, pilling, crease recovery and cover factor were evaluated for twill and plain structures using ISO 12945-2, ISO 12945-1 and ISO 2313 methods respectively. Abrasion resistance and pills property are not good for twill fabric in comparison with plain fabric but crease recovery is better of twill fabric.[10]

Woven fabric is produced by the interlacement of warp yarn that is longitudinal and weft yarn that is transverse and it is the most versatile fabric for its construction. It is the most sophisticated & aristocratic fabric available with different designs. Plain, twill, satin etc. can be produced by variation of the interlacement of warp and weft yarn. These variations of the designs have changed mechanical properties of woven fabrics. For textile fabric it is described as a result of the material's resistance to the activity of external forces causing the change of shape [11]. As the properties of fabric vary according to their weave structure, we have taken two structures of woven fabric such as 1/1 plain and 3/1 Z twill to analyze the influence of plain and twill structures on woven fabric properties.

Plain weave is the basis of three fundamental types of textile weaves (along with satin weave and twill). In plain weave cloth, the warp and weft threads cross at right angles. Each weft thread crosses the warp threads by going over one, then under the next, and so on. The next weft thread goes under the warp threads that its neighbor went over, and vice versa [12]. Twill is a type of textile weave with a pattern of diagonal parallel ribs. It is one of three fundamental types of textile weaves along with plain weave and satin. It is made by passing the weft thread over one or more warp threads then under two or more warp threads and so on, with a "step", or offset, between rows to create the characteristic diagonal pattern [13].

The weave of a fabric depends on its end use, which impacts the functional and aesthetic properties of the fabric to a greater extent. Therefore a coherent design of a fabric involves understanding of correlation between fabric structure and its functional as well as aesthetic properties. The properties of a fabric vary with weave due to introduction of parameters like float length and number of cross-over points[14].

In selection of the appropriate fabrics for the garments or apparels manufacturing, strength is the first property which has the great influence. It is totally depended on the intended end use. Literature review made us concern that the strength of fabric is not only depends on the strength of yarn alone, but also on other factors including type of fibre or blend use, twist amount, twist direction, yarn count, spinning systems, yarn bending behaviour, frictional properties.The tightness factors, firmness factors, tenseness factors, floating index and so other factors are based on either yarn specification or weave design. But, other parameters like yarn elongation and bi-axial extension of fabric are still not combined. It is not an easy and simple combination of some values. They are totally variables under different testing conditions also.[15].

The combination of a smooth fiber surface and excellent moisture absorption creates a positive environment for healthy skin, making lyocell ideal even for anyone with sensitive skin. According to recent dermatological studies, wearing clothing made of lyocell significantly improves comfort and promotes a feeling of wellbeing [16]. The comfort properties of single layered and double layered fabrics made of tencel/ polyester blended yarns in the face of the fabric and polyester as the skin contact layer. From the experimental results the authors concluded that tencel can be used effectively for the development of high performance sportswear provided that the fabric is carefully designed to maximize the contribution of the tencel to the performance of the fabric [17]. Comparative analysis of thermal insulation properties of fabrics made of cotton and tencel with different weave structures. The fabrics made of tencel yarn showed lower values of thermal conductivity and thermal absorption and also higher values of thermal diffusion and resistance than fabrics made of cotton yarns [18]. Role of fiber properties on comfort characteristics of fabric and studied how the blending of fibers at yarn manufacturing stage can lead to fabrics having the desired characteristics from comfort point of view. Air permeability increases with increase in polyester content and the water vapour transmission rate also increased with the air flow rate of the above fabric[19]. Thermal transport properties of a series of polyester, cotton and polyester/cotton blended fabric in an effort to understand the physical basis of clothing comfort. The results indicated that both the fabric construction and the constituent fiber properties affect thermal comfort[20]. Effect of polyester content, pick density and weave on the thermal comfort and tactile properties of polyester/ viscose blended yarn fabrics for suiting, by measuring the low stress mechanical properties on Kawabata evaluation system and reported that increasing polyester content increased fabric hand but decreased fabric smoothness, softness, fullness and total hand value and increased thermal insulation and water vapour resistance[21]. The handle and comfort properties of fabrics made of 100% linen and their blends with cotton and viscose, and reported that total hand value (THV) of linen fabric is higher than that of cotton fabric and blending of viscose and cotton improves the hand value of linen fabric [22]. The dynamic moisture absorption behavior of polyester/cotton fabrics of different warp and weft densities, and the results showed that the fabric moisture absorption velocity is in reverse relation with its warp and weft densities [23]. For getting thermo physiological comfort the clothing should have suitable thermal conducting properties as well as sufficient permeability to water vapour and / or sufficient level of ventilation [24]. The overall comfort of an apparel fabric depends on the proper combination of values for pore size, air permeability, water vapour permeability, thermal insulation, surface contact with skin and several other fabric properties [25]. The air permeability increased with the increase of porosity of the fabric or decrease of its thickness [26]. The type of finish given to a fabric can have a considerable effect on the permeability even though the porosity may remain the same [27]. Cover factor combines fabric count and yarn size to give an indication of fabric structural properties that contribute to thermal comfort [28]. The moisture transmission behavior of a clothing assembly plays a very important role in influencing its efficiency with respect to thermo physiological body comfort [29]. Measurement of water vapour transmission of fibers independent of any air space surrounding the fibers, by using sections cut from embodiments of the fibers in polyacrylic resins[30]. Analysis of the frictional characteristics of woven suiting and shirting fabrics with different blends, construction parameters and found that the fabric to metal friction is less sensitive to fabric morphology and rub direction, whereas the fabric to fabric friction is highly sensitive to the type of fiber, blend, yarn structure, fabric structure, crimp, compression etc. For all fabrics kinetic friction is always lower than static friction of different levels[31]. For comfort properties of textiles with varying end use applications, in the normal textile sector, technical textiles and other fields, moisture management play a key role [32]. Optimization of the thermal comfort properties of bed linen using different commercial softeners often used in home textiles finishing. The thermal related properties are influenced by polyethylene softener [33].

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